CharlieFrancis.com
The Classics

CharlieFrancis.com

Presents

“The Classics”

Welcome to the Classics

We hope you enjoy this very special compilation of material that was originally posted in 2001-2002. It represents some of the most valuable contributions we have ever had and we brought this product to life so you could enjoy it as much as we have. This product is complete and was driven from a collection of materials that was discovered in 2008, it is presented here in its original form.

This e-book is also fully supported online and we invite you to participate in our live discussions at http://www.charliefrancis.com/community/.

Special Thanks

Big thanks to all our contributing website members, moderators and chief administrators for making this e-book possible. We have omitted names wherever possible to protect the long standing privacy our members enjoy. We appreciate your contributions and look forward to many more years of fun. We send a special thanks to “Pete” for his hard work.

Disclaimer

Copyright

Piracy

The Classics

I have not been on the forum for a very long time. A few months ago I discovered it and after browsing around for a while I realized that it was full of information and people who were truly enthusiastic about track. I bought Speed Trap and CFTS and read them both in a few days.

They gave me most of the information I'll ever want or need to know, but the forum is a great place for getting those little ideas to add or subtract from already solid programs. So I went into the threads that I had missed before I discovered the site, printed them out and read them like minibooks. I'm going to give a list here of the threads that helped to give me a better understanding of Charlie's ideas and/or gave me little tidbits of information that I have incorporated into my program. I haven't read some of these threads in a while and I may have forgotten useful information or used it in my program and then forgot where I got it from.

My purpose in starting this thread is so that it can act as a guide to anybody new to the forum and so that I can get feedback on what other people thought were good threads and see what I missed. I'm sure there were a lot of them. I also hope I'll remember a few things along the way that I've forgotten since reading the threads.

30-60m Acceleration

Main ideas:
Cue ONLY when it is really needed, as much as tempo helps form the best technical work is high intensity work. For training 30-60m fly-ins are very effective. If you get gradually faster and faster up to say 20, 30, or 40 but concentrate on nothing but relaxation the relaxation will carry over to when you floor it. Trying to run the fastest 30m or so possible is pointless, the point of acceleration is to get to a high top speed and maintain that for a long time, not to be fast itself.

NOTE: These are little out of order, but I'm pretty much going from the posts I read first, and therefore least remember to the ones I've read most recently. So, I'm trying to skim through the posts to refresh myself on the main points. That one wasn't too bad, but bear with me, especially on the next few. I encourage anybody who hasn't read the threads to read them, not just the cliff notes.

Are there any real effective methods in training this 30-60m zone currently I'm training it by doing 60s with 20m sections-i.e. 20@80%,20-40@90%,40-60@100%.what do you guys think and any other ideas on this phase help would be appreciated

80% speed? Why not bump down 5% and do tempo! I'm confused. Well perhaps Charlie will go into that technical matter of cone drills since I have little knowledge on that subject matter. Still, do the technical stuff at near top speed.

I'm trying to teach myself by doing such acceleration 60s is to learn the accelerating technique. kind of teaching me to use gears. these runs are at a high quality level after these runs I'd do

s/start 50m @95-100%, again teaching myself to accelerate at the moment I'm not great at these runs but I'm working very hard on it as it is a major factor in my race I'm one of the fastest starters in my country and hopefully i'll have the best acceleration phase also.
Would you have any ideas, I regard your posts very highly and i would appreciate your views.

Again I am no expert in cueing. In fact I have done it three times in track and 4000 in swimming since most track movements are so fast cueing might slow down the movement to the point where it hurts technique! Soon we have athletes that are so stiff they look like 1980s break dancers doing the robot.

Drills or cues are designed to force the athlete consciously into doing the right thing biomechanically even if the wording does not match the science of the result. We have many choices here to get better.

(1) I love poor weather. I will give you an example of why I like indoor training. One of my athletes trains indoors right now. Years ago I would have cried myself to sleep because he could not do plyos and tempo work on the track since the surface was too hard.

I would then devise schemes of how to get money for training camps in Tampa, and other exotic locations, (I once did some myofacial release on a dancers calf since she wore high heels all the time) but then I would have to settle on what we had for a facility. This was great since eliminating the plyos and some of the other explosive movements would save some of the CNS energy envelope to use on such "NON-SPECIFIC (BJSPEED)" sprint training.

This non-specific training was doing acceleration sprints instead of the extra cleans and plyos that we did the year before and put more work on the repetitions of running then all the elastic power and RFD work. This allowed for more technical work and really helped a lot.

(2) Looking at your zones and percentages it seems that 90% speed is not good enough for me since that 10 percent reduction is a little too slow. Sure you can do some things at walking speed to help cue you for 12.1 mps but I find the most effective drills are ins and outs and other zone runs at near top speed. Maybe there is something at the 15 meters you are doing wrong that transfers later to the 30-60 meter mark? Try standing and three point starts to get the movements clean and natural.

My question is if someone is having a problem with a particular zone, what methods can we work technically to improve it if the strength and tissue texture is fairly ready? Does anyone have any comments on specific zone development?

Thanks for your reply and you lucky b****** for getting that work with a dancer (did she give you a demo of her work).As I stated before in another thread my coach and i are currently lifting heavy and the results are way up on last year.

Charlie wrote that the weights could be restricting my movements.

Last week we did some time trails all from 3point start just to see what level I'm at and were I will be by X period. Coach timed me at 2.6 for 20,4.7/8 for 40m and a slow 6.9/7.00 for 60.if I was accelerating correctly I should have gone through 40 in minimum 4.6 and through 60 in at least 6.6.

Mechanically I'm sound after spending quite a bit of time with Tom Tellez over the past years. I might still be trying too hard. Any advice would be appreciated!

I think your 40m to 60m is actually the weak zone (2.2"!). What are your splits with a RPE of, say, 97%?

What would you suggest for the 40-60? We haven't reached that area in training, yet this is my first week of doing SS50's.before this we were doing SS30's.are you saying to slightly decrease the effort from 40-60, maybe I am trying too hard.

Try using a more gradual acceleration, say an extra 10m. This allows you to conserve more energy at the beginning and channel it into the 40-60m section of the acceleration.

What I'm suggesting is using the 20m gate to work on the last part of the acceleration to get to max speed, so that you're hitting max velocity at the end of the 20m section (60m) rather than the beginning (40m).

Increasing max velocity requires you to increase the distance over which you can accelerate. At this point, your energy envelope is not large enough to allow you to continue to accelerate after a maximum early acceleration (up to 30-40m). By using a more gradual start, you can conserve energy that can then be used to extend the acceleration up to 60m (hopefully).

Remember, the ability to accelerate all the way to 60m is the mark of a world class sprinter. That's why I'm convinced that all max velocity training is really acceleration training. The only way to increase max speed is to increase the length of the acceleration, and then combine that with a maximum rate of acceleration for optimal race performance.

-Does improvement in acceleration capacity occur over the years as a result of proper training and maturity?

-Will getting stronger in the weight room and doing all the reps on the track automatically mean this athlete will improve?

-Do you examine stride frequency, stride amplitude, and ground contacts for this zone to see what might be the limiting factor?

-If an athlete trains 0-30m @ 100% in some sessions and then starts to add some fly-in sprints to train 30-40,50 or 60 meters will the desired

-Does improvement in acceleration capacity occur over the years as a result of proper training and maturity?

-Will getting stronger in the weight room and doing all the reps on the track automatically mean this athlete will improve?

-Do you examine stride frequency, stride amplitude, and ground contacts for this zone to see what might be the limiting factor?

-If an athlete trains 0-30m @ 100% in some sessions and then starts to add some fly-in sprints to train 30-40,50 or 60 meters will the desired

As already explained earlier, I was suggesting that you are putting too much effort in your first 40m, try to run the 60m at 97% RPE and see how the split change.

One of things i always tell my athlete is that there's no such thing as a 20, 30 or 40m dash. So it "doesn't really matter" how fast you are at those positions as long as you run your rhythm and run your own race.

You should run the first 30-40-50 hard, but the purpose of the acceleration phase is to allow you reach MaxV and maintain it or close to it for an extended period of time. We do 3 pt 30m and block 30m testing at various times through the year. Sometimes the worst runs are when kids hit PR's by rushing through the phases. I'll watch it and know there's no way they could carry that

rhythm to 60m, much less 100m.

Often when "slow it down" apply force complete they run even faster 30's but the momentum is ridiculously higher so they gain doubly so.

You are forgetting to add .5 you don't use a stopwatch to time your athletes do you?
2.6 are not startlingly fast to 20m. My female athlete does this in 2.7 and gets to 40 in 4.8.

I agree with the other posters about working on the speed element.

I'll tell u what zoom 100m...if u want to run a 6.6 hand-time or faster in practice you are going to need to come across the 20m mark in 2.4 to 2.5 sec. Don't forget the differential for short sprints is approximately .5.

Let's take a look at your time: 20m 2.6 +.5 =3.1. For the 60m: 6.9 + .5= 7.4

Now lets look at Mercy NKU (NGR) splits at the '99 World championships

10m 1.85
20m **2.96**
30m 3.99
40m **4.99**
50m 5.96
60m **6.93**
70m 7.93
80m 8.94
90m 9.96
100m 11.01

In other words her 20m was 2.96 -.5= 2.56h, 40m 4.99 -.5= 4.49h, and 60m 6.93-.5= 6.43h.

At the pace your running; your 100m time should equate to between 11.5-12.00f.a.t.(11.0-11.50 hand-time) -depending on your top speed!

PS. Also, based on your 40m-60m (4.7/4.8 and 6.9/7.0h) time your leveling off at 1.10 per 10m! If your technical skills are sound...it seems u need more power (for start momentum), and acceleration – which was covered previously.

"You are forgetting to add .5 You don't use a stopwatch to time your athletes do you? 2.6 is not startlingly fast to 20m. My female athlete does this in 2.7 and gets to 40 in 4.8.

I agree with the other posters about working on the speed element.

I use a stop watch sometimes but .5 dcw23? What the hell is the point in timing at all? With such lack of precision, you are spouting information that might not be right. If you are going to use splits, I strongly suggest you use video then, and get splits if you can't use a stop watch.

Then you will not be pumping your athlete information that could be way off. I think .2 is fine but half a second? Why do such break downs if you don't know what the real splits are and have a poor trigger finger.

I have used hand timing many times and never fail to give MY athletes reliable information. Many coaches attempt to choreograph the evolution of stride amplitude and frequency with the use of stick drills. Is it better to control the athlete's pattern of acceleration more in terms of velocities achieved every 5-10 meters?

Charlie,
I'd be interested in getting some brief thoughts on the development of acceleration. Do you attempt to control the athlete's efforts? Based on what you know about the elite athlete's pattern of acceleration, what words of advice do you have for the developing or sub-elite sprinter?

Quote

---

posted by

I use a stop watch sometimes but .5 dcw23? What the hell is the point in timing at all? With such lack of precision, you are spouting information that might not be right. If your are going to take splits, I strongly suggest you use video then and get splits if you can't use a stop watch. Then you will not be pumping your athlete information that could be way off. I think .2 is fine but half a second? Please. Why do such break downs if you don't know what the real splits are and have a poor trigger finger.

I have used hand timing many times and never fail to gime MY athlete's good information.

I know this statement was for dcw23...but, I don't think it's that big of a deal whether the difference is, .20, .24 or .5; as long as it's consistent.

As a matter of fact I agree with the following statement:

Quote

---

posted by Charlie
Hand times are so incredibly subjective in training that I hesitate to post them, especially over very short distances where differences are multiplied. The key is to have the SAME person time each workout so you can compare apples to apples.

Also, if you are timing using a starting pistol or on your command to go...it is possible to get a .24 differential. On the other hand, if you are timing based on the athletes reaction (first step), the differential will be greater...hence .5.

First 20m times are meaningless. I have seen a 12.1 FAT female sprinter run 20m FAT in 2.76 in training. She's faster than I am over 20m, but I take back 1.5 sec in the next 80m.

dknight posted Mercy Nku's splits: 30m in 3.99 on her way to 11.01. In the '93 WC Carl Lewis posted 3.95 on his way to 10.02 - in other words Carl and Mercy were shoulder to shoulder untill 30m. After that Carl put a full second worth of distance between himself and Mercy - in the next 70m. Linford Christie, who won the WC in 9.87, passed the 30m mark in 3.85 - 0.14 faster than Mercy, and tore off another full second in the remaining 70m.

I'm inclined to say: forget the times in the first 30m, all athletes - talented or not - run them in roughly the same time. The real damage is dished out in the 30m - 60m fase.

Quote

---

posted by

One of things i always tell my athlete is that there's no such thing as a 20, 30 or 40m dash. So it "doesn't really matter" how fast you are at those positions as long as you run your rhythm and run your race.

You should run the first 30-40-50 hard, but the purpose of the acceleration phase it to allow you reach MaxV and maintain it or close to it for an extended period of time. We do 3

pt 30m and block 30m testing at various times through the year. Sometimes the worst runs are when kids hit PR's by rushing through the phases. I'll watch it and know there's no way they could carry that rhythm to 60m, much less 100m.

Often when "slow it down" apply force complete they run even faster 30's but the momentum is ridiculously higher so they gain doubly so.

How do you keep athletes from trying to get "it all" in the first 30m or so? I find that some will try to hammer the first 30m as oppose to extending the acceleration phase and feeling the acceleration throughout. I would like some feed back on what I'm doing in attempts to over come this. Right now, for the next three Wednesdays we will be doing some cone work:

1stWed: Flying 20's from a gradual 20m accel. phase.
2ndWed: Flying 20's .....30m accel. phase.
3rdWed: Flying 20's.....40m accle. phase.

A question I have for the masses is what intensity should the accel. zone be run in, 75%, 80%, 85%? Also, should I have her max out for that fly zone or focus more on the mechanics (not that she needs much work in that department)?

What's the fastest 30m block? Is it 3.79 or 3.80? What would be the world record if we held a 30 meter dash? Would it be much faster than the fastest 30m block ever recorded?

The fastest 30 I've seen is 3.79. Ben's best was 3.80. BTW Mercy NKUs early acceleration is fantastic but she's blowing up at the end, losing at least .17sec.

Quote

2.6 is not startlingly fast to 20m. My female athlete does this in 2.7 and gets to 40 in 4.8.

What 100m times can this athlete run?

2.6 over 20m is a excellent start providing its accurate & not done on first contact.

Exactly. Hooray for someone with genuine *practical* experience!

I think Dknight is very right on his post, perhaps he should read it! Yes oti makes a great point that the first 20 will be similar to many athletes (BJSPEEDS lifters, throwers, sprinters). What we see is the 30-60m mark being a good indicator of who is talented or trained right. I am not upset but feel very strongly after video taping (and then braking down the splits from a very "respected" set of coaches) and finding them significantly off.

As for hand times we feel comfortable with them since they are rather liberal with accuracy. Sure I can be consistently off by .241000456 every time, but I would love to pull a and test everyone's .5 theory with automatic timing. Sure .17 is close but in sprinting a 60m that is not good enough for me. the .24 and .5 first step is fine to use but when you start getting into hand timing zones and practices I would rather look at the run. I can tell now what is a good speed day based on my eyes. But.... the eyes are maybe biased since some of us have huge emotional and financial investments into the training and want fast times. This feels great since my video is so precise I give my athletes the splits with 100% confidence.

I suggest that we convert, guess, calculate, translate all of our times to hopefully make sure that we are comparing apples to apples.

Coming from *practical* experience myself I have used the longer extended runs as better

distances for hand time use. I feel comfortable using hand times for a 160 or so, but timing 30's I would rather use my camera to ENSURE accuracy. Sure this take more time and perhaps it is not *practical* for coaches with less time, but the numbers are great to have long term.

Yes the .24 rule and .5 rule work time to time (pun intended), but how can you guarantee accuracy every run? Any money back guarantees?

Starts and Acceleration

Main ideas:
Charlie said this as the first reply:
I'd concentrate on technique first, as you are already strong enough to have good top speed. Perhaps you are trying to get upright too soon to get into the position you feel comfortable with.
This sounds like it is pretty much what it comes down to; strength and technique. Dcw mentioned falling starts, which I personally love. I also like starts from lying on the ground which Charlie talked about in I think Speed Trap. The common starting flaws that Charlie and dmhansen gave were great:
1: looking up too soon causing the torso to rise and the hips to drop
2: over striding on the initial steps
3: using a set position that puts the hip behind the front foot

and

- Lag in the arm drive off the start (arms seem to drag out, rather than initiate).
- Pushing too hard off the blocks (i.e. jumping) without having the strength to hold the position achieved from this type of start. Obviously, a lot of people were/are trying to copy Ben, but don't have the tools to execute it properly.
- Hip height that is too low or too high in the set position.

The things I try to think about when starting are to flick the wrist on the front leg side as if trying to catch a butterfly at the start and to get violent with the arms. Not listening for the sound of the gun, but concentrating on the movement of the hand is good. The stronger you get, the lower you can put your hips and ditto for widening your hands. I don't tuck my chin in I just try to keep it aligned with my spine. By the way, I've got a question for the forum. When you've reached top speed and are fully upright should you be looking fairly far ahead on the ground? I know different runners prefer different head positions up to top speed, but once you get there it seems it would make sense for everyone to have their head looking at pretty much the same thing.

I also liked what THEONE asked in the second section and Charlie's response. THEONE asked whether to focus on enhancing strengths or curing weaknesses. Charlie said, "It's OK to cure your weakness as long as it doesn't harm your strength-(i.e. gaining too much weight) [for a tall sprinter trying to catch up in strength for increased starting ability].

So, accelerations, weights, and explosive med ball throws are the best way to increase starting ability. I liked what I read on the new forum the other day about explosive squat throws into a high jump pit. Starts themselves onto a high jump mat were also mentioned in the thread for max extension. It's another thing to try.

Favorite plyo/jump exercises for improvement of acceleration.
Main points:
Plyos are general strength training!
Boundings & single leg hops help improve acceleration and hurdle hops and hops from a height are better for maximum speed, but stay below 30 inches. A good volume for the heavy stuff is 30-40.
Plyos can be helpful if used at the right times, but are not essential to a program. The right time is when a new stimulus desperately needs to be introduced, although special tools like plyos are not usually needed during a small plateau.
Most things sprinters do, like sprinting, can be considered plyometrics but hurdle hops, depth jumps, bounding, hopping, etc. is what is being talked about.
Box jumps are good.

What are the best ways I can improve my starts and acceleration phase up to about 40 meters or so? I am pretty much the last one out of the blocks, but I make up plenty of ground after 40m. I am open to anything.

I'd concentrate on technique first, as you are already strong enough to have good top speed. Perhaps you are trying to get upright too soon to get into the position you feel comfortable with.

What is considered the proper technique? is there a description in the e-books or in the published one? I do realize that being comfortable is the primary concern. I have also seen information that at the 10m mark a person should have about 7 steps. is it more important to be fast or correct?

Technique is always the first aspect to work on. Once it is proper, speed will come on its own. The correct starting and acceleration technique is probably the most difficult thing to learn as a sprinter (it is my pet peeve also!).

One factor that can throw off acceleration technique is consciously trying to get to top speed too quickly, instead of letting it happen naturally. I think this is what causes people to straighten up too soon after the start. You have to relax during acceleration and let it play itself out, just like at top speed. As Charlie would say, wait for it.

Remember that the highest max velocities are usually reached after longer, more gradual accelerations.

When you first get into your blocks is there any special position that your feet should be in, or should you just be comfortable?

What about in sports like football? I have heard that a common mistake for football players who practice track starts is that they have too much forward lean in the acceleration phase and can not cut or change direction quickly.

I find many athletes will try and pull themselves forward instead of pushing in the first few steps. I try to cue the athlete on overcoming their fear of falling.

Something that can help is to do a falling start with the body totally straight, the athlete should hold off on the first step a little longer each time as they overcome the fear of falling flat on their face. They should make sure that the first step sort of feels like it is behind the body. The greater the angle that they reach, the faster the first steps will be and the more power is required.

A good analogy is like getting a fast start in your car. If you don't rev it and get in the power band before engaging gear you are going to have a slow start and be behind in acceleration before you have started.

The first few steps will make or break your entire acceleration phase.

He needs to work on that aspect. His drive phase on video looked great in terms of angles, it's just his ground contact times are too long and he rarely gets to get triple extension each step. He takes sevens steps to get to 10m. Seven every time and it's on the line within inches.

I hope that my statement did not confuse the forum. This is just "Fred" running, and he is comparing himself (7 steps) to himself! I don't know about other sprinters. Does anyone know the 10m step count for any elite athletes?

This is something you can check this for yourself with the use of your VCR and a little slow-mo. On almost every track, the end of the last 4x100 zone is 10 meters from the starting line. There is always a line or a triangle or some sort of mark to identify the end.
It's not the most accurate but you can get a pretty good reading.

Common starting flaws
1: looking up too soon causing the torso to rise and the hips to drop
2: over striding on the initial steps
3: using a set position that puts the hip behind the front foot

Here is a question for Charlie
Why is it so apparent that during Marion Jones's acceleration and clearance she has her head down. I mean down and tucked! I watch clips of others, and they seem to gaze down for a few steps but not like her. She holds it down for about 30 meters i bet. Any answers here.

Other things that I see often include:

- Lag in the arm drive off the start (arms seem to drag out, rather than initiate).
- Pushing too hard off the blocks (i.e. jumping) without having the strength to hold the position achieved from this type of start. Obviously, a lot of people were/are trying to copy Ben, but don't have the tools to execute it properly.
- Hip height that is too low or too high in the set position.

Speaking for myself, it's been a while since I've done serious acceleration work, but I know that in the past I definitely looked up too soon (in fact, I used to start with my head up) and that caused me to stand up straight way too early. And I think it also caused my hips to drop (as Charlie indicated) causing me to over stride the first few steps, which is like trying to accelerate with the brakes on. And yet I could still run a 3.9 for 30m. Maybe I have more speed potential than I thought.

I'm glad I asked this question before I reintroduced accelerations into my training.

Charlie, in C.F. Training System you wrote: "The taller athlete has longer, less efficient levers than the shorter athlete. However, long levers are required for top speed. An ideal height for pure sprinting would seem to be in the 5'11" range, where levers are short enough for an explosive start yet long enough for top speed".

In a t-mag article Ed Coan was interviewed and one of the questions was, what kind of genetic profile makes for a good power-lifter?

His answer:"Big hips, big ass, and between medium to long arms. Most tend to be shorter guys. If you're six foot or over, you'd have to compensate by weighing 350 pounds to balance out your leverages".

My question is this, is there any correlation between the two (balancing out the leverages).

Specific example:
athlete "A" 5'9", 170lb, squat 340lb
athlete "B" 6'1", 190lb, squat 380lb
They both are squatting twice their body weight.(1:2)

Would a taller sprinter need to have a higher strength to weight ratio(1:3) to equal a shorter sprinter(1:2) during the start being everything else equal(training age, mechanics, coaching).

Hmmm...350 pound sprinters! That would be a sprinter trained by a bodybuilder I suppose. There have been some great sprinters who were over 6 ft tall. Remember Carl Lewis and Lindford Christie? Abe Lincoln once said that the correct length of leg is one that reaches from the hip to the ground. Seriously, the leverage issue makes a comparison analysis of squats difficult. There's also the other factor of height vs leg length. Many sprinters with proportionately longer legs found the clean a more effective training tool (Donovan Bailey for example). The preparation of top sprinters will always require individual solutions for individual requirements.

It appears that most elite males cover the first 10 meters in 6.5-7.0 steps. I recall hearing a story that Andre Cason once did it in 6.0 steps. One of my former athletes (pr 10.25) regularly did it in 7.5 steps. Unfortunately, we relied on stick drill variations to try get to 7.0 steps. Not only did this not work, but I now know that the solution, for him, should have come from the weight-room. He just wasn't strong enough, plain and simple. This leads me to pose several related questions for Charlie:

1. Why, with all the physical differences that exist among elites, do they register the same number of steps at 10, 20, and 30 meter marks?

2. How trainable is this and should we even bother?

3. Related to an earlier post of mine on stick drills, some coaches look to choreograph the evolution of stride amplitude based on trochanter measurements. Do you even care about this type of stuff? In other words, do you ever attempt to control the athlete in this manner?

Check out my post in the Q+A on Ben's stride pattern over the years. You'll see some possible explanations as to why the number of strides may remain constant despite increased power. This DOES NOT mean that the speed won't be improved. After you read it- post your thoughts on the next step in training.

Re: RMT

You wrote: “Why, with all the physical differences that exist among elites, do they register the same number of steps at 10, 20, and 30 meter marks"?

RMT something I have noticed, is even though many sprinters register the same number of steps at different marks they don't all do it with the same quality.
eg. Many elite sprinters hit 10 meters with 7 steps but the best ones do it a little different. They have higher foot holds, touchdown is further behind the center of mass, and they have lower shin angles. These are just my observations.

Hence they get there quicker!

It's almost like the more power you have, the more you can make gravity your friend.

Re: 350lb body building sprinter.

Charlie, I was not suggesting a 350lb sprinter just a higher strength to weight ratio with a little

additional mass to acquire it. I have notice that a increase in muscle mass can yield a favorable increase in the strength to weight ratio of athletes. For example, if I have a 6'1" sprinter that weights 185lb and squats 400lb, that is 2.16 his body weight.

Now, if he was to add 15lb of functional muscle mass pushing his weight to 200lb and squatting 500lb which would be 2.5 times his body weight. We can safely say he is stronger pound for pound. This would justify the added weight. (If the goal is to make the athlete stronger).

This is where it all comes into play. And it's all base around the formula: power=force/time. Charlie I need a mind like yours to help me figure out if this makes any sense, so please indulge me.

If athlete "A" is 5'7", 160lb and squats 320lb. Lets say the force he is capable of applying to the track is his squat divided by his bodyweight times one hundred. 320/160*100=200lb.

Now athlete "B" is 6'1", 180lb and squats 360. The amount of force he is capable of applying is also his aquat/by his BW*100. 360/180*100=200lb.

Now both athletes have 200lb of force to apply to the track. All seems equal, but this may not be the case. Athlete "A" is shorter, so we can assume he has a faster frequency (shorter levers) that athlete "B. This will have huge effects on the time variable in the power formula. If power=force/time and athlete "A" is able to deliver his 200lb of force in less time, then he is accomplishing a much higher power output than athlete "B".

So even though both had equal force to work with, the time component of the equation would put things in favor of the shorter athlete.

Since its not likely that athlete "B" can match the frequency of athlete "A" that leaves him with only one option, increase the force he has to work with.

This brings us back to the original question. Does a taller athlete need to have a higher strength to weight ratio than a shorter athlete in order to stay with him during the start? This of course is given all other factors are equal, mechanics, training age, etc.

Re strength to weight, upper/lower proportions come into play as well. Each individual must tailor the race to his/her strengths, whether it is at the start or the finish. Your attempt to find a formula sounds like an attempt to have everyone run the same way.

Quote

---

posted by Charlie
I refer back to the frequency vs. stride length post on the Q+A section. Have you read it yet? Re strength to weight, upper/lower proportions come into play as well. Each individual must tailor the race to his/her strengths, whether it is at the start or the finish. Your attempt to find a formula sounds like an attempt to have everyone run the same way.

Yes, I have read the stride length vs. frequency post; in fact I've read everything you've written on this forum. That's the reason I am up at nights trying to put things together.

I am not suggesting everyone should run the same way. Simply this, too often we put athlete in certain categories. If a sprinter is on the shorter side we expect him/her to be quick starters and if they are taller good closers. Shorter sprinters have a natural advantage at the start because of their levers, so we call it their gift of strength. Taller sprinters have an advantage at max velocity so we say that's their strength.

That's why we find most elite sprinters in between the two, not two tall not two short. This is not to

say we can't take a taller sprinter who in theory should be capable of achieving a higher v max and fix his start not to the point where he does not fall too far behind, but to the point where he can stay neck to neck with the shorter sprinters.

I think this may be possible if we get power levels high enough.(or higher than the shorter sprinters).Hope you see the whole strength/weight ratio may play a big part.
Tell me what you think if this explanation makes any difference. Does it make sense trying to cure your weakness or should your efforts be focused on enhancing your strengths.

p.s.
I see your point about upper/lower proportions coming into play.

It's OK to cure your weakness as long as it doesn't harm your strength-ie gaining too much weight. You're right, a shorter man with proportionately very long legs may have a harder time starting than a taller man with a longer torso.(Lindford Christie had a great start)

Since we're talking about SL & SF if you look at yesterday's semi's 100 m (mens) at the US Championships I can tell that Montgomery's SL was increasing all the way up to 80 meters. If you look at Tim's previous races he chopped it up all the way to the finish. He's finally getting it down and that's why he ran wire to wire w/ Greene. I have watched that races over and over again. I got a good shot of the semi's, if you guys get a chance to see the race, if you look closely there's marks on the track every 10 meters for USATF Sprint Dev studies, those marks can be very helpful. I notice Maurice is taking more strides this year, he normally takes 44-45 he took 46 during his last 2 races. Say Charlie does head winds play a role in this?

Linford Christie was reported to be able to squat at least triple bodyweight.
I have no idea what is 1RM max. Actually was, when he was at his best, - it was only a brief article about him

Charlie,
Other than high quality acceleration runs (20-30m) and strength training, are there any other techniques or approaches that you use to increase acceleration?

This applies to initial acceleration. Or am I looking for an unnecessary complication?

Re head winds- this will play a role in stride length- but not in this case as it was a tail wind for their race, though the track is not fast.

Re Montgomery- his problem comes from his starting position- his feet crowd the line and he leans too far forward on set. As a result, he can't get his hands far enough in front to execute a proper acceleration phase. By the time he recovers- it's too late. With a proper start position, he would have won the Worlds last year. If you have a good tape library, check the film of Tim at Modesto last year- he got it right there. He was so far in front of the World indoor Champ by 20meters he was in a different ZIP code. Too bad he shut it down at 50meters (and still ran 9.96!)
Re special start exercises- Explosive medicine ball throws are one of the best ways to improve starting power.

Charlie I agree with you regarding Tim's start. I know he's been starting like that since his Blinn days. I feel his arm stroke is too short during his acceleration also.

"Re Montgomery- his problem comes from his starting position- his feet crowd the line and he leans too far forward on set. As a result, he can't get his hands far enough in front to execute a proper acceleration phase. By the time he recovers- it's too late. With a proper start position, he would have won the Worlds last year."(Charlie Francis.)

Charlie, in another post on common starting flaws you listed one as, "using a set position that

puts the hip behind the front foot". Since we know a few things that are wrong, can you give us what the correct thing should look like?

We know starting and block positions are an individual thing, but what are the commonalities among successful starters. Alot of times as coaches, we often pick up the differences among elite sprinters, but we never train our eyes to see the thing(s) they are all doing that is leading to their success.

There's a saying "you don't attain success by doing the extraordinary, but by doing the ordinary extraordinarily". So with that said, Charlie, can you help us as coaches figure out the "ordinaries" in correct starting.

Re Start
Because Montgomery's feet are close to the line, he leans forward to keep his hips in front of the front foot. He's better to move both blocks back a few inches so he can achieve this stance yet have his hands straight under his shoulders to allow his lead hand to get well forward and promote proper arm action throughout the whole acceleration phase. If you lean too far forward, your hands are pushed into the track surface with a lot of pressure. The backward travelling hand can break free at the gun easily, but the forward travelling hand must lift clear of the ground and then move forward, making it difficult if not impossible for it to "catch up" before the backward swing is completed and sweeping forward, thus the forward action must be cut off. Also as the forward sweep is cut off, it may not be possible to get the center of mass far enough ahead of the foot during early ground contact, causing a slight stall as the body rolls over the support foot before pushing. We are talking about the highest level athlete here, but the lessons apply to all, and at least we have films and split times of the top athletes to study.

Cues for beginner starting
1: hands straight down from shoulders, shoulder width apart- to allow for the highest possible center of gravity for easier transition.
2: front foot just behind "plum line" from the point of the hip to the ground. This is usually accomplished by using a spacing of two footlengths back from the line for the front foot and one foot-length between the front and back block (the average foot is 1/2 the length of the shin)
3: in set the hips should be slightly higher than the shoulders with the back straight.
4: the head should be in line with the back to make the transition during the acceleration phase easier. All the athlete has to worry about is keeping the head in line- not up or down.

Charlie,

I note that you say that Montgomery has problems with his start and would have beat Mo at the Worlds had he fixed this. BUT, Mo clearly 'pulled something' at about the 50m mark - so how quick would MO have ran had he not picked up this injury. I would think the World Record would have gone.

You say hold tight in the blocks? What are good drills to getting full or triple extension out of the blocks? How do you know if it is correct? I don’t have extra eyes except for a video camera...

Now, would triple extension equate to jumping out of the blocks? like doing a high jump with out the run up?

Not unless you are Ben. Triple extension makes certain that you have applied all the force you have.

Is extension something you try for or is it a result of adequate strength combined with range of motion and relaxation (not cutting the stride action off before completion)?

I have a lot of trouble with one of my athletes coming out of the blocks - he tends to come 'up' vertically on the gun first rather than 'out' horizontally. What coaching cues/ drills/ exercises etc. can I use to prevent this?

"Re special start exercises- Explosive medicine ball throws are one of the best ways to improve starting power."

Charlie, what specific med. ball exercises are best? What weight ball, reps, etc. would you recommend?

You mentioned Mo's injury (it was at 90m) This brings up a point. If someone is going to get hurt at 90 while in front (quad injuries are almost always caused by pressing, he'll get the same injury a lot earlier if he's behind) This brings up a point- does anyone have the 10m splits for this race?

Re popping up at the start. Check his strength levels- if he hasn't developed enough strength yet, don't make too many technical changes until the strength issues have been addressed.

If strength is adequate, check the block position to ensure that the front foot is behind a plum line down from the hip and that your athlete isn't lifting his head up too early. He should let the position of the back dictate the head position (straight line).

Probably an obvious question, but when do you judge strength levels to be adequate Charlie?

I have always suffered from a poor start, never had triple extension in my life, am doing weights now so when should I assess that my strength is adequate to start making changes to my poor start technique?

What exactly is triple extension?

You're strong enough at the start when your drive leg (under load) can extend at the same time as the knee comes forward (no load). If the knee is well forward before the rear leg has much extension, you're too weak. Triple extension is just a way of describing a position where the body is extended through the hip, knee, and ankle. I'll be posting some photo examples on the site soon, once we're able to create a photo gallery.

Charlie,

Thanks for that explanation...not i got to ask this...what, if anything, can be done to build strength for triple extension?

If you have enough strength for the start, you have enough strength for triple extension, as long as you are relaxed and flexible enough.

Charlie, I noticed in a picture I have of Ben in his set position he has a rather wide arm base (looks like from one side of the lane to the other) and his head is looking straight foreword....this is a different description than you gave. Was this a personal preference or was this something that was changed later on in your training him. I believe the picture is from 1992 at Barcelona and he was in lane 1.

I am also doing a biomechanical analysis on three sprinters and their starts (myself being one) at my school this summer. My advisor and myself are using an APAS three dimensional computer program, are you familiar with it? I was wondering what parameters you suggest to play close attention to. I know triple extension would defiantly be one. My purpose for doing the study was to measure anterior pelvic tilt and lumbar lordosis and see if there was any correlation to COG acceleration.

Myself, I have always had a weak start (PR 3.91 Hand in 30m) and just lately after viewing hours of film and digitizing it seems my body is starting to get accustomed to having more correct limb alignments. Do you have any opinions on this?

I hesitate to give formulas. I have presented a standard starting point for finding an individual starting position. (Ben varied from the initial model significantly though Mark McKoy remained quite close- both were great starters.)

Charlie and all,

What are views of using the standing triple jump as a measure of acceleration ability?

Thanks for your response Charlie. I see what you're talking about (she seems to have some of the same starting problems as me).

I am confused about a couple of things though. I have often heard you mention the 'plumline of the hips'. What line is this? Is this the line that runs down from the hindmost point of the buttocks straight down to the ground?

Obviously the tight knee angles would be caused from not being relaxed enough (?) but what would cause her hips to be low at the start? How can I ensure that there is straight line from my head to the foot of my driving leg?

Plumline is just a term to describe a line straight down from the point of the hip socket (not the back of the butt) to the ground. All you have to do to improve the knee angles is to raise the hips higher in the set position. The position you see in the pictures is just bad mechanics, not tightness.

The plumb line is vital for precise and accurate measurements. I am glad Charlie used this. My problem is that the Gail Devers photo used measurements from the spine and not "true vertical."

A plumb bob is a weight that is connected to a wire, string, or line to help get "true vertical" by hanging. It was theorized to help the building of the pyramids at Giza. I will be installing a brick driveway this summer and will use one have natural right angles.

This is why I get confused with 95 degrees of hip flexion. At top speed the knee is never higher then the pelvis. I have noticed that at top speed Bailey had 1.4-1.8 degrees on Dennis at Atlanta. The reason I used this comparison is the dramatic weight differences between the two athletes. Bailey had a better weight to power ratio (Grange 2002, MIT student forumla)

You can use a plumb line for assessments of hyperlordodic athletes.

Carbs, what types?

Main points:
John Berardi has good ideas, but they are not all that realistic and are by no means the only way to get lean. Fruit is great. Try to eat all different colors of the rainbow. I personally think, though there is some debate over this that healthy grains are very good.

Besides that, oatmeal, all bran cereals, vegetables, muselix, white pasta, flax bread, and yams are pretty much the good stuff.

Try to go for unprocessed stuff as much as possible, period.

Hypertrophy and strength gains:
Main points:
Strength gains will slow down with time, but we all already know this. Differnet deadlifts variations (sumo, conventional, snatch grip, Romanian, etc.) are all good.

Carbs: apples, oranges, oatmeal, all bran cereals, vegetables, mueslix, white pasta, flax bread, yams?

Is that it? Looking at his meals from his website I was wondering if John was a monk! What I like about some of his articles are the protocols for GT tests (growth hormone output) and details of post workout ideas.

The next question is what carbs are good for humans in general. From there we can change some of the formula for the stresses of weight training and sprinting.

I have been researching and what I find is that most fruits and vegetables are great. *What the problem is types of grains.*

For example the human body has not changed over a 100,000 years but our behavior (agriculture over the last 10,000 years) has made us drink 100 oz bladder busters of coke from 7-11 while supersizing our biggie fries.

So what are we designed to eat? Should we drop the bread for a yam? Or can we get away with whole grains like barley and oates for bread?

I don't have an answer yet but I suggest the following.

Invest in a blood glucose monitor (instead of buying bogus supplements) and test all of your favorite carbs by eating 50 grams of your favorite carbs independently. Then see what your blood does.

I can suggest that raspberries, blueberries, cherries, and various apples are a great start.

As for grains...I will find out later.

Quote

Invest in a blood glucose monitor (instead of buying bogus supplements) and test all of your favorite carbs by eating 50 grams of your favorite carbs independently. Then see what your blood does.

Slight problem here... because your diet won't ever consist of a meal that consists of a single source of carbs and nothing else, you will also need to test the following scenarios

1. Combining carbs
2. Combining carbs and fats
3. Combining carbs and protein
4. Combining carbs, fat and protein

Can you report back to the list in 2037 when you have completed all the above combos?

Actually being serious, I would be interested in doing this test with pure glucose as a control and then following it up with, say, a fatty steak with the glucose and finding out what sort of impact this has.

As for grains, if you are ever trying to get really lean, you'll find that grains will make you a little puffy. I suspect some sort of phyto-estrogenic quality may be causing this?

Did you also know that insulin also activates HMACoA reductase which causes the liver to make more LDL (bad) cholesterol?

Of course, the dumb scientists have been telling us for years to reduce our intake of fats because these contain cholesterol. Whilst all along the low fat high carb diet was dumping tons of the stuff into the blood stream.

A recent study where 41 people ate as much red meat and eggs as they wanted, but restricted carbs to veggies only showed drops in LDL cholesterol and an increase in HDL (good) cholesterol.

Nutrition. This is a topic that I can actually contribute info on. I am of the belief that grains are not meant to be eaten by humans. The good Dr. Greg Ellis believes that if you go on a low carb diet (carbs<25% of calories), your body will become fat-adapted (after a period of several months) and actually perform at least as good as on a high carb diet, most likely better.

On a side note, I am not convinced that food intake makes any difference at all on performance. Proper nutrition only serves to keep one healthy, and reduce body fat, IMO. Also, as Charlie has stated before, carbs make you store water, which is not a good thing. And this is clearly the best way to reduce body fat.

Now for cholesterol.

High blood cholesterol has not been proven to be a risk factor for heart disease. Same thing for consuming saturated fat and cholesterol. Yet the FDA/AHA/etc. has been telling us to eat very low levels of fat and cholesterol, low levels of protein, and tons of carbs, in order to reduce our cholesterol! But we still have plenty of heart disease. On a side note, I am convinced one major contributor to this is the massive quantities of processing that most of our food undergoes.

Also, this "food pyramid" diet has produced more obesity in this country than we have ever had. I will not even mention the "Mega-Gulp" and "super-sized" pops that you can buy for like 50 cents. They go to Olive Garden and get huge plates of low-fat pasta, spike the hell out of their insulin,

and store some good old fat cells. After following a "healthy" diet like this on a daily basis, they eventually develop Type II diabetes.

I am basing this "theory" mainly on the fact that I have seen and heard of champion athletes eating all kinds of diets. There is low-carb, high-carb, 40-30-30, vegetarianism, blood test "customized" diets, and the "just eat whatever the hell you want" diet. Athletes have succeeded using all of these. I am of the belief that diet is important for health and body fat control, but that "carb-loading" or eating certain things before or after a training session makes little difference.

Nutrition is similar to every training method: different people will respond differently to the same diet. You have to find out what fits your needs best!

It probably doesn't make that much of a difference, but I do believe a suitable diet will eventually make up for the centimeters that count. In addition to this, controlling general health and body fat is essential to a competitive athlete. At least, that's my opinion.

Citation for article that may be worth getting (and we Quote)

Proc Nutr Soc 2002 Feb;61(1):87-96 Related Articles, Books, LinkOut

The athlete's diet: nutritional goals and dietary strategies.

Maughan R.

University Medical School, Aberdeen, UK.

When talented, motivated and highly trained athletes meet for competition the margin between victory and defeat is usually small. When everything else is equal, nutrition can make the difference between winning and losing. Although the primary concern of many athletes is to supplement the diet with protein, vitamins and minerals, and a range of more exotic compounds, key dietary issues are often neglected. Athletes must establish their nutritional goals, and must also be able to translate them into dietary strategies that will meet these goals. Athletes are often concerned with dietary manipulations in the period around competition, but the main role of nutrition may be to support consistent intensive training which will lead to improved performance. Meeting energy demand and maintaining body mass and body fat at appropriate levels are key goals. An adequate intake of carbohydrate is crucial for maintaining muscle glycogen stores during hard training, but the types of food and the timing of intake are also important.

Protein ingestion may stimulate muscle protein synthesis in the post-exercise period, promoting the process of adaptation in the muscles. Restoration of fluid and electrolyte balance after exercise is essential. If energy intake is high and a varied diet is consumed, supplementation of the diet with vitamins and minerals is not warranted, unless a specific deficiency is identified. Specific strategies before competition may be necessary, but this requirement depends on the demands of the sport. Generally, it is important to ensure high pre-competition glycogen stores and to maintain fluid balance. There is limited evidence to support the use of dietary supplements, but some, including perhaps creatine and caffeine, may be beneficial.

PMID: 12002799 [PubMed - in process]

If anyone wants to look at the scientific data out there supporting/against supplements the following search engine may help or confuse!!!
www.ncbi.nlm.nih.gov/entrez/query.fcgi

An adequate intake of carbohydrate is crucial for maintaining muscle glycogen stores during hard training, but the types of food and the timing of intake are also important. Protein ingestion may stimulate muscle protein synthesis in the post-exercise period, promoting the process of

adaptation in the muscles. Restoration of fluid and electrolyte balance after exercise is essential.

Sorry, I forgot to mention that adequate protein intake is essential for athletes. That study does not mean anything to me because he believes in this glycogen replacement/electrolyte balance crap. I think that this post-workout protein/carb drink idea was created to sell protein powder/mrps. Also, supplementation is another story.

I know what you mean Matt, but for each study/guru there is another saying the opposite. That's why I eat as varied and as unprocessed a diet as possible with simple supplementation. Maybe high fats are wrong as well and the truth lies between the two extremes. What do you mean by "electrolyte balance crap" - you wouldn't live too long with unbalanced electrolyte levels and the body spends most of its time regulating them e.g. breathing

Quote

I think that this post-workout protein/carb drink idea was created to sell protein powder/mrps. Also, supplementation is another story.

You are kidding aren't you! This makes a BIG difference! Many supplements are snake oil. This is something that really works. I make my own post workout mix and the results are tangible.

Now you have me interested. What is your formula? What differences have you noted since you began using this? I think that BCAA's and glutamine are good post-workout, but I unfortunately I do not have enough $$.

I completely forgot one thing. The main reason that I am not a believer in the post-workout protein/sugar drink is that I tried this, and all I noticed was extra fat around my midsection due to the massive insulin spike. I have heard similar experiences from others as well. Eating protein after a workout is probably good for the amino's though.

Quote

---

posted by OorWullie
Obviously, avoiding processed food, and sticking to natural produce, but, 'healthy' can mean alot of things to different people: vegetarians, carnivores, vegan, etc.

Yes, a "healthy" diet can mean many things to many different people. This is what I think is the "healthiest" way to eat: free-range meats, free-range eggs, nuts, natural nut butters, vegetables, and various oils/oil-based dressings. Now this does not look like there is much variety, but there are many different types of meats, and MANY different types of vegetables. But generally, the emphasis should be on avoiding processing, salt, and sugar. Once our descendents introduced grains into their diets, there was a significant height decrease, and new diseases sprouted up, namely heart disease, Type II Diabetes, and Syndrome X, along with tooth decay and obesity.

This was only 10,000 years ago, and 10,000 years is a mere blip on the evolutionary timeline. As for Berardi, yes I have read most of his articles. And the results seen from using his post-workout drinks could simply be because of the added calories or protein. The studies are a bit holey (how convenient that, on the very same site, he sells the exact formula he recommends in his articles). Sorry, I may be over-skeptical, but, then again, maybe I am not.

Matt is right about grains, but at the same time look at how we eat. Humans had to exercise to eat! You ran down deer by exhausting them or by pure speed (this is possible I saw native americans do this with my own eyes three years ago). Perhaps Tom can take a look while up in the Dakotas...

Modern times we have drive throughs so we don't actually have to get out and move to eat. Plus, saying the list of items is too much for us. Now we have "Give me a number 4" at the drive through.

As for free range I swear by that. I ate organic/free range for one month. I never felt better. I can no longer afford to do that coaching track.

As for post recovery drinks they work, I have great research and great results with the 100 or so NFL, US SWIMMING, and track athletes with GO! drinks.

Some of the older genome grains are fine for humans since man never invented barley! We just do frightening things to grains to make Twinkies.

I hope my book can convince people that a real nutrition program works. Other "extra credit" diets work well too, but you should not compare the two.

DCW23 wonders about...

1. Combining carbs
2. Combining carbs and fats
3. Combining carbs and protein
4. Combining carbs, fat and protein
Great point.

Let us think concepts first. A bad carb is still acts like a bad carb no matter what combos you start off with. You can calculate the GI of the meal by taking the GI of each carb and multiply the grams. Then take the % and get the average of the entire carbohydrate load.

John B has talked about insulin as a storage hormone. This makes thinks not only tricky, very impractical. Separating meals into groups of carbs only and with fat and protein is tough. Just keep the carbs "safe" and you should be in a good zone.

That is true, but, as recent studies have indicated, GI does not always indicate insulin response. For example, milk has a very low GI, yet it will yield a large insulin response. Many feel that insulin is a muscle-building tool, though. Probably is. But it is also a FAT storage hormone. Also, too much insulin release leads to insulin resistance, which leads to Type 2 Diabetes.

As for Berardi, I do not buy for a second that carbs should not be combined with fat. His reasoning that the insulin response will store dietary fat as body fat is ridiculous. That does not even make sense! Lastly, if you feel like crap on a low-carb diet, try to only get carbs from fruits, vegetables, and minimally-processed grains. But do not restrict dietary fat, or, for that matter, and type of dietary fat other than the trans variety.

Matt, remember that Milk has three macronutrients! What I am talking about is carbohydrate only foods (95% or more).

When you spike insulin, how high is enough? Can the low II or GI method make the spike higher and more dangerous?

Did god make a mistake on digestion for not being able to eat carbs and fats? I see a lot of nut trees next to fruit trees! Perhaps the Garden of Eden was screwed up. At least the apples were low GI!

I will see if he answers them. He is most likely reading this as we speak!

Re take % and average. You have missed some important things:

1. If combining with protein, the glucagon will affect the insulin response.
2. If combining with fat, the carb will be released much more slowly.

This is why it is so difficult to work out what the real impact on insulin is. It's why I wanted you to do those tests on yourself. Use glucose as a control by itself one day. Then combine with a slow protein source the next day. Then combine with a fatty steak the next day and let us know what happens.

Re: John B..Pseudo science conveniently interpreted to produce a highly emotive article. The hallmark of "great" bodybuilding mag writers for years.

Matt H, I completely agree re John B's totally oversimplified rationale for not eating carbs and fat together. Still, I think the way he writes he could convince many of his readers that the Earth is flat.

Mr.Berardi states...

Again, I like to spike insulin 2-3 times per day. Remember, though, that my clients are super insulin sensitive due to the training, diet, and supplementation programs I have them following. So they can handle the insulin surges and can actually grow and get lean at the same time

How in the world do you get lean with insulin. Insulin is not a catabolic hormone (fat breakdown. Plus if you are elevated three times a day for let's say an hour and 40 minutes at the least. That is five hours a day! Or 1/3 of your waking life is chronically high!

How high is high John? Through the roof!

Not only is this not specific, it could be dangerous.

What about fat slowing down absorption?

After exercise, the next step would be to supplement with 600 mg of alpha-lipoic acid and concentrated fish oils containing a total of 6-10 grams of DHA and EPA, which are the most active omega 3 fats in fish oils.

So fat doesn't slow down absorption....

This maybe this is true dcw23 since the Biggie Coke from Wendy's always has a Triple burger with biggie fries. I don't think the Fries are powerful enough to undue the coke! Perhaps I will test my blood sugar then.

Fat will slow down gastric emptying a bit but our stomachs and hormones are good about absorbing things pretty fast. Coconut oil can help a little but it has a limit.

1. If combining with protein, the glucagon will affect the insulin response.
2. If combining with fat, the carb will be released much more slowly.

Number one- please go into more detail. Glucagon will not be major factor. AA transport speeds up with insulin, who cares about AA weight when on it's own it is slower. The key is damage control, not Berardi fantasy. I have athletes that drink slurpies from time to time. Damage control.

The biggie combo says enough.

I think Matt has some points here about a good diet. With all the meal replacements we forget about phytochemcials. It will be interesting to see if the genetically engineered foods have the same phytochemcials as organic food.

What about cooking? At 118 degrees vitamins and enzymes break down. There are pros and cons to this. Ketchup has more lycopene then any other vegetable! Dried fruit such as prunes have more phytochemcials then anything else in the vegetable/fruit world.

I am working on a chart that divides up all the vegetables and fruits into colors of the rainbow (verstegen 1999) and show the pytochemicals that they have so we can do more then make sure that we get vitamin C and zinc in our diet. The "Phytochemical Prism" will be copied by other nutritionists but who cares.

So, if I understand it correctly, everyone should spike their insulin every day, three times a day. Gee, that's a lot of Surge! Getting your advice on insulin spiking from John Berardi is like getting advice on your ideal weight from Baskin and Robbins (400 pounds sounds about right).

Re: Berardi/Baskin-Robbins
Hahaha! Charlie, you are great!

Re: MRP's/phytos
This is what everyone is forgetting about! The stuff in REAL food that is not in MRP's/whey/weight gainers/etc. Those things are made of one or both of the following: the leftovers from dairy processing, and sugar.

Mmmmmm, does a body good. Spiking insulin constantly and consuming sugar are things that I will avoid, thank you.

This is probably one of the reasons why Poliquin favors limiting MRPs and other shakes to post-workout.

Sorry Folks:

My understanding of JB's writings' Is when you have your Protein and Carb meals, the carbs should come from a low II and GI source, and also, the quantity of the carbs is not too high (I believe he suggest about 1g of carb per kg of body weight).

So following his training and other supplementation recommendations, these meals actually does not cause your body to produce alot of insulin, and therefore, your insulin levels should not be jacked all day long.

He does go on to say, this varies from individual to individual, so some people might respond better to more protein and carb meals, and others might respond to less.

Also, combining carbs, protein and fat in the one meal, means the body produces alot of insulin. Alot of circulating insulin AND fat - spells trouble.

The protein and carb meals are eaten around the training period, when your body is more able and ready to use the carbs.

Quote

Also, combining carbs, protein and fat in the one meal, means the body produces alot of insulin. Alot of circulating insulin AND fat - spells trouble.

This is where JB's pseudo science falls down in a big way. Let's say we are consuming the same calories in each meal but we are keeping protein constant.

Let's say the meal is 500 calories and we aiming for 40g of protein which is 168 calories.

That leaves us 332 calories to find from carbs and fat. If we exclude fat, that would be 79 grams of carbs. This is a damn huge plate of vegetables considering much of their weight is water... or, to meet satiety needs, it would need to be a bulky starchy high GI carb source.

Now, let's say we want to include fat with this meal. Let's go for 20g of fat. That's 180 calories. Now, this means the equation has changed so that we now only have 152 calories of carbs to find which is around 36g.

So, I've just combined carbs protein and fat, reduced my insulin levels, improved satiety, slowed my digestive process and helped my hormone factory. Where is the trouble coming from?

Hey, maybe the Earth is spherical

Re:Berardi
That is some fuzzy logic. Why no carbs and fat together? Dietary fat does not automatically become bodyfat, and insulin certainly will not store the dietary fat as bodyfat. That is one of the largest myths in our society about nutrition. Eating fat does not make you fat! If anything, I would think that it would be better to eat fat if you are eating carbs to LIMIT the insulin/glucose response.

Yes, plus the fact that if you eat fat with your meal, unless you are Mr. Porcine, you will generally eat less carbs to balance out the meal and in particular, you can choose to eat less starchy (higher GI) carbs.

Let us slow down here. Is John telling the truth? First of all John reads a lot and knows his biochemistry very well. But his suggestions are a little demanding. The theory is that dividing macronutrients may help lower insulin responses. I am not a fan of dividing up the nutrients as strict as John. Let us get real here. Craig does an amazing job of monitoring his diet and doing the things to make him better. I drink coffee and eat donuts at www.dunkindonuts.com almost every day. I am lean and you can see some of my abdominals when my shirt is off. I don't exercise that much (I walk and lift once a week to stay at 175) but I have great genetics.

One athlete that I work with is so lean he looks like a Hasbro action figure! God is not even with looks and brains...

Why did John write the article? Besides the money he read research showing what happens. Does this make sense? Yes. John is looking at the wrong protein. Modern beef is 30% fat...while wild game is 5% fat! Take the hormones and grain out of the cows (plus hundreds of years of breeding. I saw paintings of the cows over the years of breeding. Scary! They use to look like f$#%$% deer before man started getting greedy, and they are much healthier. Bison taste great but are you telling me that MO eats bison? That dude was eating Krispy Kream donuts near the UCLA campus.

Let's get back to evolution. Peanuts have tons of fat and it is a food that homo erectus and hablis ate. Fat and protein only. What carb source by itself has fat and protein? Not many in nature. Fats are mainly in animal products and oils from seeds and nuts. Caveman ate when they wanted in natural ratios. In Chapter 19 or "Gorillas in the Mist" I go into this in detail. A new movement in Nutrition and anthropology has sprung up. Plus the human genome project is also shaping how we should eat. Our body can eat a wide range of foods and eat them in combinations. One problem is that total calories are so artificial; homosapiens 50 thousand years ago could not hunt and gather that much food. I can eat 7-8000 calories a day when lifting 5 times a week and

running hard three days a week(1997 was the last time I worked that hard)and be at a really low body fat level. This never happened 80 thousand years ago. It started only when the the middle east started agriculture...

John may be right to a point, but we can't live in a fantasy world.

Bodybuilding writers have been coming up with pseudo-scientific interpretations for years. 10 years ago, I read the same stuff that Berardi is saying about sugar + fat in either Ironman or Muscular Development or something like that. I think the guy's name was John too. Do some research? It's simply not true. It goes back to my original post in this thread pages ago about interaction of different foods.

He is selectively taking the worst properties from both foods and assuming that there is no interaction between either. This approach is very simplistic and very convenient.

I must say, Berardi is guilty of this all or nothing attitude in quite a few of his site's and T-mag articles. All it means is that we have to become adept at reading between the lines and separating wishful thinking from facts.

John Berardi's articles at T-Mag are geared towards bodybuilders - everyone can agree on that.

Whilst I appreciate everyone's input, and after all we are all here to learn and improve, but, has anyone tried to follow his recommendations?

If not, how can we really criticize him?

I have, and to me, they are not to difficult to follow and they fit in with my lifestyle (and the foods I like).

I also agree with you regarding how our ancestors ate, and I believe I started another thread about which expert was right, Charles Poliquin, Super Mario, Dr Serrano (the low carb people) or Dr Colgan, and JB (higher in carbs).

The point is do you do what you post. Flash can attest that one of my hurdlers was warming up right, resting 5 minutes after each 30m, squatting 450+ safely. Does he sleep in an altitude tent (O2) while having an omega-wave machine monitor his slow waves? I have been blessed with athletes that do the right things when I am not looking...

Quite simply there is nothing new. Bodybuilding writers have been coming up with pseudo-scientific interpretations for years. 10 years ago, I read the same stuff that Berardi is saying about sugar + fat in either Ironman or Muscular Development or something like that. I think the guy's name was John too. Do some research. It's simply not true. It goes back to my original post in this thread pages ago about interaction of different foods.

I did the research Dcw23 and John has valid points. No research will give a diet for sprinters. We must gather all the information and see what makes sense here. I hope I can share my thoughts by June 6th.

I just bought another copy of Colgans book (Optimum Sports Nutrition). He is not perfect but he raises the bar on nutrition and science. We still have the Nancy Clarks telling us "eat carbohydrates for energy!" and other childish stuff.

How about this one forum? Let us come up with markers for nutrition. When we agree on numbers and subjects that are important then we can do what ever we want diet wise. We then can see (underwater weighing, blood work, muscle biopsy) who is right? Also, the tale of tape would be clear as well.

Triple Extension, drive phase, and acceleration

Main points:

Again, for start strength and technique are what to focus on.
One legged weighted squats are an interesting exercise to consider. I know a lot of people on the forum use them. I personally haven't tried the, but skimming this over again, I think I will.

Strength along with flexibility, muscle status, relaxation, and technique make you fast.

Erector spinae strength is very important fast and slow-twitch wise.
Charlie says, "Most start problems are correctable, regardless of strength levels, by adjusting the start position to reflect current strength levels rather than to establish one final position and wait for strength to catch up. This is not only possible, but necessary, as the start affects the smooth execution of the whole race. When strength is lacking the COM should be raised as much as possible in the set position by insuring that the arms drop straight down from the shoulders to the line (in both planes), that the hips are as high as possible while still maintaining enough bend at the back leg to ensure force on the back block, and a position close enough to the line that the athlete will automatically raise his COM as fast as is necessary. The start can be re-adjusted in lock-step with strength improvements (the needed changes, while effective, won't be huge)."
Make the start simple. Just concentrate on the wrist flick, the rest will take care of itself. Sprinters and sprint coaches like philosophy.
Good form is what works for you. I liked the statement, "The torso must raise the head." And "let the torso unfold"

I am working with a sprinter (10.02, 6.49 prs) and I have a very important question concerning acceleration and mechanics.(1) This athlete is very strong in the middle of the race (40-80m) and has a hard time the first 30m.(2) How do we improve his acceleration? My feelings is he needs more base strength (squat 4x375). He has trouble on his first 5-7 steps.(ground contact is too long). What should he do. Should he get triple extension off each step? Should I have him pull a sled to work on his posture while sprinting? He ran a 6.53 electronic today and I feel that his top speed will improve if his acceleration will improve. I feel that while his mechanics have improved his time has stayed the same in the 30m. I feel that his neural pathways are slow and he is "weaker" in his new drive phase. He has a habit of standing up too vertical too soon. I believe this is a weight room strength and track strength issue. What do you think. Thanks for your help.

I'd be careful not to draw too many conclusions about this athlete's strength qualities before ensuring that his technique is optimal. You mentioned that he comes up too soon. He may be trying to get into his full upright running position too soon. This sometimes happens if the athlete presses. Work on this aspect of the transition phase without the watch for awhile and see if it helps.

Wouldn't this point to a lack of RFD or Fmm??

High contact times at the start would be indicative of low RFD, and/or bad technique as Charlie pointed out.

But still, another point is that if he does not have the RFD/and or Max force, he cannot hold a body position that is low due to lack of strength, as Charlie has also said.

It is quite simple to train, either aspect (RFD vs FMM), as you probably already know.

What times is this athlete doing over the whole first 50? eg 10m, 20m, 30m, 40m, 50m etc... do you have timing lights? It would be interesting to look at if his first 10m splits are low.

Right on the spot "no endurance". He needs to work on that aspect. His drive phase on video looked great in terms of angles, it's just his ground contact times are too long and he rarely gets to get triple extension each step. He takes sevens steps to get to 10m. Seven every time and it's on the line within inches. His block clearance (10m) is 1.92-1.94. After looking at tape his left hand (the blocking hand is late and slow) causing his second step to be slow. I believe his max strength and speed strength is weak. I will try adding some more power exercises. My feeling is he will improve that segment as his strength levels improve. We use half a tennis ball as 1;5;10 meter segment markers. The first 10m is every meter and then we space every five meters apart. Time will tell with our strength and mechanics and that 10m segment. He is a tenth behind Mo, Bruny,Frank, and Ato in the first 10m. If he improves to a 1.86 he will be a 9.95 runner!

It sounds like everyone is hitting the nail on the head. I have a comment/question regarding your athlete's first 10-15m segment. This actually ties in with what Charlie said in regard to getting up into the upright position too early. One possibility that your athlete may be spending too much time on the ground is that he is starting to close his heel prematurely as he is driving out.

I have always(and you guys tell me what you think) emphasized with my sprinters to emphasize a "piston" like action with the early steps during their drive phase. As they begin to transition up, the heel begins to close until max velocity mechanics take over and you have full heel recovery.

In other words, since a sprinter is "driving" down and back into the track in order to propel them self forward, it makes biomechanical sense to try and eliminate excessive heel recovery (cyclic action); if you are at the ideal angles both overall body and lower limb, the heel should be swung close to the ground and then driven down/back slightly behind the center of mass. If the athlete begins cycling too early in the drive phase, this would promote longer ground contact time thus eliminating any sort of actual "drive". Just a thought. Thanks for the good post. I'm sure you will solve the situation.

Interesting! So you are telling me that Mo and the "guns" are running 1.85 to the 10m?

Do you have splits for all the sections that I could see? I am only starting out in my sprinting career (WAAAYYY too late), and I would like to compare my times. We have electronic gates which are pretty useful to train with, and get accurate times often.

Is it possible to get him on a force plate so you can tell the time to Fmm?

Re splits
Ben ran several times at 1.86 to 10 but I have seen some faster practice times with another athlete(1.85). I haven't seen the splits yet on the 2001 WCs but I'm sure Mo's split was in that range at least. Rest assured that a 1.92 to 1.94 split is still world class!(good enough for a top sprinter to clock a 9.90 to 9.95)

Again, every time I give out secret information I risk my health. Who cares? A good website is desert.jsd.claremont.edu/~newt/track/splits/ for people who want to break down the 100m. One problem with splits is that you can rarely have the race analyzed in the real world. In practice we get some close times. I do not have force plates, or electronic timing. I have a digital video camera. If you have a good camera, you can put the play speed on slow motion. I will take a time on camera with my watch and divide the time by 4. Example a 26.12 is 6.53 . Although it is hand timed, the longer duration (26.12 is less affected by that .24 reaction time because of the larger value) and better stop time (you can stop the watch at the precise time when the athlete completes the segment.) We run 65m for the 60m. This makes sure that they run through and not brake too much. Even if an athlete runs through 60 but breaks after they are putting too much

stress on their body. We are able to add one or two repetitions a practice since each run is focused on sprinting, not breaking like Fred Flintstone. But, as I learned (Charlie's response on regeneration) the intensity of the stimulus is higher as well.

Re follow-up
I posted earlier about the need for a gradual rise to the full upright position in starts, which may be more important than more power. I just got some feedback on a guy I worked with on this very matter. He was a quality sprinter (10.23)but had a big lag at the 10m point. We worked on making sure he didn't rush to get into the full upright position too early by keeping his head in line with his back at all times (thus allowing his back control his head position at all times). His 60m time dropped .08 in the first race with no other change and the improvement carried over into the 100m as he opened with a 10.13. Obviously, I could site more prominent examples if I hadn't signed confidentiality agreements, but the principles are the same.

Re splits
Just a point of interest on splits. Everyone seems to think that Ben won everything at the start, but look at the split differences with Maurice in his 9.80 in Seville. At 30m Ben has .01,but the margin grows from there all the way to 80 when Ben shut it down. The margins in Ben's favor were as follows; 40m-.02, 50m-.05, 60m-.06, 70m-.07, 80m-.07! Too bad he didn't run through the line!

Some coaches have discussed the concept of an athlete being "too fast for their strength." This certainly could be tied in to noendurance's comment regarding your athlete not being strong enough to "hold" certain positions while executing high velocity movements. If part of the solution can be found in the weight room, I might consider examining the ratio between various lifts. This process may reveal a limiting factor which is preventing your athlete from improving his acceleration capacity. Back in the mid 90's, one of my athletes had a similar problem. He would split 5.75-5.80 for 50 meters, but come back in 4.45-4.50.

I now know that he was weak, especially his low back, VMO, and rhomboids. Those were his weak links. Charlie, do you have any thoughts on the concept of optimal maximal strength ratios?

RMT, Please tell me what you think the numbers should be. But are those numbers "tests"? It seems that we are getting closer here to some interesting concepts with quantification. What strength and power levels are needed to achieve certain times? I like that phrase "too fast for his strength." Perhaps his nervous system is able to release an ample quanta of transmitter, but his muscle strength can not contract with enough force to catch up to his true abilities....very nice RMT. People how much strength is enough? Three times your bodyweight? While many mid 80's have been run, many different weight programs have been used to achieve this. No endurance? Fly30? Flex?

Re Strength
How much is enough? Or is it how much is too much?
I'm wondering about the question of strength when the problem is in the second half of the race. What about flexibility, muscle status, relaxation, and technique? There are so many factors at work here that you have to be careful about hard and fast rules. This is where experience comes in.

Two things:
1. What is happening in the start? The start sets up what happens over these first 10 metres. If the first step is long so is the next one. Worth checking?
2. Has he ever been trained with the ladder/sticks/other mental straight jacket?

Other thing:
do you use digital video? On DV frames are time coded. If you set up your camera to display the

time codes you get 4/100 seconds accuracy frame by frame. Its fully accurate as it is digital and not subject to tape stretch. I knocked up a spreadsheet that lets you enter the time codes for each frame and it will calc the elapsed time. Do you want the formula as I can look it up?

Writes.

.(1) This athlete is very strong in the middle of the race (40-80m) and has a hard time the first 30m.(2) How do we improve his acceleration? My feelings is he needs more base strength (squat 4x375). He has trouble on his first 5-7 steps.(ground contact is too long

Correlation between heavy squatting and increased acceleration don't exist.

Have the starts improved over the last 6 months or have they reached a plateau?

If they have reached a plateau then specific strength gains may be needed.

On video look at the breaking point on contact, in the start they should be behind the COM. If it is in front of the COM then it will reduce acceleration by additional breaking.

How good is Erector spinae strength?

Low projection of the hip depends largely on the strength levels of the erector spinae.

Most start problems are correctable, regardless of strength levels, by adjusting the start position to reflect current strength levels rather than to establish one final position and wait for strength to catch up. This is not only possible, but necessary, as the start affects the smooth execution of the whole race. When strength is lacking the COM should be raised as much as possible in the set position by insuring that the arms drop straight down from the shoulders to the line (in both planes), that the hips are as high as possible while still maintaining enough bend at the back leg to ensure force on the back block, and a position close enough to the line that the athlete will automatically raise his COM as fast as is necessary. The start can be re-adjusted in lock-step with strength improvements (the needed changes, while effective, won't be huge).

Too much weight room. Especially if athlete is clean. To much tempo. To many speed sessions a week. To many plyos. Overtraining causes slow starts. To much everything basically!!! Cns system is shot, probably tight coming out of blocks due to not being fully recoverd. Arm drive is everything

Why do you automatically assume that overtraining is the cause? If it was, wouldn't ALL aspects of the run be weak? Even if the finish is poor, it might be due to the extra effort required to overcome the poor start mechanics. In the absence of other info, before making any assumptions- fix the issues at hand. If they don't solve the problem, then consider CNS overload.

This is all very well but where do you go after identifying this gem? How do you "fix" it? Does it actually need to be "fixed" or is it a symptom of something else that is pointing you in another direction?

It depends on the cause of a bad breaking point, however the most common cause from my observations is bounding out of blocks, or using over long strides. Work on a sligthly shorter stride on the start.

If you look different stride rates between Ben and Calvin Smith in soul its obvious Ben had a shorter stride in the start at higher frequency which gave him the best start.
Ben Johnson

0-30m Nu: 17.5 Rate: 4.61 length 1.71

0-30m Smith Nu: 16.2 Rate: 4.15 length 1.85

If the power & strength capabilities are there then overly long strides will reduce acceleration. I find that i have this problem in the start I am 177cm and between 0-30 i have 16.0 strides at 4.1 rate and average length of 1.87cm,

Power and strength is not a issue. I need to pull down the length which makes a closer breaking point which in terms increase's rate and acceleration. Its also a much more efficent acceleration pattern.

How do you "fix" it?

Gradually overtime, trial and error with different types of cues. Have the video data to measure the change, possible twice a macro-cycle.

Currently i have included some single work in strength training, set ups, single leg dead lift, followed by speed bounds and speed hops. This could increase dynamic stability and firing patterns to make a closer breaking point.

Quote

---

posted by
Work on a slightly shorter stride on the start.

Would you work on this directly? Do you think this may cause as many new problems as it solves?

While I lack the technical eloquence to articulate a response that your obvious attention to this problem deserves I had a question that may or may not help you out. You said that you needed to pull down the stride length at the start in order to increase efficiency. Do you think that possibly relaxing and getting back to simple basics could help? By that I mean going with simple cues such as firing out with your arms, achieving good hand clearance, and maintaining good body angles. Also, this may seem somewhat juvenille but possibly even incorporating some starts without blocks coming from either your back or your stomach. What do you think? Others?

Reply DCW 23,

Take a holistic approach, if the acceleration phase is more efficient then max velocity and top end speed will be better.

I would apply it directly, in terms of creating new problems, the most obvious one is a shorter stride length in the start however this is not significant since the fastest starters are characterized by rate.

Applying a slightly shorter stride in the start can be a failure if the athletes does it inefficiently by placing maximum effort on stride rate.

Slightly shorter stride in the start= closer breaking point= increased efficiency=improved top velocity and top end speed.

Reply Tunnel Vision:

I have tried those cues, extreme hip and quad power causes my COM to be projected significantly further then most starters. This can gave give excellent starts however since the breaking point is in front of the COM its not very efficient and as a result top end speed is down.

I have recently resolved this problem by reducing stride length in the start.

(Something I thought of when posting on this forum)

Quote

---

posted by
Reply Tunnel Vision:

**I have tried those cues, extreme hip and quad power causes my COM to be projected significantly further then most starters.
(something i thought of when posting on this forum)**

Extreme hip and quad power sounds like an issue most sprinters would envy. What have you done to develop that kind of power? Anything out of the ordinary?

I think that if you are thinking about your foot placement, it means that your stride rate will be slower simply because you are thinking about it.

So, really, thinking about your foot placement to make shorter strides to increase turnover is a paradox.

What about coming up with something that shortens your stride without thinking about your stride? Maybe a change to your start position and start mechanics? What about head position? What about arms?

Quote

---

posted by
Reply Tunnel Vision:

I have tried those cues, extreme hip and quad power causes my COM to be projected significantly further then most starters. This can gave give excellent starts however since the breaking point is in front of the COM its not very efficient and as a result top end speed is down.

I have recently resolved this problem by reducing stride length in the start.

(Something I thought of when posting on this forum)

Could it be that you were just over striding before?

Reply Tunnel Vision,

I have trained with power lifters who can squat 300kg and bench dead lift over 200kg.

One of the OL had a record was 100kg at 21 rps power clean.

My advice is to train with specialist to develop technique.

The number one rule, never lift heavy without proper technique. Often the lifting technique of sprinters is bad, if not woeful.

I think that if you are thinking about your foot placement, it means that your stride rate will be slower simply because you are thinking about it

Plato said " thinking is being"

Anyway lets forget the philosophy, I don't agree with this general notion that thinking will slow stride rate.

When i get into a deep squatting i am thinking strong chest to prevent my back from arching. The same when doing squat cleans. Thinking enhances the movement by maintaining good technique.

Maybe a change to your start position and start mechanics? What about head position? What about arms?

Changing start mechanics by altering head position and arms also involves thinking.

The key is to devise cues that are unique and work for the individual. Some sprinters run well using arm cues for others they ran worse using the same cue. However all cues involve thinking.

I simply have no answer to this All I can suggest is reading up on the cerebellum.

"Thinking is being" (lat. "Cogito ergo sum") is by Descartes, a few hundreds years after Plato.

Reply by CB

Descartes Cogito Ergo sum translated **"i think therefore i am** ". Descartes concludes from this that he is in essence a spirit, mind, and that something that is distinct from the brain.

Rather a extension of Plato's **thinking is being**. Descartes followed in the tradition of thinkers in allegiance to Plato.

I suggest that you read up on your history of epistemology.

Quote

---

posted by
Reply CB.

Descartes Cogito Ergo sum translated " i think therefore i am ". Descartes concludes from this that he is in essence a spirit, mind, and that something that is distinct from the brain.

Rather a extension of Plato's thinking is being. Descartes followed in the tradition of thinkers in allegiance to Plato.

I suggest your read up on your history of epistemology.

I believe that was a 2nd round TKO -Put some ice on that swollen right eye, will you?

I think the problem with your guy can be fixed by simply adjusting his block settings and his overall position in the blocks. I've been tinkering with blocks for the past couple of years and I've figured out a couple of techniques that will improve the athletes start AND reaction no less,

relatively easily. I also think that since you mention he comes up to soon, that he maybe doesn't have a problem with strength, but that he is simply slowing down too soon because he's hitting top speed too soon. (I.e. Jon Drummond)

Maybe this is why the middle part of his race is strong and he falls off after that. If you look at Mo's races, his drive phase last about 55-60m. This whole time his head is still down, while everyone else's head came up around 40m. Mo's start technique allows him to powerful out of the blocks, but at the same time it sort of delays him of reaching top speed before he's supposed to.

With 3 easy steps you can get your guy to run the first 60m faster while still running the next 40m faster. Sounds like commercial.

I don't know what your block start days look like, but you can have him do 15 starts. 3x5.

1st set have him focus on his arms. Make sure that the arm that swings backwards really swings. That's the arm that will allow him to drive out lower in the blocks with out him having to worry about falling on his face. Doing this quicker will cause him to come out quicker in general. But not to the point of exaggeration. His arms are obviously going to be able to move faster than his legs.

2nd set have him focus on keeping his head down, and letting his body come in into the full upright position. Not making it. When he's down in the blocks have him relax his neck, so that his head is down. When he comes up in the set position his head should still be down and his neck should still be relaxed. When he comes out of the blocks he should focus on naturally driving out and just letting his head come up on its own.

3rd set he should focus on extending the leg on the front pedal as quick as possible. Doing this will cause his back leg to drive out with more force. He'll come out the blocks with more velocity.

After a while he'll start doing all the steps together unconsciously and he'll adjust to it, making his start more efficient.

RE: "**hitting top speed too soon**." I do believe you have been listening to too many television commentators regarding this theory. I think it came from the Carl Lewis days when Carl would seemingly get out of the blocks slower than his competitors and gradually catch up and pass them later in the race. People did not know what to make of this so I guess they decided to say that he was conserving energy and saving it for the part of the race where he was going his fastest, thereby prolonging the amount of time he spent at his top speed. I believe that this theory is fallacious. This race only lasts 9.78 seconds. There is no time to pace oneself. Jon D's problem is that he cannot relax under pressure and tries to hold proper running form for the whole race instead of sprinting the way God designed Jon Drummond to sprint. He is very mechanical, especially at the end of his races. He needs to let go. One could say the same thing about Donovan Baileys Olympic gold run regarding conservation of energy. However, there is no time to reserve one's energy in the 100m. Why are the 50 and 60m world records not faster than they are if this were the case. (Perhaps it is because everyone is slower during the winter months).

RE:
Quote

1st set have him focus on his arms. Make sure that the arm that swings **backwards** really swings. That's the arm that will allow him to drive out lower in the blocks with out him having to worry about falling on his face. Doing this quicker will cause him to come out quicker in general. But not to the point of exaggeration. His arms are obviously going to be able to move faster than his legs.

The arm that moves forward, not backwards is the focus. The only focus. A backwards focus (motion) would cause his centre of gravity to drop down rather than explode out of the blocks like

Super-Ben, ah I mean Super-man. It may also cause separation between the torso and the legs. Sort of like breaking a bow in half.

RE:
Quote

2nd set have him focus on keeping his head down, and letting his body come in into the full upright position. Not making it. When he's down in the blocks have him relax his neck, so that his head is down. When he comes up in the set position his head should still be down and his neck should still be relaxed. When he comes out of the blocks he should focus on naturally driving out and just letting his head come up on it's own.

Head position has no effect on when the athlete will get into their full upright position. Charlie has mentioned this before. In fact, dropping the head actually puts stress on the back of the neck causing tension. Relaxed good...tension bad. Have one of your athletes hold their head in line with the rest of their spine and check the tension on the back of the neck. It will be more relaxed this way that with the head down. Bruce Lee would not approve of the head down posture. The next time you lift weights, do dumbbell arm curls with your head in both positions. You will be able to lift considerable more with the head in the upright position. (Be sure that the head is "relaxed when in the down position or this will compromise the example).

RE:
Quote

3rd set he should focus on extending the leg on the front pedal as quick as possible. Doing this will cause his back leg to drive out with more force . He'll come out the blocks with more velocity.

I am not sure what you mean by the back leg driving out with more force. Do you mean driving back with more force, or coming forward? From what I understand, extending the front leg as quick as possible would cause the back leg to prematurely come off the block. Not a good thing, as discussed under many other forum topics.

Quote

RE: "hitting top speed too soon." I do believe you have been listening to too many television commentators regarding this theory. I think it came from the Carl Lewis days when Carl would seemingly get out of the blocks slower than his competitors and gradually catch up and pass them later in the race. People did not know what to make of this so I guess they decided to say that he was conserving energy and saving it for the part of the race where he was going his fastest, thereby prolonging the amount of time he spent at his top speed. I believe that this theory is fallacious. This race only lasts 9.78 seconds. There is no time to pace oneself. Jon D's problem is that he cannot relax under pressure and tries to hold proper running form for the whole race instead of sprinting the way God designed Jon Drummond to sprint. He is very mechanical, especially at the end of his races. He needs to let go. One could say the same thing about Donovan Baileys Olympic gold run regarding conservation of energy. However, there is no time to reserve one's energy in the 100m. Why are the 50 and 60m world records not faster than they are if this were the case. (Perhaps it is because everyone is slower during the winter months).

RE:
Quote

1st set have him focus on his arms. Make sure that the arm that swings backwards really swings. That’s the arm that will allow him to drive out lower in the blocks with out him having to worry about falling on his face. Doing this quicker will cause him to come out quicker in general. But not to the point of exaggeration. His arms are obviously going to be able to move faster than his legs.

The arm that moves forward, not backwards is the focus. The only focus. A backwards focus (motion) would cause his centre of gravity to drop down rather than explode out of the blocks like Super-Ben, ah I mean Super-man. It may also cause separation between the torso and the legs. Sort of like breaking a bow in half.

RE:
Quote

2nd set have him focus on keeping his head down, and letting his body come in into the full upright position. Not making it. When he's down in the blocks have him relax his neck, so that his head is down. When he comes up in the set position his head should still be down and his neck should still be relaxed. When he comes out of the blocks he should focus on naturally driving out and just letting his head come up on its own.

Head position has no effect on when the athlete will get into their full upright position. Charlie has mentioned this before. In fact, dropping the head actually puts stress on the back of the neck causing tension. Relaxed good...tension bad. Have one of your athletes hold their head in line with the rest of their spine and check the tension on the back of the neck. It will be more relaxed this way that with the head down. Bruce Lee would not approve of the head down posture. The next time you lift weights, do dumbbell arm curls with your head in both positions. You will be able to lift considerable more with the head in the upright position. (Be sure that the head is "relaxed when in the down position or this will compromise the example).

RE:
Quote

3rd set he should focus on extending the leg on the front pedal as quick as possible. Doing this will cause his back leg to drive out with more force . He'll come out the blocks with more velocity.

I am not sure what you mean by the back leg driving out with more force. Do you mean driving back with more force, or coming forward? From what I understand, extending the front leg as quick as possible would cause the back leg to prematurely come off the block. Not a good thing, as discussed under many other forum topics.

This is why I don't like explaining certain things in writing. It's a lot harder to explain and certain things get taken the wrong way.

P.S. Ben Johnson is the last person I would look at for ideas on blocks. The reason he "exploded" out of the blocks was because he pushed off of both legs. He was basically jumping out of the blocks. This helped him to come out harder, but his technique suffered from it. When his foot hit the ground it actually slowed him from moving forward, Because it landed infront him having BOTH arms going backwards didn't help at all. As powerfully as he did come out of the blocks he could have come out much more efficiently if he changed that.

I plan on writing a book someday on my theory of dualism and how it could still be feasible in the Cartesian sense

Descartes was the classic dualist in that the mind and body are separate entities. A modern form of this argument is presented by Saul Kripke which is against the modern forms of scientific materialism.

Current work on the mind-body tries to avoid this mind-body problem.

Human consciousness cannot be quantified, neither dualism nor materialism is true yet the alternatives are not clear.

Quote

P.S. Ben Johnson is the last person I would look at for ideas on blocks. The reason he "exploded" out of the blocks was because he pushed off of both legs. He was basically jumping out of the blocks. This helped him to come out harder, but his technique suffered from it. When his foot hit the ground it actually slowed him from moving forward, cuz it landed too far in front of him. And him having BOTH arms going backwards didn't help at all. As powerfully as he did come out of the blocks he could have come out much more efficiently if he changed that.

Have you ever actually seen the IAAF slow-mo footage of Ben starting in '88? What you are saying is utter garbage. Ben's COG is well and truly ahead of his foot when it touches down, which is only a little way past the start line. Understand what you are saying before you blurt it out, there are very few fools on this board, you and dknight may have been able to get away with it on atoboldon.com, not here.

BTW the arms come almost straight up ... not back.
And dropping the head, even by relaxing the neck will tighten the traps and rhomboids as well as putting the spinal cord and other nerves on stretch.

Mo doesn't reach as high a top speed as Tim, Donovan or Carl because as has been pointed out many times, John smith tends to lean towards consistency through the race (IE better to run five 0.85 segments than one 0.83 and the rest at 0.88.

Quote

posted by Dazed

Have you ever actually seen the IAAF slo-mo footage of Ben starting in '88? What you are saying is utter garbage. Ben's COG is well and truly ahead of his foot when it touches down, which is only a little way past the start line. Understand what you are saying before you blurt it out, there are very few fools on this board, you and dknight may have been able to get away with it on atoboldon.com, not here.

BTW the arms come almost straight up ... not back.
And dropping the head, even by relaxing the neck will tighten the traps and romboids as well as putting the spinal cord and other nerves on stretch.
Mo doesn't reach as high a top speed as Tim, Donovan or Carl because as has been pointed out many times, John smith tends to lean towards consistency through the race (IE better to run five 0.85 segments than one 0.83 and the rest at 0.88.

Get away with what? Just because I disagree with you doesn't make me a fool. You truly are Dazed.

I wouldn't have said anything about his start if I didn't see it. It's not just one race, it's all the ones I've seen. "88" in particular. The slow-mo made it even more evident. And you should be the one to understand something before you blurt it out. Technically speaking Bens start was awful. Marion Jones starts almost the exact same way, and I don't even have to go into detail about her start. Everyone knows how bad it is. I understood and I'm pretty sure everyone else understood what I was saying about Bens start. I know so because I've read, and heard other people say the exact same thing. His start was explosive because he pushed off of both legs like he was jumping. Try testing your vertical on one leg and see what the difference is. And both of his arms coming straight up is no better than both of them going backwards.

Holding your head up, like I said is using energy. Your using some form of energy to hold your head up. It causes the athlete to stiffen up, and more than likely causes the athlete to come up to early. Letting your head down relaxes you and helps you to stay lower coming out of the blocks. I'm not saying because everyone at HSI does this is the reason I say it's right, but take a look at their starts and the rest of the worlds. There's an obvious difference. J.Smith, in my opinion is the best 100m coach in the world.

Compare Mo's start to all of those guys you just mentioned and tell me what the common characteristic is. Mo in my opinion can reach the speeds of those guys but has never really had too. Like you said, and like i've said before his focus is on consistency. If Monty, and the rest of those guys can learn to spread there speed out through out the race, instead of the end they would be running a lot faster than they have. Everything you said is basically proving my point.

P.S. The only fools on this board are the ones who don't think for themselves.

And Bens starts is still awful.

,
Have you looked at your boy's breathing pattern? Is he holding his breath out of the blocks? As you well know, the Valsalva is very beneficial for force production. If his breathing is screwed up, he may be compromising the power that he does have.

It's ok to admit your wrong!
The proof is in the pudding look at the split times for Ben's race in Seoul? Go to the discussion suggestions forum, and look under the topic Splits BJ/MG/TM. Bens reaction time is the same as Mo's and the split for the first 10 meters is 1.70 Ben , 1.73 Mo.

1: You have "studied" Ben's starts, reviewing a number of races, and you have concluded that both arms go backwards? Did your study consist of: "I know cuz I've read, and heard other people say the exact same thing." Why don't you go to the vid-clip of Ben's start on this site to see for yourself which way his arms are moving- facts are facts. (dcw- can you put the clip in here?)
2: IAAF analysis shows that Ben's first steps land farther BEHIND the CG than any other top sprinter ever- the inevitable consequence of the level of force production.
3: The emphasis on the lead arm in no way diminishes the action of the backward driving arm. The lead hand emphasis compensates for the mechanical disadvantage the lead hand has in clearing the ground. (The forward lean or pressure,in the set position, however slight, makes clearing the lead hand slower, as it must lift slightly before moving forward while the backward hand is released more easily- this becomes increasingly pronounced as forward lean in the set position increases.)
4: You say that John Smith is a great coach. I agree! Then watch how beautifully Mo gets his lead hand forward.

Quote

I think Michael Johnson said it best. There's really no such thing as "bad form" or "good form". As long as it's "effective". Remember the comments he had with his upright posture, or "funny technique". Well, 19.32 & 43.18 is pretty impressive (though I think he could have run 42.14 for 400m, but that's another story) don't you think? Same for Ben's 9.79. Whether or not his start is great or awful, the stopwatch/splits doesn't lie.

I agree totally. But the key word here effective. Ben did win a lot of races, but having a better start would have only mad his races better. MJ is a great example. Even though his form was "different" there were things about it that made him go faster easier. Which brings back the point

of effiency. He has called his own form efficient. Take a look at all the athletes today that have that effortless running style. Bens start may have been effective, but it could have been better. A lot better. He could have run faster a lot easier. Using far less effort. I know it's not always in the best interest of the coach or the athlete to change something that has been working, but there is always room for improvement. Mo Greene has by far the most effective and efficient start in the world. This is why I use him as an example.

Quote

---

posted by
Treble it's ok to admit your wrong!
The proof is in the pudding look at the split times for Ben's race in Seoul? Go to the discussion suggestions forum, and look under the topic Splits BJ/MG/TM. Bens reaction time is the same as Mo's and the split for the first 10 meters is 1.70 Ben , 1.73 Mo.

It's no ones fault but Bens that he slowed down. The reason he got to 10m faster is cuz he simply ran faster. It may sound wierd but it wasn't cuz of his start that he ran that split. It was because of his explosiveness. I've taken people with pedestrian starts to having a better start than a person twice as explosive as them.(better to start correctly than to start quickly) So if Ben had a start like Mo he would have run 9.6 a long time again. According to Charlie Ben was on his way to 9.72 or less. I'm confident that Mo could have run just as fast for the 1st 10m, but he may have run a slower race overall because of the way he runs his races. When Mo runs faster than 1.73 for the 1st 10m, he'll break the record again. And who's to say Ben would have run faster than lets say 9.76 if he didn't "slow down", since you start slowing after a certain point anyway.

Quote

---

posted by Charlie
Treble
1: You have "studied" Ben's starts, reviewing a number of races, and you have concluded that both arms go backwards? Did your study consist of: "I know cuz I've read, and heard other people say the exact same thing." Why don't you go to the vid-clip of Ben's start on this site to see for yourself which way his arms are moving- facts are facts. (dcw- can you put the clip in here?)
2: IAAF analysis shows that Ben's first steps land farther BEHIND the CG than any other top sprinter ever- the inevitable consequence of the level of force production.
3: The emphasis on the lead arm in no way diminishes the action of the backward driving arm. The lead hand emphasis compensates for the mechanical disadvantage the lead hand has in clearing the ground. (The forward lean or pressure,in the set position, however slight, makes clearing the lead hand slower, as it must lift slightly before moving forward while the backward hand is released more easily- this becomes increasingly pronounced as forward lean in the set position increases.)
4: You say that John Smith is a great coach. I agree! Then watch how beautifully Mo gets his lead hand forward.

---

4. When did I say that the lead hand isn't important? If my memory serves me right, I actually said that I should have mentioned something about the lead arm in my other post. Also watch how beautifully Mo gets his other arm swinging back.

3. I don't know if your saying that I said to have a forward lean at the set position or if you're saying you should have a forward lean. Either way it goes I don't think you should have any type of forward lean. It restricts too many movements. Including the moving of the lead arm. It's pointing the athlete towards the ground, and it put too much pressure on the shoulders. It also restricts the range of motion the lead legs has when initially coming out. You can't drive your knee out if your torso is in the way . Forward lean usually means the athlete is too close to the line. And I see no reason to purposely do it.

2. I'll have to take your word on this one. I haven't looked into that area.

1. Again, i've seen the race. Otherwise I wouldn't have mentioned it at all. Readin the post more clearly would help you to understand why I said the things I said. Your right both of his arms don't go backwards. One goes backwards and the other one goes straight up. I said that i've read and heard other people say the same thing I said, because some people might not understand what I was saying. Meaning i'm not the only one that's seeing these things. And i'll never comment on anything if I didn't have some type of knowledge about it. If I don't know, i'll find out. Refer to # 2

Ben- Tim -Marion- Others??? The conclusion is: Anyone with technique other than "yours" should be corrected, regardless of their level of superiority. Lets move on from the special class and move over to philosophy 101. If sprinting (rather than the forum)is a hind brain activity, the sprinters can devote their higher function to contemplating your philosophical questions. In a similar vein: In ancient Greek, hate and fear were the same word.

I am not posting to win arguments, just to share the truth. I feel that any information, either sprinting technique or even ancient history should be based on truth and fact. I just don't need a generation of athlete coaches thinking that Plato is clay for little kids.

Anything here should be monitored for content both in accuracy and respect. Just like the sauna thread I want to make sure that we are not hurting athletes or giving the wrong information. Saying that it doesn't matter if the history is wrong or right is insulting me and everyone that is involved with that discipline.

I have hundreds of books on Greek philosophy, roman history, mythology, and general history. When someone makes a bold claim, I want the truth to be there.

I have shared in over a dozen of personal mistakes that I have done over the last two years in my athletes training. This take a lot of fortitude to share with thousands of people every day. Likewise, when others spout misinformation I will make sure that the truth is presented so all of our lurkers, not just members can have access to the facts.

Along the same line. I have a friend who's writing about Tupac Shakur and the Iliad. There are astounding parallels!

Quote

---

posted by Charlie
Treble
Ben- Tim -Marion- Others??? The conclusion is: Anyone with technique other than "yours" should be corrected, regardless of their level of superiority. Let's move on from the special class and move over to philosophy 101. If sprinting (rather than the forum)is a hind brain activity, the sprinters can devote their higher function to contemplating your philosophical questions. In a similar vein: In ancient Greek, hate and fear were the same word.

Lets say Marion, Tim, and Ben were losing some races because of their starts. What then should they continue to allow themselves to run less than they're capable? I'm not saying they have to do what I think is right. My ideas are influenced by everyone around me. I didn't invent the start that I teach. They can do whatever improves their start. You're right about the level of superiority, whether you planned it that way or not. No matter the amount you're winning your races by or how much faster than everyone else. You can always improve on certain things.

Oh yeah, did any of this help at all with your guy. I'm pretty sure someone answered your question between all of this.

I posted something similar awhile ago but it went into the ether!? Maybe it'll show up somewhere else. A few points to talk about:
1: A mechanically efficient start can be defined by speed thought the acceleration period.
2: the efficiency/economy of the start will be reflected, in part, by the athletes ability to finish the race.
That said: Mo, Marion, and Ben have/had equally efficient, albeit different, starts, but Tim does not (his reaction advantage is entirely lost by 30m- .02 to Mo, .03 to Ben, even though his top speed and finish is equal or better.
Based on all the training options available, at what point, and with whom, should changes be made in the start?

Is there an optimal way in teaching the start so changes would not have to be made as the athlete develops?

Besides focusing on correct mechanics i don't think so. As speed and power changes so does timing and the ability to apply force.

This may sound daft but it's not meant to be -
When breathing in at the start , how much air is the optimal amount considering the importance of what are you going to do with the oxygen.

How quickly should you exhale ? - short and sharp like when lifting a big weight or gently slowly expelling ?

I'm not referring to valsalva btw .

Well, I thought valsalva was what occurs over the course of the 100m, that it shouldn't be attempted deliberately and that it was better if it was allowed to happen naturally,
whereas I'm only doing 60m at present and was wondering what the optimal way of exhaling at the start was so as to maximise the explosive quality. But I suppose that in turn affects what comes after.

Does valsalva figure in 60m then?

Since I'm on...can someone explain the significance of having flat back when start? I'm asking this question for one, because I don't know and two because alot of coaches can get caught up with the idea of keeping there head down and not if the concept my be having adverse effects on the athlete? Therefore, a head down approach may be good for some and detrimental for others....just a thought.

Personally, I only think the biomechanics work one way: The torso must raise the head. Or as I tell my athletes, "Let the torso unfold". Don't let the head position fool you. In other words, their should be a line of force that can be drawn from the front block all the way up to the top of the head. That "line" should be straight. If the head is "forced" down, the shoulders will come down, the torso will come down, etc. That puts the athlete in a poor position to apply force and accelerate. I think that so many coaches and young athletes have watched what Mo is doing with his start and "think" that they must keep their head down like him. When in actuality, if you look at his torso position, it's angle with respect to the track is increasing exactly the way the biomechanics say it should- torso rises and "unfolds" during block clearance and rises with every step, adhering to the law of "every step gets progressively faster and longer". I think the fact that he purposefully keeps his head down is some sort of "overcorrection" or cue for him to insure that he executes his acceleration phase properly for HIM.

Mo is another example of how studying the performances of other athletes is important, one must always be careful to not try to imitate a particular individual just because.

Stretching and Massage

Main points:
Hydrotherapy is good.Biofoam rollers are good if used not that often. I'm going to try to order them soon. I didn't pay too much attention to the massage stuff since I'm not going to have a massage therapist for a long long time. Contrast showers are great.

After reading the recovery threads I decided I would make myself follow this recovery routine:
One CNS day:Ice bath
One tempo day:Hot shower
Next CNS day:Contrast shower (3 min. hot, 1 cold, 3 hot, 1 cold)
Next tempo day:Hot bath
And also try to get the stick and biofoam rollers and start using them on occasion. This is not very elaborate, but I don't have access to a steamroom, whirlpool, or sauna on tempo days.

Over the summer I'm going to use the 10*100 PU and SU workout detailed in Welcome to Recovery and Regeneration.

We have over 800 posts on training, what about recovery? Since half of training is recovery, what are people honestly doing? When do people massage your athletes, what types of stretching do you use? When do you do it, why then? After a speed day when should you do static stretches? Share your protocols. When do you do an ice bath? When do you use a sauna? When should you not use a therapy? Should you cycle therapy so it stays effective?

How about post- workout stretching as a recovery enhancer? Nutrient transfer and waste product removal are normalized when the muscles return to their pre-workout length (improved blood flow). Restoring the muscles to their normal length by stretching immediately after a workout can speed up recovery by 4hrs (the time it takes for the muscles to lengthen on their own).

How did your athletes respond to stretching post workout? Many times it is hard for them to relax after being so explosive. Precisely when do you have them stretched after cool down?

With all of the hype with ice baths, when do you do those? If cooling the the body slows down your metabolic rate, wouldn't that slow down repair as well? If an elevated metabolic rate increases activity would you lift and then go into a suana after drinking your recovery drink? What gives?

Re Stretching and cold therapy
Post workout stretching should be relatively static with long holds and great care should be taken not to overstretch. Cold therapy initially increases blood flow before prolonged exposure reduces it. Short applications of cold or hot and cold contrasts are very helpful for recovery.

What are the mechanisms behind contrast showers in accelerating recovery? Is it strictly the influence on increasing circulation? Thanks.

Contrast techniques, ice baths, and saunas.

It is very important to know the mechanisms of regeneration. Many time people do a recovery technique with no real understanding what is going on! What happens when you put an athlete in a bucket of ice? Stated in my previous post on regeneration, what happens when you use cold? No increase in blood flow.(Hocutt 1981, Knight 1995) In fact there is less blood flow with the increase of vasodilation from cold then room temperature. How can this be you say? Well the diameter of blood vessel doesn't not determine blood flow rate. In fact they have researched this. The theory of Cold Induced Vasodialation, CIVD for short, has been wrongly used for therapy. So why do cold baths? To fight spasm (muscles at resting length improves recovery and strength), decrease pain, and decrease swelling.

Saunas are a passive way to increase metabolism, this also increases melatonin levels to help with sleep, a vital part of recovery.

Contrast showers feel great, if they help relax the athlete then great. But again, there is no "muscle pump". Even if there was, it would be a waste of time. Many "special ratios" have been theorized (3:1 5:1 3:2) but if you heat for three minutes, and then cool for 1 minute. The transition from hot to cold was Dilation to constriction. First, why does constriction happen when the ice bath was "suppose to increase blood flow?" Well the initial response in cold is vasoconstriction, after 20 minutes or so then vasodialation will occur. Second, if the transition did happen, it open and released one time in 5 minutes. One "pump" in five minutes, or 12 an hour? Not very effective in my opinion. Lastly the lymphatic system is responsible for edema and free protein reduction, not the circulatory system. The lymphatic systems is mechanical so water running helps since it doesn't break down tissue like gravity based exercises such as jogging or most cardio programs. Don't do it during big meets because the nervous system can be stressed and altered firing patterns may be programmed(mayo 1998).

A good massage from an expert can help with lymph flow and those massage **machines (relax a minute-hydrotherapy) at malls work nicely.**

Re Contrast:
To all list members. Go into the shower, Run the water over your whole body,head included for 3min hot as you can stand it, followed by 1min cold as you can stand it. Repeat the cycle three times. Then, lets talk and compare personal experiences.

Ice Baths increase skeletal muscle repair! A mechanism to ice baths has been found this month on the thyroid and cold therapy. It seems that the thyriod has an important role in muscle synthesis. The cold will trigger a "significant release in thyriod hormone" to help repair muscle! As for protocols it must be under 60 degrees Fahrenheit for at least 15-20 minutes.

Can you articulate on this:
<<Lastly the lymphatic system is responsible for edema and free protein reduction, not the circulatory system. The lymphatic systems is mechanical so water running helps since it doesn't break down tissue like gravity based exercises such as jogging or most cardio programs. Don't do it during big meets because the nervous system can be stressed and altered firing patterns may be programmed(mayo 1998).>>

I remember cooling down my legs after a semi-final just to be informed that the final was only 30 minutes away. Do you think that cold shower affected my firing ability or pattern of recruitment somehow?

What I am talking about is pool running for blood flow and recovery. When running in deep water things happen that most people are not aware of. First the density of water is 800 times more then air. Gravity goes on vacation so it helps with reducing the impact forces to take stress of the joints. I am a swim coach as well so when I see speed guys in pool all of the time it drives me

nuts. It is trendy to do pool work, but too much will create problems like changing firing patterns of muscle systems.
Think about it, you do two sprint days a week of maybe 200-300 meters, while you are in the pool for two hours jogging back an forth or playing water hoops? In one session you are doing 100 times more work then a sprint session.

What does your brain remember? "As I apply more force in the water, it creates more resistance, so I am not accelerating but slowing down limb speeds." I am also teaching a slow movement and programming a different activation pattern. This is only splitting hairs if you are doing it with balance. I would not worry about it too much, just don't get addicted to the pool. I am not going into chlorine ions, or temperature, but the key question is "how did you run in the final?" A shower will not hurt performance; it might wake up the athlete.

An ice bath works, if you are doing one at all it means you are at worlds or nationals, so you have plenty of time between rounds to warm-up your core temp. It will not make a difference in a HS meet, I see fat kids running in sweatpants doing ice baths, work the basics first. As for pool work during a taper, I would request that no work should be done 4-5 days before the first round of your final meet.

I thought I was going to pass out! The change did something very strange. While I felt good after, I usually feel good after a shower period. I did finish with warm water since I had to actually shampoo and soap up to get clean, so I hope that didn't screw up the protocol.

Charlie, something happens but I just don't look forward to that type of recovery as much as a massage or sauna.

Last night I was sore from a long day, so what did I do? A contrast shower. I put it on as hot as I could take it, then went to cold (very cold), then repeated two more times.

I thought I was going to pass out! The change did something very strange. While I felt good after, I usually feel good after a shower period. I did finish with warm water since I had to actually shampoo and soap up to get clean, so I hope that didn't screw up the protocol. Charlie, something happens but I just don't look forward to that type of recovery as much as a massage or sauna.

I would suggest using a warm bath to take care of the washing routine and finish up with the hot and cold shower. It is important to finish with cold. I'm sure there are more pleasant means to recover but you can't beat the price!

How does this increase recovery? What is the mechanism! It was one of the most uncomfortable experiences in the shower I have ever had. Does the head being a target of the water have something to do with it?

I wish to incorporate more pool workouts, as a means of recovery, in to my weekly schedule. I really do enjoy tempo runs, however, our track isn't the greatest and I can't gain regular access to a "decent" grass field. The way our facilities are arranged the pool and the indoor track are in the same building (easy access). So with that said could anyone suggest how I might structure a pool workout to aid in recovery? Real quickly, I put 3 threes athletes in the pool once and experimented with some different movements/activities and they seemed to enjoy it. For one it's different and two there's no pounding.

Please be as specific as possible, i.e. duration, days in should follow, right after practice, etc.

DOMS.
What is your take on muscle soreness? do you try to avoid it at all cost? Or do you consider it as just one of the variables of recovery?

A strength training program in which the exercises vary often, causes more DOMS than one that doesn't, even ridicule volume of a new exercise will cause them. Increase in sprinting intensity will also cause soreness...do you plan to avoid soreness? do you still train a neural pattern that involves a still sore muscle group (e.g. running when sore from hip extension weight training)? any more issues anyone can think of?
I'd like everybody's take on that.

I will email you some ideas, research, and concepts I have learned from some great people. I don't believe in posting specfic information anymore because of two reasons. (1) Many sport coaches and performance specialists learn from the mother of sport (Track and Field, Speedtrap and Charliefrancis.com), then later bash track coaches, I Quote "simplicity of running in one line." I can't support this anymore.(2) Not enough space. I am not as concise as Charle, Who, like Sun Tsu from the *Art of War*, can make one or two sentences explain a rather difficult topic.

Speed Trap.

In **Projections 3:2-3** Charlie mentions water running. Ben ran waist high in the ocean and used the resistance of the water to improve. He also ran on the grass to cushion his legs.

In **Conquering Heroes 4:3** Charlie tries to save his athletes legs by getting off the indoor track surfaces.

After reading this I looked more into water running as a method to recieve the postive effects of tempo work, without the extra pounding on the legs. Here is some important factors(1) Match the cardiovascular effects of tempo work with water running. Intervals and percieved exertion scores do not match water running. Also deep water running(no ground contact)is a different motor program. Too much will compete with what you are doing on the track and screw your wiring. As for shallow work, there are still some differences, but they are too minimal. (2)The skin is an organ, named, as many of you know, the Integumentary system. It is receptive to many stimuli such as temperature regulation, pressure, and like a cats wiskers, direction. When in water this is a massive overload to the nervous system. While swimmers can adapt to this, pool work can fry many other athletes.(3)Knee lift, and other movements mechanics can cause tightness in the psoas major. (4) duration- Shorter the better. (5) Place before a "off" day.
There are even more details but talking to your athletes will help.

Re Water
Most of our water work involved drills from waste deep water to the shore- a distance of about 15meters. We tried for relaxation and extension in all our drills. We did them in the ocean in Guadeloupe or St. Kitts. Actual water running was done running in place in a pool, usually with feet touching the bottom about neck-deep.

Re DOMS
We certainly tried to avoid it, though not always successfully.

In **The Mentor 3:3-5** Charlie describes the value of massage a diagnostic tool. I feel that prevention is the key. Look at some of the elite warm-up...they don't. Speed workouts cold can cause unnecessary DOMS. Also all of the restoration and regeneration tools such as icebaths, massage, stretching, and electrotherapy/laser therapy are available. Some times you must have the balls to pull the trigger and say "go home". I think DOMS has value because it shows what

areas are trouble spots. I am not a employee of GO!, nor do I receive money from the company, but I have seen a huge difference in soreness in our athletes. I use it for my own lifting, and It works great.
What massage techniques do you find to be effective. What about stretching? What do you look for in a therapist?

Re Therapy
There are all sorts of massage techniques- light slapping before speed, flushing massage after speed, deep tissue work on the tempo days. As for therapists- try to get someone who will complement the skills that you learn to do yourself (yes- you're going to have to learn to do it yourself. You'll never have enough support to do all the work) Try to emulate what you have found works on you, get some tapes of skilled masseurs and practice. You don't have to be a rocket scientist to be better than the alternative (nothing!) and, after a while, you'll learn to be pretty damn good- Just start in, put your mind in neutral and rub!

Yes Charlie, even a coach can be good. Since I feel that massage should be done almost every day, I have the carpal tunnel syndrome (not from typing Pioneer) to prove it; my wrist is fine with the budget for tissue work is high. In addition to the fact that my athletes have reduced injuries, my skills with massage for "other endeavors" have made me more popular.

My next question is how much range of motion is enough? I feel that 115-120 degrees for the hamstrings is optimal for most sprinters. How do you monitor flexibility day to day? Does anyone use a Goniometer? Yoga or Pilates as a cross trainer during the restoration phase after you last meet?

I have a short lukewarm shower to wash etc. if I must wash during a hot and cold shower, and do not count it in the intervals. THEN I begin three minutes as hot as possible, 1 as cold as possible. It is never as hot, and never as cold, in the first set as it is in the last. Tolerance increases. By the end the last cold, previously dreaded, is wonderful in its relief. Staying longer than a minute is a temptation, but does not work if you stay too long. Then the cold is a chill and doesn't feel the same.

Is that funny feeling referred to after hot and cold because the hypothalums is more involved when you wet your head? I have tried hot and cold with a shower cap and it did not seem to work as well, even though I focused water directly on the back of the neck, the "rabbit punch" target area that controls temperature, as the "Mae West" cold water life preservers attest, and other survival techniques against hypothermia when immersed in cold water.

RE: I tried ending with warm to wash my hair etc and it seems to undo everything, wreck you. One feels similar to having stayed in a hot bath too long.

Does anyone do minor stretching under the hot on the first interval, just rolling the head, pulling an arm across the chest, or an elbow behind the neck? I find doing it briefly and gently in the first three minutes also help the hot water work. I don't do it after the 1 st cold or during the cold.

For those who want a great option for recovery the link in this post to one website that has a video clip of a machine I love. The reason I like it is that many malls in the US has it, and getting a appointment isn't hard. In addition to availability, it will not bruise tissue and feels great. Click the film animation to watch the video. *They are not a replacement* to a Waldemar or Skaggs, but something is better then nothing.

It uses water jets to break adhesions, relax tissue, and wear down trigger points.

What do people think about biofoam rollars and self massage techniques. We use biofoam rollars for only a few muscle groups since rolling just to roll is a waste of time and the athlete’s compliance will go down. We also do stretches with the ropes for hamstrings and groin.

For those who want some urls to checkout online:

www.tomdrum.com for fraidnots

(call to request the good ropes, meaning longer is better. The material is nice and female athletes at the university liked the look of them. They stretched to be cool!

www.performbetter.com
Biofoam rollers

Charles Poliquin recommends his athletes lie on a spine roller for 15 minutes prior to training. He says that this can increase performance by 2-3%.

See, step number 4 at:

www.testosterone.net/html/81ultim.html

I use my spine roller on average twice a day (morning and night) and I feel that it definitely helps my posture and back stiffness (in the lumbar region).

I noticed Charles Poliquin at his website states that contrast showers post-workout, raise the catabolic hormones - therefore, obviously not a good idea.
He said okay to do them before.

how long should the roller be?

Quote

---

posted by
What do people think about biofoam rollars and self massage techniques.

I've been using foam rollers for number of years now. I feel it's a great tool! Yes, just like anything else too much may be bad, but when you're working with a humble budget and a large group of athletes, the roller can be a great. We use it alot on our I.T. bands and on our posterior chain of muscles. Now that I introduced it to my athletes they always seem to ask for it, mainly after heavy lifting day and following lactic acid/SE work. When funds are low you need to find a way to get the job done!

Need is the mother of invention!

Quote

**How long should the roller be?
thanks!**

They are sold 3ft in length. We simply cut them in half and it has worked fine.

Quote

---

posted by Charlie
Re Therapy
There are all sorts of massage techniques- light slapping before speed, flushing massage after speed, deep tissue work on the tempo days. As for therapists- try to get someone who will complement the skills that you learn to do yourself (yes- you're going to have to

learn to do it yourself. You'll never have enough support to do all the work) Try to emulate what you have found works on you, get some tapes of skilled masseurs and practice. You don't have to be a rocket scientist to be better than the alternative(nothing!)and, after a while, you'll learn to be pretty damn good- Just start in, put your mind in neutral and rub!

AMEN to that! I've found that know one knows the athlete better than the athlete them self and the coach. At collegiate level you're given student trainers, who at sometime do more harm then good. Sure enough their heart is in the right place, but that doesn't exactly get the job done. I took in upon myself to learn through other coaches and specialist various forms of message, i.e. ART. I've come to believe to offer your athlete the best, you yourself has to be as well rounded or complete as possible.

Charles P states "**All of my athletes are told to lie on the spine roller for 15 minutes prior to training. My intern, Dave Harris, likes to call this area the "Poliquin waiting room." Lying on the spine roller opens up the intervertebral spaces along the spine, thus allowing optimal nerve conduction. This alone can lead to a 2-3% increase in the loads used in training."**

I will assume that CP is talking about using the foam rollers for traction. This is manual way of increasing the intervertebral spaces to improve nerve conduction.

Let's look at this theory from a....

(1) Physiological perspective
(2) Anthropological view
(3) A Charlie/Practical angle

The spine is composed as we know vertebrae that stack on top of each other. In my book I go into this further and how important it is to have good alignment.

(2)What is interesting is that the first vertebrates were aquatic. The primary locomotive abilities were from lateral movements. What is important is that Whales, dolphins, and yes, humans, are prime sagital movers. Front to back. Our problem with running and jumping is that the spine is loaded in a vertical plane. Other fast mammals do not have this problem because *the spine is horizontal*. Even an osterich who looks frightening similar to a struthiomimus (cretaceous period dinosour), has only the "cervical" part of the spine vertical. The rest is flat because of its' pelvis.

(1)Now, looking at a thoracic vertebrae, we will see two features that will protect the ventral and dorsal roots from damage. The height of the **Infererior** and **superior articular surfaces** and **transverese process** protect the spinal nerve. The intervertebral discs are also act a shock absorbers during fast running and jumping. What people usually forget is that the pulposus part of the disc is water. This all protects from vertical load. The only risk is when an individual disc slips out of alignment. Compression fractures do happen. Rarely does this occur with healthy bone though. Mainly with geriatric women with osteoporosis. With modern diets this will increase more and more with younger athletes and non athletes.

What location impinges the nerve to "slow down" conduction velocity? Plus, it is more the quanta of transmitter, not speed.

(3) Now does the foam rollers do this?(increase intervertebral space) I would say no since the vertebral spinous process would interfere with any manual work. Besides resting length of prime movers has very little effect on total length of the spine. Indirectly yes, but traction is the only way to go. Too much manipulation will increase ligament laxity(CFTS 2002) and this is expensive. Just like the secret lifts in the lifting before competition thread, this is not practical if it worked in the first place.

Ok, now for correct use of Biofoam rollers. This technique of self myofacial release has been used for years. I am getting more into balls. One of my mentors, Travis Skaggs, introduced me into this method. I feel that the shape of the ball, as well as the different inflation levels and ball size works better then just a foam rollar. I still feel that a one foot length biofoam rollar is great only for IT bands, anterior tib work, and some posterior chain groups. As for back, stay away.

One problem with the rollers is that they are too trendy and people think that they will do magical things. Get money for real hands if possible. But for people like me with no budget they are a great investment.

Re Therapy
Therapy doesn't speed up conduction velocity, but what it can do is reduce the volume of "traffic" being processed by the nervous system, making it possible to increase the alternation/inhibition frequency by reducing extraneous input. Comments?

What therapy specifically are you talking about Charlie? Please go into detail about what messages the body is sending.

As for catabolic hormones. GH is a catabolic hormone, it breaks down adipose tissue! Craig, tell me what specific mechanism CP is talking about.

Re Therapy
Any therapy that reduces muscle irritability or inappropriate tension will reduce the "background noise" that muscular activity must contend with. You're too young to remember party line telephones,(though you do hang out near Mayberry) but, when other people began talking on your line, it was hard to hear your own conversation. Getting the other unwanted people to hang up made getting your message out a lot easier.

Charles Poliquin replied, "I am not too keen on this system. Even though it has helps with circulatory clearance, it also increases noradrenalin output, which leads to increase catabolism. Of course that is the last thing you want post-workout. However, you can use this technique to activate yourself BEFORE workouts."

Q. I have seen a few articles regarding an alternating shower post-workout. Two articles cited a cycle of one minute hot with 30 seconds cold. In the other article, it cited 2 minutes hot and two minutes cold. What do you think of this technique? Has any research been done? Do you recommend it?
Thanks for any information you can give,

A. I am not too keen on this system. Even though it has helps with circulatory clearance, it also increases noradrenaline output, which leads to increase catabolism. Of course that is the last thing you want post-workout. However, you can use this technique to activate yourself BEFORE workouts.

Looks like it's time to throw the stone between Goliaths eyes.

This is a fantastic point of view. I am glad you pointed this out to me since I failed to post my theories of hydrotherapy. In Tampa, their are an array of amazing therapists. One does hydrotherapy only, and has great success. I use his methods and they help greatly.

Lying down helps greatly with allowing for intervetebral space, but sleeping 8 hours a day helps more then any biofoam roller.

What CP argues is that the contrast showers will increase epinephrine levels of the blood and start acting catabolic.

The science states that epinephrine is not elevated from exo-temperature.

But catabolic and muscle breakdown are different. Remember that epinephrine increases FFA mobilization, using fat as fuel. Another example of why strength training and sprinting make so many beautiful bodies (Sir Mix-a-lot you were right) Now, after finding the truth painful, the CP followers will say "what about glycogenolysis?" Well if you're using *fructose* and consuming enough carbohydrates then it shouldn't be a problem. It's like certain performance institutes that use cool capes to spare glycogen levels, eat more carbs if you have to people. Sometimes cool capes are needed to protect the health of the athlete, but some take it too far. If you slow down metabolism you slow down repair. This is why your body's metabolism stays elevated after exercise.

What about cortisol? Easy. Most good sprint programs will not have this problem. Why, low volumes will not create a depletion of glycogen stores. Only swimming and middle distance running may have this problem.

In fact hydrotherapy helps with cortisol levels. Remember that cortisol helps with repair when the environment is primed for an anabolic process

As for hydrotherapy and cortisol, some athletes respond poorly to high intensity training. Spending years in the intermediate speeds, max speeds can quickly drain an athlete. External stressors such as finacial, family, and media can increase resting cortisol levels that will start using muscle as fuel. I experienced this during the awareness of how much money it is needed to run fast (see superclub). I couldn't sleep, so my glycogen stores were empty, so my body was needing fuel.

Hydrotherapy helps with the "mind-body" relationship for health.

RE: Self Massage
I agree with concerning the roller balls. I've been using them for several months and they are very effective (and inexpensive). In another thread I mentioned the Trigger Point Therapy Workbook by Claire Davies. I strongly recommend this book. It teaches you how to work out trigger points in just about every muscle in the body, usually requiring nothing more than a tennis ball and a wall (or floor). It is some of the cheapest and most effective soft tissue work you will experience. The self-applied trigger point work is espcially effective when combined with the roller balls mentioned.

Re Hydrotherapy
On the subject of mind and body- and why you have to stand outside the shower to enforce the hot/cold sessions,as Richard Nixon used to say: "Once you've got em by the balls their hearts and minds will follow!"
Re Self massage
Has anyone tried the old tactic of using a kitchen rolling pin to work on the hamstrings? There's a therapy tool you can "borrow" from your mom! (seated or lying,you hold the handles and pull towards you while rolling up and down. Works pretty good.)

Charle,
I am keen to try using the rolling pin to massage my hamstrings, as mine do get tight quite frequently.

Before I start, can you answer: How long should I massage for? What time of the day is best? Should this done before and/or after training sessions? What are your recommendations on the above?

RE: Rolling pin
I have a message tool called The Stick which is based on the same idea as the rolling pin (only skinnier). MF Athletic sells it, but the rolling pin is probably cheaper. I need to get one anyway for making pizza dough and pasta. Might as well kill two birds with one stone.

What is your recipe for pasta and pizza dough? Perhaps we can share recipes. I have taken some classes from some "big wigs" perhaps we cans share actual recipes since they are whole food protocols.

We should probably start a recipe thread under Nutrition. I use the pizza dough recipe in Nick Stellino's cook book.

Please post your theory of what a trigger point is....we have a lot of talk about it but very little in depth discussion.

As for Claire's book, practical, affordable, and interesting.

Flash-
I do not wish to sound like a snot, but how you are doing trigger point work on your QL? I have done 2 dissections of humans(all male:1 bodybuilder who died in a car crash and one gang member who played varsity football and got shot.)

All of them had facia that covered the space between their low back and QL.

Travell and Simons' medical texts "Myofascial Pain and Dysfunction: The Trigger Point Manuals vol I and II" are simply the best out there. It shows a cross-sectional cut of a human every inch from the upper chest cavity to the pelvis. Very little room to get in and work with the QL.

This is a relatively mild form of therapy and the broad contact surface allows safe manipulation, even for a beginner. It can be done anytime you have available for up to 5min total (both legs). I prefer to use shorter periods like this more often as it gets the best results for the time spent.

Charlie,

Regarding the Rolling Pin: Do you hold the rolling pin in your hands, so it does not turn? or do you let it roll in your hands?
Also, do you only roll up towards your body, or do you roll towards and away from your body?

I will be honest with you. I am not a fan of rolling pins and I hate the stick. This is my "taste" in massage and bodywork from a practical standpoint, not on any specific research.

Take a look at the hamstring muscles. *Who is going to do the rolling? You can not do it with enough pressure to replace a biofoam roller or dense theraball.*
Post how you do the rolling by yourself, and I will explain some of the drawbacks.

I massage my athletes since I feel that this should be done as much as possible. We go back and forth on the balls and foam rollers.If you do decide to roll yourself remember to hold the handles. Keep in mind that an external device is between the best tool for massage, your hands!

My athletes realize if they get hurt, I will ask about the "hidden training" such as the rolling and static stretches. If they say no, I get quiet. Since I am the biggest bargain in pro track, they know they better follow my directions or I will go back to swimming full time or work in the Investment world for a year or two, leaving them out in the cold.

WHAT IS A TRIGGER POINT? ANYONE?

A trigger point comes in many forms, as you know, from travells legacy.

Personally, I think that trigger points are specific regions of tissue, in the muscles, connective fascia, joint and other biological material that when active, produce pain referral to stop unwanted movement.

Now why do I say this? Well, look at what happens when a muscle gets sore. Let's say the anterior deltoid. When the ant deltoid gets sore, one of the possible causes is referred pain from infraspinatus and subscapularis. This happens because these muscles have been overloaded, and once that happens the body doesn't want injury, and thus makes the dormant trigger points active, thus providing a safety mechanism for the joint.

You look at the similarities between say the TCM meridian system, the Japanese Tsubo system, the Indian chakra system, acupressure/puncture, reflexology and Janet Travell's system, and you find that they are all very similar. The way I think of most TCM is that they had the practical answers, and described it as best they could at that time of existance. This means that energy flow was described, instead of patterns of biological muscular activation, and energy fields, instead of electro-magnetic fields... it is all so similar its not funny.

As a therapist I know once said (he knows EVERY type, been practicing for years) - once you know them all they all merge, they are all much the same.

He taught me quite a lot.

So, a trigger point can have many names, but really, I think is just a bodily protection mechanism to decrease overload under certain situations. As a reductionist we can't see how they form, for example: a decreased resting endplate potential will never show an overlying system such as the meridians.

There is a book I would recommend for a beginner wanting to do massage, which has general descriptions of most of the techniques, goes into some detail, and has pictures and methods of self massage. The book is called Sports and remedial massage therapy, by Mel Cash.
This would be a good book for introductory massage.

The studies show that superficial massage is not as good as deep massage for prevention of myofascial trigger points, and if this is what you are trying to treat, then massage with the pin has too bigger a surface area to get in there, especially as the TP's are < 1cm diameter.

RE: QL
I'm relying primarily on Clair Davies' Trigger Point Therapy Workbook in treating my trigger points, and he bases his self-application methods on Travell and Simons. I'm simply following his recommendations.

I fully realize that the QL is beneath other more superficial back muscles, but I can still feel the benefits of applying Davies' recommendations for the QL. He does a good job describing approximate trigger point locations and their referred pain patterns. I have definitely noticed an improvement in the referred pain pattern specifically associated with the QL, which is different from the referred pain patterns of the muscles lying over the QL, so I'm inclined to believe that the QL is getting some of the benefit, not just the superficial muscles.

The inability to properly isolate deeper muscles is one of the practical limitations of massage in general and self-applied trigger point massage in particular. There's what's optimal and then there's what's doable, and as long as I notice a benefit I'll use a method, especially if its cheap and convenient.

RE: rolling pin/stick
I have to admit that I've had the Stick for several years, but I never really used it consistantly for the main reason pointed out: not enough pressure. I agree that the small Theraballs are far superior because you can simply rely on bodyweight to do the work for you. If you have to use a lot of effort to apply self-massage it becomes self-defeating (robbing Peter to pay Paul).

But I'll probably still get a rolling pin for baking

Flash-
Don't take this the wrong way, but when do you expect the QL problems to stop? Is this a pattern of pain? Or was is just an isolated incident? Are you treating a symptom?

Let's solve this today and find a way to apply the right therapy.....

This is not a recurring pattern. The tightness in the QL has been there for a while and I'm just now starting to address it. It's not as if it keeps coming back after I work it out. Trigger points that have been around for a while take longer to work out. I had more recent ones form in my shins from running and I got rid of them in one session. It's also been a while since I've seen my ART guy. I went to him initially to break up scar tissue in my left rhomboid which had been there for years. Now I need him to address the QL and a few things in my left hip. But again, it's not like they keep coming back. I just haven't gotten rid of them yet.

I've only been apply Clair Davies' methods (based on Travell& Simons) for a few weeks, treating one area at a time, and so far the results have been great and the problems do not come back. I just have to get rid of the effects of several years of training without concurrent soft tissue work.

I hope things improve Flash, why were the trigger points there? Trigger points are warnings....

Taken from www.thebodyworker.com/triggerpointdefinitions.html

Trigger Point Therapy Definitions

Trigger point - (Myofascial): An area of hyper-irritability within soft tissue structures, characterized by local tenderness and sometimes referred phenomena. These referred sensations can include pain, tingling, numbness burning, or itching.

Not all trigger points refer pain, some are just localized. Each person is different depending on their life history. Localized areas of deep tenderness and increased tissue resistance that often produce referred pain.

The origin of the trigger point is thought to be changes in the chemical balance in a local area, irritating the sensory systems.

Active trigger point: Cause of the immediate pain, prevents muscle from fully lengthening and sometimes weakens.

Latent trigger point: Unnoticed by the client until pressure is applied, Not actively painful. Usually feels dense and fibrous.

Characteristics
Trigger points may be associated with Vitamin B-6 and other vitamin deficiencies. Usually after a trauma or stressful event, the body is lacking in B-6, magnesium or Vitamin C. Trigger points are more likely to develop.
Trigger point are usually bilateral, with one side being more symptomatic than the other. Both sides need to be treated.

Trigger points may be a result of underlying visceral disease, arthritic joints, or other trigger points.

The most tender trigger points are usually not the source of the problem. Other areas need to be treated like the referral area and the surrounding tissue. Look for tight stringy band in small supporting musculature.

Trigger points can cause referred pain, but not always.

The referral patterns are not the same in any 2 people.

Referred pain does not follow segmental, scleratomal or dermatomal patterns.

May cause pain and stiffness especially after periods of inactivity such as sleeping or sitting for awhile.

Possible Causes
Acute overload, overwork, fatigue, direct trauma, chilling.
skeletal asymmetry such as short leg or pelvic imbalances.
Other trigger points can cause new points to occur.
Arthritic joints can cause trigger points.
Visceral diseases such as ulcers, renal colic, myocardial infarction, gall stones, kidney problems, irritable bowel syndrome can cause trigger points.
B-6, magnesium, vitamin C, folic acid deficiencies which are common after injuries or trauma may cause trigger points
hypoglycemia
chronic infection from a viral or bacterial disease.
food allergies or intolerances. Wheat and dairy products should be checked first.
toxicity due to exposure to organic chemicals or heavy metals

Thanks. However, I'm not debilitated by any measure. I'm just very tight on my left side and stretching alone has not improved it. The only time I feel tenderness is when I apply pressure directly to the area, and the referred pain is very slight, again it's more tightness than anything else.

The tightness in my QL has probably contributed to tightness in my left hip (or vice versa) as they are interrelated. It's just a matter of loosening everything up, but again, stretching alone is not enough.
Quote

Latent trigger point: Unnoticed by the client until pressure is applied, Not actively painful. Usually feels dense and fibrous.

That's me.

This is why bodywork is vital! Massage needs to be done every day if possible. Superclub anyone? I am still waiting.... (I don't have a solution, I just whine a lot.)

Having good hands on you can "catch" things before they get bad. Not to sound like a cocky jerk, I am proud of the work we have done as a team to prevent ANY trigger points. This is from quality and self recovery (athlete)....

Get enough CASH, and you will see how fast you can be. When you have consistent massage, maintaining tissue texture becomes easy, so then the progression becomes:

Therapy --> Recovery --> Performance!
Latent trigger points are not active - so therefore will not cause tightening!
So, yours must be active, if they indeed produce pain on compression. Otherwise, you will not have felt any referral patterns.

There are many ways to treat quadratus lumborum; the effectiveness of each will depend on the problem, and the individuals surrounding musculature. I think one of the most underrated ways of releasing trigger points, and a therapy modality that should be used after pressure manipulation is stretch and spray.

A good technique for QL would be to do your TP therapy in a myriad of positions, lying on side, prone etc, different leg positions (on table, raised or hanging off table), and then do some stretch and spray. A good technique I use in this area is to apply the stretch, and apply a cold metal comb to the skin, going at 10 cm/s as per travell/simons, and then do contract relax stretching to further release. This will provide a better overall response than just the TP therapy alone.

Remember that TP's are activated by the body to protet regions of impending stress, and that the body will re-activate them if correct movement and flexibility is not re-established.

This, along with other measures which would take me a long time to write out, forms what I believe to be a complete therapy, as it not only tried to lower the irritability of the TP, but to decrease its reoccurrence.

I agree 100%. An ounce of prevention...

I think this has always been my #1 problem. It's ironic; when I was younger I simply did not have the financial means to afford the massage work. And now that I can afford it, it's hard to find time to schedule it. But if I can find time to train, I can find time for massage.

I feel that coolant sprays are not that effective for all the work to obtain it (US perspective) If you have a problem with trigger points then you have far greater problems that you are not addressing.

As for QL and sprays some of the methods Simons and Travell have provided were been disproven 10 years ago. I am not saying that their work is not good, It just that not everything is gospel or perfect.

Trigger point therapies are funeral home skills, too late to help the healthy.

RE: trigger points
Some of them cause dull pain. The latent ones do not cause referred pain normally, but when I press on them, I can feel either pain or tingling in the predicted referred pattern. So I know they are there. I'm trying to get rid of them before they become active. And I've found trigger points in almost every chronically tight muscle I have.

The more extensive Travell&Simons methods aren't practical for me right now, even if they are more effective. Again, optimal vs. doable. I definitely need to see my ART and massage people more consistently.

What does everyone think of Applied Kinesiology? I haven't studied it much, but my ART chiropractor is big into it. To be honest, I'm not impressed. I go to him mostly for the ART and if he wants to throw in some AK, fine. Any experiences with this?

Mel Siff did a big review on AK practitioners on the super training forum a while back, basically said no research says they are any good, and no one has had many good results with them, just like chiropractors.

I think that all the different modalities have their advantages, and disadvantages... I think stretch and spray - (well when I use it it is a stretch and comb) - is a good method for increasing ROM to the muscle AFTER it has been released - not instead of. This release could be ART (which I also am learning to use), NMT, Deep Tissue or acupressure, whatever. The same thing as using PNF/contract relax, muscle energy, AIS etc, I think comb and spray is great for re-educating movement patterns that the body has not been able to do because of the TP.

To get rid of the TP's, you have to do remedial work to make sure they don't come back, whether this is changing motor patterns, working on the spine (as cannon's law states - if the nerve supply is decreased, the tissue supplied becomes hypersensitive), or working on emotional issues which can also effect this.

I would love to know how they disproved it, and who did it. I love reading anything by the man in black

I just got the new edition of the Journal of Strength and Conditioning Research from the postman.

J Strength Cond Res 2002 Aug;16(3):446-450

Acute Effects of The Stick on Strength, Power, and Flexibility.

Mikesky AE, Bahamonde RE, Stanton K, Alvey T, Fitton T.

Human Performance and Biomechanics Laboratory and National Institute for Fitness and Sport, Department of Physical Education, Indiana University-Purdue University, Indianapolis, Indiana 46202.

The Stick is a muscle massage device used by athletes, particularly track athletes, to improve performance. The purpose of this project was to assess the acute effects of The Stick on muscle strength, power, and flexibility. Thirty collegiate athletes consented to participate in a 4-week, double-blind study, which consisted of 4 testing sessions (1 familiarization and 3 data collection) scheduled 1 week apart. During each testing session subjects performed 4 measures in the following sequence: hamstring flexibility, vertical jump, flying-start 20-yard dash, and isokinetic knee extension at 90 degrees'(-1).

Two minutes of randomly assigned intervention treatment (visualization [control], mock insensible electrical stimulation [placebo], or massage using The Stick [experimental]) was performed immediately prior to each performance measure. Statistical analyses involved single-factor repeated measures analysis of variance (ANOVA) with Fisher's Least Significant Difference post-hoc test. None of the variables measured showed an acute improvement ($p </= 0.05$) immediately following treatment with The Stick. Reference Data: Mikesky, A.E., R.E. Bahamonde, K. Stanton, T. Alvey, and T. Fitton. Acute effects of The Stick on strength, power, and flexibility.

The above study just had a direct connection to my r-level (thanks Clem that was interesting).

I am going to hold my own study on acute effects of the stick when used via a totally different means on really dumb researchers. My guess is that it will make the eyes bulge.

Yes Clem, the stick isn't the greatest tool but it is better than nothing at all as a POST workout massage substitute if the athlete has no other means at their disposal.

Who pays for these studies?

The above study just had a direct connection to my r-level.

I am going to hold my own study on acute effects of the stick when used via a totally different means on really dumb researchers. My guess is that it will make the eyes bulge.

I like the stick thing with the wheel- (looks like a tire on mini-hummer). They come with and without magnets. The one I saw was a Nikken. whether the magnet helps or not, the wheel itself works well for self administration. For the budget conscious, you can always ripp off your mom's rolling pin. (Did I say that?)

I like the stick thing with the wheel- (looks like a tire on mini-hummer). They come with and without magnets. The one I saw was a Nikken. whether the magnet helps or not, the wheel itself works well for self administration. For the budget conscious, you can always ripp off your mom's rolling pin. (Did I say that?)

There are some interesting trends in the flexibility research over the last few years questioning what changes are occurring in the muscletendonis unit if any-

J Physiol 1996 Nov 15;497 (Pt 1):291-8 Related Articles, Links

Erratum in:
J Physiol (Lond) 1996 Dec 15;497(Pt 3):857

A mechanism for altered flexibility in human skeletal muscle.

Magnusson SP, Simonsen EB, Aagaard P, Sorensen H, Kjaer M.

Team Danmark Test Center, Copenhagen Muscle Research Center, University of Copenhagen, Rigshospitalet Afsnit 2001, Denmark. P.Magnusson@mfi.ku.dk

1. We investigated the effect of a long-term stretching regimen on the tissue properties and stretch tolerance of human skeletal muscle. 2. Resistance to stretch was measured as torque (in N m) offered by the hamstring muscle group during passive knee extension while electromyographic (EMG) activity, knee joint angle and velocity were continuously monitored during a standardized stretch manoeuvre. Seven healthy subjects were tested before and after a 3 week training period using two separate protocols. Protocol 1 consisted of a slow stretch at 0.087 rad s-1 to a predetermined angle followed by a 90 s holding phase. Subjects were brought to the same angle before and after the training period. Protocol 2 was a similar stretch, but continued to the point of pain. 3. During protocol 1 the torque rose during the stretch and then declined during the holding phase. EMG activity was small and did not change significantly during the protocol. No significant differences in stiffness, energy and peak torque about the knee joint were seen as a result of the training. During protocol 2 the angle to which the knee could be extended was significantly increased as a result of the training. This was accompanied by a comparable increase in peak torque and energy. EMG activity was small and not affected by training. 4. It is concluded that reflex EMG activity does not limit the range of movement during slow stretches and that the increased range of motion achieved from training is a consequence of increased stretch tolerance on the part of the subject rather than a change in the mechanical or viscoelastic properties of the muscle.

Are you sure massage needs to be done everyday? I mean, if money and a good masseur is there, very probably, but is EVERYDAY a high priority?

Some national teams have A SET of good therapists, yet not all the athletes respond as well to therapy and sometime get their butt kicked by african sprinters that get a massage may be once a

week.
My point is: there can be something like "over-adjusting" for some athletes. Of course, it depends on the therapist and his knowledge upon the muscular status changes of the very athlete, too. Thoughts?

I think it depends on how the massage is performed. If the therapist is significantly reducing the muscle tone too often, then it's impossible to fire the muscles at maximum on the track. If some of the massage is light, then there shouldn't be as much interference. It's a balancing act. Too little chronic muscle tone is almost as bad as too much tone.

Massage everyday? I think too much adjustments from chiropracters is a problem. In the CFTS the chiropractor is very clear that too much adjusting will create joint laxity. As for muscle tone I will stick to 5-6 days a week for massage. One thought is will massage loose its effectiveness being done every day. Sort of like a drug. I don't know since we could never afford to pay for that type of therapy for more then a few weeks.

(1)Sure, I can eat nutritionally sound meals prepared by a chef, have a strength coach, pay for a track coach, and still not run as fast as a guy who works out a few times and has more talent. Just because someone is faster, you can't compare that much on therapy.

(2) Some athletes might be born with a great metabolism. Maybe some athletes are born with great muscle tonus and are able to maintain most of it during training and competition.

(3)Mix up your recovery to get better results. Not only does this keep the stimulus sharp, but gives variety to the athlete. Maybe a deep tissue massage twice a week, a professional stretch by elitis on Wednesday evening, ice baths after each speed session, and hot saunas on tempo days? This is a pretty good mix.

What do you think?

It depends on the Therapist, the athlete and the coach. Sorry this is so open ended but that's what it comes down to.

Quote

---

professional stretch by elitis on Wednesday evening,

You may not need elitis to be there at all. As at Saturday 2PM I think he is a genius but I need a few more weeks to correlate and test. Stay tuned

> 1) I was comparing élite athletes, actually a whole team compared to one or two athletes. I think therapy can be a component that could be overdone in the peaking phase.
>
> 2) True.
>
> 3) I agree.

Yesterday i had a high cns day with sprints followed by weights. I was extremely sore today, more than usual, probably because I hit a new 5 rep max on power cleans. Anyways, today I decided to try the contrasting shower therapy that Charlie proposed earlier on this thread. 3 min hot, 1 min cold; repeated 3 times. When I had my 3 min of hot, I put the shower on as hot as i could stand almost no cold. When it was 1 min of cold, I had no hot on, just all cold. i must say, it was a lot different than i thought it would be. When I would switch to cold, i would get almost short of breath and a tingling sensation would rush through me. When I was finished I felt very relaxed. I will report on how my muscles feel tomorrow, but i already feel better than before.

I have a question specifically for you regarding tight soleus muscles. My solei (sp?) get very tight particularly when I do my tempo running. The stiffness and soreness usually show up the next day. The tightness causes a lot of pain on the inside of my lower shin. I regularly use the calf stretch in your microstretching routine, but it doesn't seem to go deep enough into the muscle to relax it sufficiently. Are there any other techniques or stretches you could recommend.

In addition, I think the tightness in the soleus is due to the soleus compensating for another muscle, resulting in the soleus getting overworked. Also, because the soleus is tight and can't fire properly, I think a lot of impact force gets absorbed by the tibia and connective tissue, which might be why there is so much soreness along the bone. I stretch and get massage regularly, so I really can't detect a major tight spot. In your experience, have you found a correlation between the calf muscles and other muscles groups that can result in the calves getting overworked to compensate for the other muscles?

Do you wear orthotics? As for the question yes the calf muscles can compensate for other groups, specifically if you have an imbalance in your system where one side is compensating for the other. What calf stretch are you doing, the sitting one or the stand up one?

No I don't wear orthotics. I've been doing the sitting stretch. As a further detail, my peroneal muscles tend to get tight as well. This might be related to running on the grass. However, I do tempo runs on SMUs soccer field, which is flat and well maintained, and if I do tempo on the track, it kills.

I tend to have tight hips muscles, specifically the external rotators and glute med, which I know is common in runners. This might be contributing to the extra load placed on the calves. Are there additional stretches or methods you could recommend for the hips other than what's in your micro stretching routine? I think this might be useful for other members of the forum as well.

I view my calf/lower leg problem as a symptom of some other underlying muscle problem.

When stretching your calf muscle do you find discomfort in your tibialis anterior?

None. Although I don't stretch the anterior tib. Could that be contributing factor?

often if the calves are tight the foot is pointed forward this is an indication of a weak tibialis anterior. My next question is how tight are your hip flexors? As for the peroneus muscles how tight are your ITBs? They often contribute to peroneus problems specifically laterally and distal to the knee.

How strong are your feet? Think about it!

Surprisingly, my hip flexors are pretty loose. Although, I'm sure there's room for improvement. At the seminar Derek showed me a new supine hip flexor stretch that I will probably incorporate into my stretching.

My ITB has been tight in the past, which caused a lot of pain in the right knee this summer. But I've been having the ITB worked on during my twice weekly massages for the past couple months and all problems seem to have been resolved. The peroneus only tightens up from time to time, most of the problem seems to be in the soleus.

Originally, I thought the problem was in the flexor digitorum longus because most of the pain is along in the inside of the lower shin, but a few weeks ago I had another massage therapist do some deep trigger point work higher up on the soleus and it loosened up everything. But as soon as I ran again, the muscles tightened up. I just have a feeling that something is wrong with my biomechanics, but it really only happens with slower running, when there's heel strike. So I feel it

when I do warmup jogging and tempo. I don't feel it from the sprinting, but of course it affects the sprinting.

E-reading your original message to me this pain in the bone have you been checked for stress fractures?

No I have not been checked for a stress fracture. However, I don't think this is the problem. I need to be clearer, the pain is along the inside edge along the bone where it meets with the muscle, so I think it has more to do with inflamed connective tissue.

What you said about the extra range of motion in the calf makes perfect sense. I really only feel it when the heel strikes. I've always had problems with heel strike doing this, which is one of the reasons I neglected slower running in years past.

Though I have been performing your stretching routine fairly regularly, I do think my calves need extra attention. For example, when the lower leg is acting up, I feel intense stretching and pressure when I squat down, e.g., to check something in the cabinets. In fact, last night, after I finished my stretching, I went back to the calves and finished with another set of three stretches for each side, which really made a difference. So I think I just need to increase my volume of stretching for the calves. I assume the routine in your PDF file is primarily a maintenance routine, and I really need to do extra remedial work for my calves.

Related to the swing through at the hip that you mentioned to dcw, I notice that I tend to do this in tempo as well. The legs feel a little like dead weight, so there's probably a foot strength issue there as well. As usual, there are probably a couple of things interacting. Thanks for your input.

my take is that everything is connected to everything else. All it takes is one little thing to be out and after a few weeks there's problems everywhere!.. But what you said makes perfect sense.

I am very interested to hear your comments on Flash's last post. We have been using the routine for a while now and I think it's good enough to be declared a secret (this is what my athlete wants these things to become once she find that they work).

But, as Flash has asked what about when needs are above maintenance? Do we double up on the existing stretches for the problem area or are there some most secret routines locked up in the Elitis vault?

My biggest challenge is to try and teach people how to stretch from a therapeutic view. Over the past two years I have shown Derek how to do it. He has apprenticed with me but there still is a lot of groundwork to lay down. I am open to suggestions as to how we can bring this technique into the forefront but I do not want to give it a Paul Chek or a Micheal Lehy approach.

One cannot take a weekend seminar and then expect to stretch the individual properly. The in depth knowledge that underlies the technique is immense. David (dcw23) I would like to set up something through you too down in Australia. Any suggestions to my dilemma?

When it comes to education about microstretching I would take a two pronged approach directed toward different audiences. The first approach would be directed toward professionals like Derek and David and would include coaches, therapists, etc. who actually treat patients/clients. This obviously involves a lot of hands on personal training similar to a medical residency. There's simply no substitute for that kind of training, and it's the only legitimate method for educating professionals. You're right, a weekend seminar is not sufficient to adequately educate a therapist, only to introduce basic ideas.

The other audience would be educated laymen such as myself and other members of this forum. Your PDF containing the basic microstretching is an example of this approach. The idea is not to

educate someone that has the comprehensive skills to deal with a wide range of serious orthopedic problems. Instead these would include basic techniques that can be used on one's own. In addition to the basic program in the PDF file, you could also produce material on some more advance techniques for specific problems that could be learned with a little bit of practice, maybe in the form of additonal PDF files, a book or video presentation. The key is to be clear about the limitations of such instruction and the issues which can and cannot be addressed without a trained therapist.

I had no time to read all the posts but Charlie referred to your "mom's" rolling pin. There is a product available (probably everywhere) running stores some bike shops for $30.00 called "The Stick". Looks like a narrow rolling pin with roller-segments on a semi-flexible rod with rolling handles. I got's one and it works great particularly (for me) on the anterior and posterior tibialis. Grip the handles and roll towards the heart...The calves especially love it.

I like the stick too. I get the blood flowing if you don't have massage. It certainly can't hurt the workout. Shannon Sharpe uses it in his warm-ups one of the NFL coaches claimed that he was the best prepared player in the NFL.

i have also used "the stick" with some success. to many athletes use it with nothing else. it is a good aid, but shouldn't replace any part of your warm-up. i have used it watching TV and just sitting around the house. not a bad investment, but i also considered a rolling pin for a fraction of the price!

I use the stick after a workout during my stretching regimen. I have to say that last winter I was injured for 3 months due to tight calves pulling all the other junk on the front of my shins outta whack. Since purchasing the stick and using it religiously after every run, regardless of effort, and including static stretches I haven't had a problem since. Not a bad recovery tool for 30 clams.

Muscular mechanics from a sprinting perspective

Main ideas:
This is a very important concept for sprinting:

While sprinting at a high level can do much to develop the appropriate muscles, first you have to develop the muscles to the point, and in the way, that will allow adequate speed to be carried out (another chicken and egg deal). You need to have an adequate hypertrophy phase- though the form that will take is highly individual- but once musculature and speed are falling into place, I'd say that the sprinting leads the weights.

I also like what Charlie says about the "scientific limit" of times always changing, especially with Dwain Chambers talking about the limits of the human body. I'm going to ask about that sometime soon in that thread. Science is good, but most of the time it follows coaches. Muscle biopsies are sort of ridiculous. Performance is what matters.

"What about the sequence becoming better by increased power due to the shift paradox and hip height?
The body will fire a pattern that is more effective from a mechanical perspective, meaning the right muscle is fired with the right level of tonus in the right order. This can only be done if optimal technique is in place but will improve from lower levels of ability as well."

This of course can occur, but has anyone considered changes in the macrostructure of muscle? Muscle can change fiber arrangement, pennation angles and other macroscopic qualities to improve the ability of that muscle to handle a stress.

Does anyone have any information (Tom///Charlie) about how long these changes take, and how specific to the angles of force through the muscle they are?

Is the rearrangement of macroscopic muscle structure with respect to time asymptotic? I would think it is. Maybe that is why some gains in sprinting happen very fast after you start, and then the gains (in actual top speed) occur more slowly after the initial rate of improvement.

This rearrangement of muscular fibres to maximise force output for a given activity would also give a lot of indicators to training.

A. Too much time in the weightroom, or doing plyos would tend to decrease ones ability to change the macrostructure to the correct angles for sprinting.

B. This is another potential way for tempo work to help the sprinter - by increasing overall volume of tempo work, one can effectivley force the body to spend more of its state in the "sprinting state" - therefore allowing one to do additional, non-specific work such as weights and plyos.

C. The ability to relax may not only help the body run faster, but help it align the fibres into the correct arrangement.

D. Practice makes perfect - if you have perfect practice, your body can align itself to efficiently completing that task. Non-perfect practice would lead to non-efficient muscular arrangement.

Maybe this would explain why Carl Lewis had some of the best upper hamstring development I have ever seen and swears he never seriously lifted before 1996.
Can sprinting cause hypertrophy in the prime movers?

Sprinting will increase muscle mass since three of the handfull of hypertophy elements are in place for this morphological addaptation.

(1) It is high intensity
(2) 180 plus ground contacts minimum (high volume)
(3) Large muscles are stimulated.

One variable is time under tension and rest periods of 90 seconds (clasic hypertrophy PH disruption protocol).

Why not hypertrophy from just the sport?

Charlie
Administrator
Forum Moderator
Posts : 1506

10/17/2002 : 2:11:48 PM

I have spoken to witnesses who saw Flo Jo run 2 times 640m runs at 400 m splits of 50.0 and 49.7 from a stand- and keep going at a similar pace to the end and walk away without bending over!! (approx 45 min break.)
Also 6 times 160 meters (not 150) in 16.4 from a stand with a 240 m walk recovery! What else needs to be said!! Truly as amazing as her races in Seoul- still running 48.0 after all those races!

Can increasing the breath of exposure at a certain % of max be a key to developing the appropriate levels of organism strength needed to improve max velocity?

In weight training we stay with low reps(3-6) at 85% and above to elicit strength gains. We don't go in the weight room put on the max we can bench, start trying to knock out singles and expect to make continued gains. Is not, doing flying 20 the same as doing singles.(we can only hold max for 20m)

On the other hand if we go for 20 reps we have to lower the % of max we can use, and as a result recieve less if any gains in strength(maybe some in endurance). So maybe the art is in finding the right rep at the right % (6x160 at 16.4)

I reposted the above post because I think it may tie in with this discussion.
We are always looking for a way to bridge the gap between weight room strength and output on the track, what if all or most of our strength requirements can come from the track. As stated above all of the elements for hypertrophy development are present in sprinting. The stimulus is high intensity and very specific, so we can bet the hypertrophy is functional. The key may be the time under tension. Which is more inportant, the height of the stimulus of the breath of the stimulus(sprinting is already high intensity). Flojo's 6x160 in 16.4, is that the right amount of t.u.t. at the right %.
Desai stated that when he is having an optimal run he feels it in his upper hamstrings. Maybe we need to have our sprinters experience more volume running the optimal way to develop the organism strength needed to keep getting the hips higher and higher.

Noendurance writes.....

This of course can occur, but has anyone considered changes in the macrostructure of muscle?

Muscle can change fiber arrangement, pennation angles and other macroscopic qualities to improve the ability of that muscle to handle a stress.

Does anyone have any information (Tom///Charlie) about how long these changes take, and how specific to the angles of force through the muscle they are?

Most strength/power differences of elite sprinters results from superior neural patterns rather then differences in fibre architecture.

Fast twitch subtypes can change FTb to FTa, however FT cannot be altered to ST primary due to the type of nerve innervation.

Angle of pennation of fibres is determined by genetics.

Long term changes in sprint performance results from neural changes

Hypertrophy results from a combination of the following microscopic qualities.

*more myofibrils
*more actin and myosin filaments
*more sacroplasm
*more connective tissue

These components exist within a single muscle fibre.

Anthony Blazevich did some interesting research in the area for his PhD (has not been published yet).

Some interesting points being made here. Not sure that all of it is 100% accurate though!
Not sure I agree with your statements on muscle adaptations, as far as i can see it is becoming clear that muscle fibre types are something of a continuum... from type I to type IIx or IIb as it is still often referred to in many texts... A lot of experimental evidence from both training studies and cross sectional research shows that shifts in fibre type or proportions of myosin heavy chains can and do occur as a result of training. Often the common shift seen with sprint training is a bidirectional one towards IIa (from type I and IIb).
So yes type II fibres can become type I with the wrong training.
A couple of references to this effect
Simoneau et al., 1985. EJAP; 54: 250-3
Esbjornsson et al., 1993 Acta Physiol Scand 149; 245-6
Linossier et al., 1993 EJAP; 68; 408-14

In general excessive over loading of a muscle can and will cause a shift towards slow twitch muscle. It is my belief that those individuals that are able to handle a high training load and still maintain favourable fibre type proportions (ie high IIa and IIx) are the individuals that are most likely to succeed in sprinting (all other things being equal of course!!)

As far as the time frame for adaptation it appears some changes can take place extremly quickly with a couple of papers suggesting measurable changes within a week although a month may be more relistic (am happy to provide further references if you want them).

Finally I don't believe that all long term changes in sprint performance are just due to neural changes. Muscle adaptations will also continue for long periods of time given changing stimulus...

Oh yeh I also have a feeling that pennation angles can change slightly with excessive hypertrophy, though would be hard pressed to find a reference for that quickly...

Angus writes

So yes type II fibres can become type I with the wrong training.

Human skeletal muscle fiber type alteration with high-intensity intermittent training.

Simoneau JA, Lortie G, Boulay MR, Marcotte M, Thibault MC, Bouchard C.

The response of muscle fiber type proportions and fiber areas to 15 weeks of strenuous high-intensity intermittent training was investigated in twenty-four carefully ascertained sedentary (14 women and 10 men) and 10 control (4 women and 6 men) subjects. The supervised training program consisted mainly of series of supramaximal exercise lasting 15 s to 90 s on a cycle ergometer. Proportions of muscle fiber type and areas of the fibers were determined from a biopsy of the vastus lateralis before and after the training program. No significant change was observed for any of the histochemical characteristics in the control group. Training significantly increased the proportion of type I and decreased type IIb fibers, the proportion of type IIa remained unchanged. Areas of type I and IIb fibers increased significantly with training. These results suggest that high-intensity intermittent training in humans may alter the proportion of type I and the area of type I and IIb fibers and in consequence that fiber type composition in human vastus lateralis muscle is not determined solely by genetic factors

1) Note no fibre conversion of type 11 to type 1 was found
2) As previous posted, alterations within subtypes occur.
3) From bioposies no data is availabe showing the conversion

Ergometric and metabolic adaptation to a 5-s sprint training programme.

Linossier MT, Denis C, Dormois D, Geyssant A, Lacour JR.

Laboratoire de Physiologie, Faculte de Medecine Saint-Etienne, France.

The effects of 7 weeks of sprint training (repeated 5-s all-out sprints) on maximal power output (Wv,max) determined during a force-velocity test and a 30-s Wingate test (Wpeak) were studied in ten students [22 (SD 2) years] exercising on a cycle ergometer. Before and after training, muscle biopsies were taken from vastus lateralis muscle at rest for the ten subjects and immediately after a training session for five of them. Sprint training induced an improvement both in peak performances by 25% (Wv,max and Wpeak) and in the 30-s total work by 16%. Before sprint training, the velocity reached with no load (v0) was related to the resting muscle phosphocreatine (PCr) stores ($r = 0.87$, $P < 0.001$). The training-induced changes in v0 were observed only when these PCr stores were lowest. This pointed to a possible limiting role of low PCr concentrations in the ability to reach a high velocity. The improvement in performances was linked to an increase in the energy production from anaerobic glycolysis. This result was suggested in muscle by the increase in lactate production measured after a training session associated with the 20% higher activity of both phosphofructokinase and lactate dehydrogenase. The sprint training also increased the proportion of slow twitch fibres closely related to the decrease in fast twitch b fibres. This result would appear to demonstrate an appropriate adaptive reaction following high-intensity intermittent training for the slow twitch fibres which exhibit a greater oxidative capacity.

1) Note again no conversion from type 1 to type 11 fibres where found
2) adaptations occur within subtypes

Angus writes

Oh yeh I also have a feeling that pennation angles can change slightly with excessive hypertrophy

1) share the logic how pennation angles change with excessive hypertrophy

Ok not quite sure I follow your logic with this one. In the abstract you posted it clearly says the proportion of type I fibres increased! Doesn't that infer a transition from IIa or do you have an alternative explanation? Your first point is a little ambiguous I guess you mean there's no evidence for a shift from type I to type II? If so yeh you're right its a pretty debatable issue although several papers would argue that it can and does occur with sprint exercise.

Jansson et al., 1990 Acta Physiol Scand; 140:359-63
Dawson et al., 1998 EJAP 78: 163-9

Also a number of other papers showing a bidirectional shift to IIa as I mentioned. Basically there is data from various studies we both could post to support an arguement for or against fibre type shifts, as I said b/4 its an area of some debate. However you're stretching the facts a little to suggest there is no biopsy data around to suggest that it's possible.

Regarding the pennation angle stuff am not at all sure about that just think may well have read something about that b/4. Could well be wrong, was just a thought...

Angus writes

In the abstract you posted it clearly says the proportion of type I fibres increased!

I never stated that type 1 fibres cannot increase in size. And this does not support your argument which is type 11 to can be converted to type 1.

So yes type II fibres can become type I with the wrong training. (Angus)

No conversion occurs between from fast twitch to slow twitch, or type 11 to type 1.

Please post data showing change from Type 11 to type 1 as you have mentioned. From the biopsies of the Simoneau & Linossier research no data showed a change from type 11 to type 1.

To make sure we are on the same page, conversions in subtypes 11a to 11b occur however conversion of type 11 to type 1 doesnt occur.

Lets be practical, if a conversion from type 11 to type 1 occured or vice versa then in essence anyone could be a sprinter or a endurance athlete since muscle fibres can be changed under the right conditions. This is clearly not the case.

RE: strength through sprinting
This relates to what Charlie has been saying since the early days of the forum regarding the carryover of the high speed elements to the weightroom. Charlie has stated several times that the weights Ben and the others were able to lift were more likely the result of their speed on the track, rather than the other way around. Over the last several months I've experienced this myself by placing primary emphasis on the high velocity components (sprinting, med ball) while using minimal weight volume and have experienced the most rapid and consistent strength gains I have ever had in my training career. This is not to say weights are unnecessary, but I now view the weightlifting as a supplementary component that merely reinforces and consolidates the strength potential developed by the high velocity components. Thus a little goes a long way.

Quote

---

posted by flash
RE: strength through sprinting
This relates to what Charlie has been saying since the early days of the forum regarding the carryover of the high speed elements to the weightroom. Charlie has stated several times that the weights Ben and the others were able to lift were more likely the result of their speed on the track, rather than the other way around. Over the last several months I've experienced this myself by placing primary emphasis on the high velocity components (sprinting, med ball) while using minimal weight volume and have experienced the most rapid and consistent strength gains I have ever had in my training career. This is not to say weights are unnecessary, but I now view the weightlifting as a supplementary component that merely reinforces and consolidates the strength potential developed by the high velocity components. Thus a little goes a long way.

Flash, I understand and agree with the above. My thing is this, Charlie advocates some sort of hypertrophy work until the sprinters somatotype is in place. If sprinting can cause hypertrophy(and it would all be functional) why spend time using weight training to develop hypertrophy(sprinters somatotype)instead of just focusing on force output in the weight room. I know Charlie only advocates this at the early stages of development, but why develop unnecessary mass/weight if it can be avoided.
Is it because the volume that would be needed to bring about these morphological changes are too high that we need to supplement with weights? If what the Lewis camp said about his training is true and he did not lift a lot of weights, he sure found a way in putting on muscle mass(no gluteal fold) in the right areas. Is there a certain % of max speed, for a certain distance with a certain rest ratio that could bring about these morphological changes?

Charlie's really the best one to answer that, since he's one of the very few coaches to develop sprinters from scratch all the way to world record level.

While sprinting at a high level can do much to develop the appropriate muscles, first you have to develop the muscles to the point, and in the way, that will allow adequate speed to be carried out (another chicken and egg deal). You need to have an adequate hypertrophy phase- though the form that will take is highly individual- but once musculature and speed are falling into place, I'd say that the sprinting leads the weights.

, did you look at the full text from the articles I cited? I think you have misinterpreted the abstract maybe? With the Linossier paper I cited there was a significant increase in type one fibre number from 43 to 51 percent and a significant decrease in IIb from 15.3 to 7.6%, similarly with the Simoneau paper type I fibre number increased from 41 to 47%. Note this is not fibre area data, which is also referred to but changes in fibre number as I originally stated.
As for the other way from type I to type II (slow to fast) there are also some papers showing this. The Dawson paper used sprint training consisting of 30-80m efforts and found that type I fibres went from 45.8 36.2 percent of the total fibre number, while type I went from 54.2 to 63.8, both statistically significant changes. There are more papers out there and I know of at least one other in preparation showing the same thing.
I know what you mean with regard to it doesn't seem logical as that could make everybody a sprinter or distance runner depending on their desire, however I believe that the evidence suggests that training can make changes in your fibre type though clearly not from one extreme to the other without extreme measures.... It is worth noting that in the most extreme type of detraining ie dennervation there can be extreme shifts towards the IIb or IIx fibre or Myosin heavy chains. Likely the dennervation and not just the absence of contraction or tension has an effect but it does to my mind have implications as to how rest and recovery are critical factors in a sprint athletes physiological adaptations.

I guess the same as every other adaptation to training there are genetic limits specific to each individual as to how they will adapt to a type of training. I guess the trick for an athlete or coach is to learn enough about themselves to ascertain what suits them. Genetics will also play a major role in elite sprinting. As i posted earlier I believe that those individuals that can handle a high training load and still maintain high proportions of IIa and IIx are the people that will succeed in sprinting.

While you make a good effort in researching and providing data for all that you state (which I respect), you should be careful on how much you rely on that.
We would probably agree that it's a good idea to use science as a starting point, and to back up what we see and feel on the track. However, I believe that science cannot always be taken as fact. I'm sure a number of people on the forum (yourself included) could point to scientific "facts" and data, that were later disproven. I think science is far from fully understanding the human body, and how adaptable it really is.

Lets be practical, if a conversion from type 11 to type 1 occured or vice versa then in essence anyone could be a sprinter or a endurance athlete since muscle fibres can be changed under the right conditions. This is clearly not the case.

While I understand where your coming from, I don't think it's a practical statement as proportionally not that many people even TRY to become sprinters/endurance athletes. The average population’s idea of being an athlete is biking to work, buying their food at the health store, and going to the gym for a few months prior to summer.
That, and "looking good" in athletic apparel
(anyone whose familier with kitsilano, vancouver knows what I'm talking about)

All this talk about what CAN happen and what CAN'T happen makes me laugh. , please conclusively prove that changes in pennation angles CANNOT happen, and that the body would not adapt to different situations based on different stimuli in this way.

Science at the moment is taking the reductionist viewpoint, I see Charlie and the other guys here taking the complex systems approach. Taking what has worked, and what should work, THEN trying to explain it. If they can't, it doesn't matter, because it works.

The research process and accumulation of elements of a complex system is interesting, but it will never be able to explain that complex systems behavior. This is why reading countless studies will more than likely not give you any better information that Charlies books, or this website.

Also, classifying fibre types as 2a/2b/1a/1b etc seems redundant to me, as it doesn't happen that way. Do you think that the cell knows it is a "type 1 fiber"? Have you ever thought that a fast twitch fiber can express myosin light chain isoforms while having a fast neural innervation?
Or what about a "type 1 fiber" expressing fast isoforms, while having a slow innervation?
Has anyone else looked into muscle expression signalling pathways? They are very complex, and make classification virtually redundant.

Tom Green Writes...
"VL muscle fibre pennation angle was observed to increase in response to resistance training. This allowed single muscle fibre CSA and maximal contractile strength to increase more (+16 %) than anatomical muscle CSA and volume (+10 %). 7. Collectively, the present data suggest that the morphology, architecture and contractile capacity of human pennate muscle are interrelated, in vivo. This interaction seems to include the specific adaptation responses evoked by intensive resistance training."

I agree with your points, actual classification of fibre type changes is a little redundant when the outcomes of any changes in terms of changes in force output or rate of force output is what is important in a practical sense. I guess my points can be boiled down to

1. Fibre type is not some unalterable genetic gift, within reason changes in both fibre type and the associated force properties do occur and this is a critical part (among many others) of physiological training adaptation.

2. Different individuals respond differently to the same training. Its a matter of recognising these differences and writing programs according to optimise the program for an individual... a lot easier said than done!!

If improvement beyond accepted norms is the goal, then nothing must be accepted as unalterable. In the 1930s, the "scientific limit" in the 100 yards had been reached at 9.4. Jesse Owens was asked after his greatest day in 1935: "What was the difference between the 9.4 you ran today and the 9.4 you ran in High School?" Owens replied: "Four yards!"

How accurate are muscle biopsies? From what ive witnessed they are likely to be as subjective as skin folds, and only give a percentage of fiber types at one given point. The only way that they could be accurate in this sense is if there is a perfectly even distribution of fiber types through the muscle.

THEONE,
You are absolutely right about fiber type's being redundant. As technology has improved over the last few years it has been found that fiber types cross a spectrum as opposed to being two or three distinct types. However the "types" have been kept in fashion so scientists can quantify and categorize.

Exactly guys.

Biopsies are really inaccurate, and when realising that expression profiles of muscle differ according to the conditions and recent history of the muscle, they are really a waste of time.

Instead of focusing on fast twitch, I believe we should concentrate on thinking fast. No amount of whining about how you have slow twitch fibers is going to make you fast. As charlie said, to break limits you can't set any, and because we don't know the limits, we can't place any. Those that place limits on the human body have already failed!

In CFTS I remember Charlie talking about Ben, after he came 5th? in the 50m at a young age, and he asked Charlie "Do you think I can break the world record next year?". Do you think this belief that he was "all-powerful" was a major source of his success? I do.

In my study I have realised that any biological system can optimise itself to the constraints placed upon it. Optimise those constraints for speed, and your body has to adapt. It really is that simple. Practice makes perfect.

Think Fast, Train fast, Lift Fast.

Fair enough Joe, though not sure I'd go as far as to say biopsies are a waste of time, yes there is variability and inherrent inaccuracy in them however it is largely accounted for using statistics, control groups and often double blind analysis I would have thought... we have learnt something from them.

Think fast, train fast, lift fast, sounds good to me though better be recovering fast too I reckon!

Science at the moment is taking the reductionist viewpoint

Science greatest successes is based mothodological reductionalism, the major methodological triumph has been the the demonstration that the unit of heredity, the gene is a macro-molecule, deoxyribonucleic acid (DNA).

Methodological approach has allowed coaches to analyse stride rate/stride frequency, angular acceleration, ground reaction forces, ground impulse, joint torques, swing time.

Why do Coaches prioritise minimal contact time ?

Quantified scientific data showed that elite sprinters have shorter contact time.

Your logic is rather fallacious and contradictory, in one paragraph you critise reductionist reasoning

Science at the moment is taking the reductionist viewpoint, I see Charlie and the other guys here taking the complex systems approach. Taking what has worked, and what should work, THEN trying to explain it. If they can't, it doesn't matter, because it works Joe

And then in the final paragraph you provide methological reductionist data

VL muscle fibre pennation angle was observed to increase in response to resistance training. This allowed single muscle fibre CSA and maximal contractile strength to increase more (+16 %) than anatomical muscle CSA and volume (+10 %). 7

Rather self refuting, deny the effectiveness of methodological reductionalist data then rely on it to prove your point.

Note this is not fibre area data, which is also referred to but changes in fibre number as I originally stated.

For fibres to increase in number they would have to undergo splitting which under normal conditions does not occur. Splitting of muscle fibres is another argument.

Do you have a PDF file of the research?

Reply Redundant fibre types:

FG can be converted to FOG, which increases the speed endurance capacity of the fibre without losing force or rate of force capabilities.

This information is of extreme importance in the prescription of sprint programs.

"Science greatest successes is based mothodological reductionalism, the major methodological triumph has been the the demonstration that the unit of heredity, the gene is a macro-molecule, deoxyribonucleic acid (DNA)."

I completely disagree. As in my research I am facing the task of trying to make sense of the genomic data (I do research in computational biology/artificial intelligence), we find that the reductionist systems approach simply isn't working.

Who cares what your genomic sequence is if you can't figure out the effect on the organism? And if you didn't know, WE CAN'T

This is exactly the same system as saying that the body can't do something, through science When coaches see it every day.

Charlie has been right from the beginning. If you see research that backs up what you are seeing on a daily basis, then it might have some validity. If it goes against what you are seeing, its a waste of time. Have you been through the research process? It is a lot different than you think I would suggest.

In regards to muscle biopsies, I would rather not have ANY muscle taken out of my muscles, as I have seen big scar tissue buildups in some athletes that have had biopsies taken (from qualified medical doctors too). You can get the same data from simple testing (be it anecdotal or not, if someone can jump 90cm+ they have some decent ability to provide force). Hell, maybe we could even test them with a 60-100m sprint?

Quote

"Science greatest successes is based mothodological reductionalism, the major methodological triumph has been the the demonstration that the unit of heredity, the gene is a macro-molecule, deoxyribonucleic acid (DNA)."

I completely disagree. As in my research I am facing the task of trying to make sense of the genomic data (I do research in computational biology/artificial intelligence), we find that the reductionist systems approach simply isn't working.

Who cares what your genomic sequence is if you can't figure out the effect on the organism? And if you didn't know, WE CAN'T

This is exactly the same system as saying that the body can't do something, through science when coaches see it every day.

Charlie has been right from the beginning. If you see research that backs up what you are seeing on a daily basis, then it might have some validity. If it goes against what you are seeing, its a waste of time. Have you been through the research process ? I think if you haven't it is actually a lot different than you think.

In regards to muscle biopsies, I would rather not have ANY muscle taken out of my muscles, as I have seen big scar tissue buildups in some athletes that have had biopsies taken (from qualified medical doctors too). You can get the same data from simple testing (be it anecdotal or not, if someone can jump 90cm+ they have some decent ability to provide force). Hell, maybe we could even test them with a 60-100m sprint?

Charlie,
Would EMS be a possible way of determining muscle type? I am sure however, that there would be many factors to consider such as bodyfat % and whether the tested area is "warmed Up" or not.

Why do you need to test this anyway? What are you going to do with the info? The most famous biopsy study showed that Hasley Crawford, the Oly 100 meter champ should have run the 800 meters! The patchy distribution of various fibre types throughout the muscle make a biopsy a crap shoot. MRI is a possible means, but, again, just look at performance.

Phew, you guys are using some pretty impressive words. I had to get a dictionary to hang with this discussion. Thanks for keeping it simple Charlie.

Eloquence...
Quote

---

posted by Charlie
...make a biopsy a crap shoot...

Clockwork...
Quote

---

posted by angus
, did you look at the full text from the articles I cited? I think you have misinterpreted the abstract maybe?

"Science greatest successes is based mothodological reductionalism, the major methodological triumph has been the the demonstration that the unit of heredity, the gene is a macro-molecule, deoxyribonucleic acid (DNA)."

Joes writes

I completely disagree. As in my research I am facing the task of trying to make sense of the genomic data (I do research in computational biology/artificial intelligence), we find that the reductionist systems approach simply isn't working.

This is fallacious argument; you disagree on the successfulness of reductionalism in human genetics on the basis of its failure to be successful in artificial intelligence.

For a deductive argument to be valid the premises must be related to the conclusion, your argument is negated by a non related premise.

Your arguments demonstrate a absurd use of logic which are beyond the limits of rationality.

Reply muscle biopsy

In the future muscle biopsies will no longer exist with technology allowing muscle tissue to be measured without evasive methods.

Some interesting points . Perhaps you could post your opinions on the biomechanics of the swimming start being down under and all.

As for pennetion and speed of contraction a straight fiber is more effective for contraction then an excessively round one. Bodybuilding dangers.

Quote

---

posted by
Reply muscle biopsy

In the future muscle bioposies will no longer exist with technology allowing muscle tissue to be measured without evasive methods

---

Do you mean invasive? Although i know i try to evade large needles when ever possible.

I agree with charlie. Those tests are useless. Performance is what matters. Now I understand why Charlie didn't do vertical jump testing or standing long jump. Who cares if you can jump 100cm if you can't run 10 seconds?

I know this is off topic, but give me an example of any reductionist approach which has been shown to enable complete understanding of a metabolic pathway, a signalling pathway, function of muscle, gene expression or anything you like. Sorry, I just don't see it.

What research are you doing again? You left that out of your last post.

I do know a few biomechanists who specialise in swimming; maybe we can start a thread on the biomechanics of swim starts.

In all honestly i would have to read up on my knowledge of fluid mechanics.

Joe, i am not involved in research at the moment. I dont see myself being a reseacher, i prefer to pick it to peices.

When technology improves being a reseacher seems a much more lucrative option. Current research in sports sciences tends to open up more questions.

I think we have been talking at cross purposes a little. I didn't mean an increase in the total number of fibres as in hyperplasia, rather an increase in the relative number of fibres of a given fibre type...ie a transition from one type to another. And no I don't have PDF files of the papers I cited, had to do the old fashioned thing and go to the library for them.

Charlie and Herb, yeh there are potential EMS and likely MRI methods for assessing fibre composition, which will have the advantage of assessing a relatively large area of muscle, though from what I can see so far still many potential errors. As for Biopsies being a crap shoot and the Hasely Crawford stuff, i guess depends how closely you look at it too. I mean what muscle did they biopsy, I'm betting it wasn't glutes or hamstrings, probably vastus lateralis and if so how critical is it that VL be super fast twitch for running fast?
Fibre type varies between muscles and having a lot of type I or II in one muscle doesn't necessarily mean you'll be so endowed in another muscle.

Angus

rather an increase in the relative number of fibres of a given fibre type

Since you have ruled out hyperplasia as a means for increase fibre type number, then the other means of achieving this is by a conversion of fibre types.

As i said before there is no conclusive evidence showing conversion of type 11 to type 1.

Lets move on from this differences in thinking on fibre type conversion,

On my next thread i'll post research that shows how type 11 fibres can be increased by splitting under extreme conditions.

I would like to bring up a few questions/points. I think they tie in here somewhere.

What ultimately determines maximal velocity from a physiological (not mechanical)standpoint? The current trend is to develop better times through improved acceleration on the track and strength training in the weight room. It seems that there are individuals that can accelerate faster than others but those others can often times hit a higher speed.

Does most everyone agree that weight training only targets the acceleration portion of the sprint? Do the strength improvements from weight training influence max velocity at all or just the acceleration phase?

Now we know that the recruitment patterns are different in a given weight exercise versus sprinting, if an athlete can maximally recruit high threshhold muscle fibers in the weight room, does it mean that the athlete will be able to recruit those fibers as part of the sprint motor patterns?

As was said earlier maybe there is a lot more influence from the sprints to weight room that the other way around.

Just to make a quick point, I feel that lifting will prime sprinting to a point, *and then the sprints will prime the strength*. Sprinting for force production at early ages might not work as well. Is their a switch or does it always follow one direction?

Regarding the fibre transition stuff I think we'll just have to agree to differ. Am a little surprised at your strong stance, given that there are no certainties in the literature and you don't appear all that familiar with a lot of the stuff in this area. Seems to me there is a lot of papers using both histochemical and electrophoretic techiques which indicate muscle is very adaptable. As I said in an earlier post biopsies of denervated muscle show an almost complete shift to IIb over time albeit with a whole lot of atrophy! (See Burnham et al., 1997, Spinal Cord, 35: 86-91)
As for the Hyperplasia issue, no i haven't ruled that out, what I meant was that the authors of those studies were suggesting conversion rather than an increase in total fibre number. As for research in that area would be interested in any references you could post, most of the stuff I've seen is either from animal work or evidence from cross-sectional stuff... both of which suggest it may well be possible.

Either way a lot of this is pretty academic and worrying about these mechanisms is not going to help anybody run fast in the short term.

I don't agree that weight training only helps acceleration, max V may also be affected, though don't have to time to go into it right now, am sure you'll get plenty of f/b on that stuff from way better sources than me though...
As for the recruitment issues, my gut feeling would be no, recruiting in one posture, velocity action etc in the gym doesn't neccessarily mean you can transfer that same recruitment to the track. I s'pose fully recruiting on the track in terms of heaps of agonist-antagonist stuff (being tight)(which you may learn in the gym?) is not going to a good thing on the track either.

The evidence that you have provided to support your views that conversions of type 11 to type 1 occurs isnt suffice. The following is a example of this

"As I said in an earlier post biopsies of denervated muscle show an almost complete shift to IIb over time albeit with a whole lot of atrophy! (see Burnham et al., 1997, Spinal Cord, 35: 86-91)" (Angus)

This statement does not provide a mechanism for the shift nor does it specify what fibres have undergone conversion. Simply stating a authors name and making non specific claims for fibre conversion doenst provide insight into fibre type conversions.

"Hyperplasia..... Either way a lot of this is pretty academic and worrying about these mechanisms is not going to help anybody run fast in the short term" (Angus)

Drawing your conclusion before assessing the evidence, does that seem fallacious. Contrary to your statement knowing the conditions in which fibres can split can dramaticly increase speed.

Greek Sprint Training

Main points:
There are many ways to skin a cat and the Greeks seem to have a program many of us would consider crazy. It seems to be a sink or swim system started from a pretty early age. If you really want to spice things up one off season this might give you an idea or two, but it seems unlikely anyone on the forum could see good results with this program, at least not for a long time, as laid out.

Weight Increases:
Main points:
Everybody uses different systems in the gym. The important thing to understand is that the better your sprint session the weaker you will be in the gym.
Cool's program sounds good.
I think most people agree that added strength will greatly help acceleration, which will make for a higher top speed and make you faster.
's big post at the end of the 2nd section is great. I think after reading it a few times I really understand it. When a stimulus gets stale, strength is there just not expressing itself. If you change the stimulus for a little with something else intense, it will express itself again when you come back to it. Sorry, just read his post.

OIs & alternatives for improving RFD (part II):
Main points:
Read Charlie's 2nd post in the read. "I believe that synergy moves in both directions on the force time curve…when trained in conjunction with others (Vertical integration) as opposed to serially, and, as the greatest beneficiary components will be at the slow end. The implication for top sprinters is:
1.Lifting improvements will advance at a rate and to a level that initially appears to be out of all proportion to the emphasis placed there.
2.The proportionately greater contribution of high velocity components to improvement indicates that they should be in place as soon as possible. These comments only apply to higher level athletes who already have sufficient general development." The faster you go, the more the weights follow you.

Actually it is all about the amazing Kederis performances the last 2 years. Although from the same group with the same bizarre of training style more athletes have succeed in the past (Papadias 10.15, 6.50 - Choidis 10.19) and present (Thanou 10.83).

The use of the race distance the run (only) with long rest up to 6 times in one day, close to max intensities. That's all. No jumps etc.

Are they all coached by the same person/team? If they spread the work out, why 3x200 meters per sessionx2 Why not 2x200 for 3 sessions? Does this vary by event or person?

Quote

Lets say that I'm always ...close by!

Lemme Guess ... Your Clark Kento!!!

Coming from an athlete's perspective, i think that this type of training would be a touch towards the boring side. What do they include in their warm up?

Can you let us know how the training changes throughout the year?

What are they doing in these days?

What are the requirements to access the indoor facility in Athens?

Dear Charlie,
I can't tell you why they split it like that. Maybe it has to do with the needs for speed endurance. (my guess)It doesn't vary from person to person if they ran the same distance.
Yes they are all coached by the same person.

Quote

Quote

Lets say that I'm always ...close by!

Lemme Guess ... Your Clark Kento!!!

Coming from an athletes perspective, i think that this type of training would be a touch towards the boring side. What do they include in their warm up?

I;m not Clark Kento. The warm up is simple and without the many drills usually US or other sprinters are doing.And yes indeed this type of training is boring, but if you know the ...results... The interesting part of this training is how fast the improvement is.

Quote

Glad to see we have a Greek connection.. for FREE

Can you let us know how the training change throughout the year?

What are they doing in these days?

What are the requirements to access the indoor facility in Athen?

Ok CB, if you want send me a cheque...

The training change close to competition the 2x3x200m becomes 2x2 until only 1x2.
Simple. Overcompensation occurs towards the end of hard training (mainly for the CNS) and the faster times are a fact.
To train in Athens you need a ticket to fly over, a Hotel to stay and the address of the Olympic Stadium

But seriously, this training system is indeed very hard for the system. Papadias has still injuries from the past. There are training days that the CNS is completely down. But still after a while it

seems that it adapt to the stimulus. The question is why it doesn't become overtrained.

The fact that it is a boring training system doesn't say much because the result which is 100% a fast race keeps you motivated. But no weights or jumping exercise? This is really amazing and unique. It seems that the max intensity of the reps somehow thru time also is a stimulus for strength and explosiveness.

Besides it is the same muscle fibres that are day in day out working.
Charlie what do you think about this explanation?

Are the training sessions held at the Olympic stadium only?

I have been told that they don't train outdoor at the moment, and/or that the facility is not open to just anybody; so what is the actual situation?

Quote

---

posted by CB
I have been told that they don't train outdoor at the moment, and/or that the facility is not open to just anybody; so what is the actual situation?

Right now the facilities are open. Seriously if you want to go for a training camp, you can do that any time of the year. There are also new facilities open next month.

It is great to train outside. Temperature in Athens is 25 - 27C...

Some questions...

1) Are the runs from block starts? (And do they perform practice starts as part of the warm-up?)

2) How are multi-events handled? (ie are there any 200/400m or 100/200m athletes) How does the rep scheme reflect this?

3) Is this system applied to any 400m athletes? (did Kenderis use it when he was competing over 400m?)

Quote

The training change close to competition the 2x3x200m becomes 2x2 until only 1x2. Simple. Overcompensation occurs towards the end of hard training (mainly for the CNS) and the faster times are a fact.

Now that's what I'm talking about "quality over quantity." Can I assume that the 2x3x200m are done at 90% or better?

By the way, big-ups to this forum. Its about time we have a World Class track forum on the net! **(Side note- we are now the leader in elite athletic development and discussion!-thanks everyone).**

How long have you been observing them? A full training year?

I am wondering if this philosophy can only apply to fully developed athletes and the training would need to be a constant.

Quote

Some questions...

1) Are the runs from block starts? (and do they perform practice starts as part of the warm-up?)

2) How are multi-events handled? (ie are there any 200/400m or 100/200m athletes) How does the rep scheme reflect this?

3) Is this system applied to any 400m athletes? (did Kenderis use it when he was competing over 400m?)

No the runs are never from blocks, neither they "loose" time to train the start ability.
No athletes are running 2 different events.

K.K. did not use this training system in the past for the 400m. It was applied to 400m runners but the result was shin splits and "lower abs syndrome". No success

The intensities are indeed above 90% but not for the 1st repetition.
I have observed this training system for 7 years...

My opinion is that this system can only be applied to higher level athletes. If you think about it it's like a continuously pre - competition type of training. Can you imagine at the end of the preparation how many times he has run a max intensity 200m? He knows every cm of the distance...

Quote

The intensities are indeed above 90% but not for the 1st repetition.
I have observed this training system for 7 years...
My opinion is that this system can only be applied to higher level athletes. If you think about it it's like a continuously pre - competition type of training. Can you imagine at the end of the preparation how many times he has run a max intensity 200m? He knows every cm of the distance...

Linarski, thanks for the info! Makes sense to me! I believe that once a proper foundation (i.e. conditioning, strength to weight ratios, etc.) is met; the emphasis should be on running reps at a high percentage. After all, sprinting up to 200m is 90 to 95 percent anaerobic, and one's training should reflect this!

But I'm still wondering why there is no speed plateau (Thanou has improved dramatically the past 5 years) in this type of training. If she had a better start technique I think she would be able to break indoor 60m World record...

I also believe that we will see KK running faster in the future.

Yeah! I think that they can continue improving speed by establishing new intensities at the beginning of the training phase. For example, after the final phase, overcompensation occurs, and then faster times are manifested. The next new phase starts with a faster workout time establishing a progressively intensified workout!

The theory I guess is similar to the weightlifters, they have dropped most of the ancillary exercises and now work mostly with the main competition exercise, with fluctuations in the loadings and volumes.

This ties in with what Charlie says, the # 1 priority is sprinting, everything else supports this (weights/Plo's ect), This program is specificity at its most extreme (Probably a little too much so)but what I think you can take from it is why worry too much about the biochemistry etc if most of your training involves fast sprinting over competition distance (be they 60's,100's,150's,300's) then you must be developing the relevant systems.

PS
I would give the CNS a break at some point if it were my athlete.

I understand exactly where the coach is coming from. It is training for a developed athlete and is particularly suitable for the 200. I can clearly see the logic.

It's probably also a great system particularly for women's 100 for someone like Thannou who is very much a powerhouse but would benefit a lot from the speed endurance.

But why doesn't Thannou so some work on her start? I don't know whether you looked at the recent Edmonton start thread but we covered her main issues.

Does the coach feel that she gets more benefit from the speed endurance nature of her training and working on the start may detract from this which would in turn mean that it would be harder to get back to this level of training?

She is a very powerful girl and her power overcomes a lot of the start problem in the 100, but you are right that this is a slight limitation in her 60.

Quote

The interesting part of this training is how fast the improvement is

---

What type of progression and over what time do athletes new to this system under go?

Do you feel the work KK did as a 400m athlete developed a base which he is now able to take advantage of? Or does the coach feel that this is can be used for developing athletes?

Does KK perform 100m training in this way? I've noticed a few time accredited to him over the distance

Quote

Does the coach feel that she gets more benefit from the speed endurance nature of her training and working on the start may detract from this which would in turn mean that it would be harder to get back to this level of training?

She is a very powerful girl and her power overcomes a lot of the start problem in the 100, but you are right that this is a slight limitation in her 60.

You see, here you have to stay focused: The coach cares only about max speed. If not he would also do more interval kind of training to develop the endurance. But he doesn't. He stays with the high speed and by running this a couple of times more he develops the ability for endurance.

It sounds logic and the main thing is that it works. But while in the past the training up to indoor was only 60m reps,(and after focus to 100m reps) they found out that the speed endurance for

the 100m wasn't there in the summer. So now the distance is right from the beginning 100m. (I'm talking about the 100m sprinters).

Do you feel the work KK did as a 400m athlete developed a base which he is now able to take advantage of? Or does the coach feel that this is can be used for developing athletes?

Does KK perform 100m training in this way? Ive noticed a few time accredited to him over the distance

---

I believe that his 45.60 400m endurance is a good basis for a 200m sprinter. He runs sometime 100m but without training specific for the distance. This is the amazing part. His PB was 10.40 when he trained for 400. I assume he is able right now to run close to 10.05

I like your approach. You see there is a lot of research on the interval kind of training as we all know it (reps/intensity/etc) but no-one attempted to start his preparation season from a pre-competition level. This sounds unique if you think about it (why do we have to return always every new season to the basics?), but you need the dedicated athletes who want to do this instead to go for 1 month on vacation.

In Bulgaria particularly weightlifting is extremely specific and variability is low. Exercises are limited to:

1. Clean & Jerk; Power clean
2. Snatch; Power Snatch
3. Squat; Front Squat

Lifters rarely perform anything but singles, and intensity except during 'unloading' weeks is maximal.

Sessions are limited to 45minutes to limit drops in blood testosterone. The 30 minute rest period between exercises also permits a high intensity level to be maintained.

The Greeks seem to have developed these theories for Track. I would say that for a system to be successful requires two factors:

1. A 'camp' where athletes are provided physiotherapy, massage, nutrition and where all facilites are easily accessible.

2. Strong mental strength: Routines (and life) can become monotonous. Certain athletes regardless of talent just would not perform in such an environment.

Why do you we not see KK on the grand prix circuit (golden league especially)?

Next year the 200m is a grand prix event, let us see if he comes out then. I was wondering the same thing, why is he never around.

It makes a lot of sense now.

3. He has enough support not to need to.
2. His training doesn't really permit it.
1. Because the big ones are what he is after.

Let's face it, he is the current Olympic Gold Medalist, World Champ and European champ. I think he is achieving his goals

Quote

posted by linarski
..why do we have to return always every new season to the basics..

yes, hence my observation re developing v developed athletes. The training is circular. It's hard to get in but when you are in it is efficient.

I don't think it is the right method for everyone but it does sound suitable to 200m men and 100m women that do not require multiple peaks or a sustained competition period.

From what you've observed the squad trains 2x3x100 or 200m (GPP), 2x2x100 or 200m (SPP) & 2x1x100 or 200m in comp phases, with one set in the morning & afternoon 5 days per week with thu/sun rest days. Apart from training is there any variation when preparing for competitions?

From what you've observed the squad trains 2x3x100 or 200m (GPP), 2x2x100 or 200m (SPP) & 2x1x100 or 200m in comp phases, with one set in the morning & afternoon 5 days per week with thu/sun rest days. Apart from training is there any variation when preparing for competitions?

Depending from the state of the athlete. From the times in training it is easy to control the status of your athlete and what to expect in competition. KK was running close to 19.5 (standing) before Sydney. Usually no need for variations. but the most important thing with this type of training is that worries about running technique, adaptation of energy systems required and speed development are not existing.

Everything comes in place like puzzle pieces after a certain period of time. My estimation is 1-2 full season cycles (depending from the athlete if he can tolerate this style of training).
BJ Speed is right about the testosterone level etc.

From what you've observed the squad trains 2x3x100 or 200m (GPP), 2x2x100 or 200m (SPP) & 2x1x100 or 200m in comp phases, with one set in the morning & afternoon 5 days per week with thu/sun rest days. Apart from training is there any variation when preparing for competitions?

Ok what does this mean 2x3x200 or 100? 2 reps with 30 minutes rest, doing a 100 or 200??? In the morning and in the afternoon.. I understand everything else but not this.

Hope this helps you. The 100m sprinters run 100m, the 200m sprinters run the 200m in training, twice a day. 3 reps in the morning & 3 reps in the afternoon with 30min break between runs.

Quote

posted by mossman
I understand now. But how many times per week do they do this workout?

We already said this. 4-5 times a week. One thing you said was wrong: they go all the way up to pre-competition phase with 3reps in the morning and 3 in the afternoon. The 2+2 stands for about 20 days before the meet, and the single routines (only 2 or 3 in the afternoon) closer to the meet. The last 3-4 days it comes to 1-2 reps and that's it. The key is to find exactly when super compensation occurs to YOUR athlete.

I think most people have had experience with being very fatigued via speed work; this is essentially like 'crash' training. I have always found, albeit accidently that, when my CNS is completely fatigued, a good couple of days rest and I bounce back in PR shape. I have never had the confidence to implement crash training though.

Over the years I've become very skeptical of "secret" training methods. Most of them turn out to be garbage or misinformation sold to gullible people. Remember all those Soviet training secrets? People jumping off 5 foot boxes. Charlie's been very open about his training approach over the years and most of the dumbasses out there still aren't listening to him.

To the extent KK's training is successful, it's because the training is custom tailored to his individual needs. When it comes to basic training principles, there's very little new under the sun. Minor refinements in application build up over time through experience, but the underlying principles don't change. So take everything with a grain of salt and never loose sight of the specific context in which training methods are being applied. And if the specific context is shrouded in mystery, then forget it.

Good point! Although I must add: Charlie is a brilliant coach, but, his way is not the ONLY way of training right!

I agree also with those opinions but the facts here are that the training KK is doing has fast results. That means that this bizarre style of single reps in high intensity make the body to adapt faster to the stimulus. No one can deny this. Also no-one can blame about why he is not training in good old traditional way (like we all know, etc). We just see the results and know the way (read the beginning of the forum), what we don't know is the mechanism of the system how it adapts so easy and fast. Why there is no speed-plateau. Also it sound (in the first place bizzare that jumps and weight lifting is not present). These are questions to investigate and to think about. Ofcourse there are many paths to the top of the mountain. Here we have a faster one and the theme is for everyone to start to think the evolution in sprint training.

3 years for KK (don't forget also Thanou - 10.83) at the top and 19.85 Is a good reason to do this. For example one of my questions is what is happening with the CNS. Why is it not become over-trained. And many more.

As seen in Chris's Dr.Squat article (as well as numerous others if read off-line), the Bulgarians who use a similar system for weights (single max's), still drop the intensity from time to time to allow adaptation to occur, in fact the intense periods are quite short and are always followed by a moderate period. How ever from your description the Greek's don't appear to be implementing any time for regeneration and adaptation. Have you an idea where these important factors may fit into their program?

Quote

As seen in Chris's Dr.Squat article (as well as numerous others if read off-line), the Bulgarians who use a similar system for weights (single max's), still drop the intensity from time to time to allow adaptation to occur, in fact the intense periods are quite short and are always followed by a moderate period. How ever from your description the Greek's don't appear to be implementing any time for regeneration and adaptation. Have you an idea where these important factors may fit into their programm?

They drop the quantity, that's how regeneration comes. The intensity stays always high.

What did KK, Thanou etc do for initial training. At what point does this kind of approach to speed become effective, is it only effective once a certain level has been achieved.
My main reason for asking is that although this approach wouldn't appeal to myself and many others because of it's overt simplicity, I can imagine it could be effective and would appeal particularly to female athletes, many of whom in my experience weight training with a vengeance.

Before the speed becomes effective they suffer from CNS crash down. No idea how they overcome this. But training goes on. It seems that somehow the body adaptates (after 3-4 months they run really fast).It doesn't matter men or female. The system works for both. Thanou is working like this from the very beginning of her training.

KK right after Sevilla.

Do the people you know run world record times?

Well they are world class athletes, running from Zimbabwae, and Jamaica.

Short rest would reduce testosterone levels and increase lactate free flow in the muscles. The last thing they want.

When the athletes are performing the 2x3x200m a day sessions, what is the sort of drop off in times they experience compared with taper and championship times?

Nice question...
the times can start from 23-24sec and it will go down close to the main competition under 20sec, but not 2x3 of course.

Sounds like the 7x100 used by HSI.

So most of the major clubs or organizations have kinda the same training. Like HSI for example does 7x100 and the Greek athletes do 2x3x200. So for the normal athletes they try to mix it up. So what is the best rest time? Would it be better on the higher end side like 30 to 40 minutes? But when you peak can you drop it to 10 to 20 minutes. I read that the Greeks do the 20 minutes before a major comp. Correct me if I am wrong. I know in college we did ladders like this 1,2,3,4,3,2,1 but the rest was 20 minutes between. So is this for a person trying to get in shape? Then the rest time will be greater when you are a professional and your body can handle the harder running (if you have a chiro and a massage person there) Just a general question.

Here is an study I got the chance to read the other day. Interesting implications for the use of the half or full squat- the hormonal response and specific muscle fiber recruitment as well as the effects of testosterone.

Med Sci Sports Exerc 2000 Jan;32(1):202-8

Monitoring strength training: neuromuscular and hormonal profile.

Bosco C, Colli R, Bonomi R, von Duvillard SP, Viru A.

Universita di Roma Tor-Vergata, Fondazione Don Gnocchi, Rome, Italy. C.Bosco@Quipo.it

PURPOSE: This study investigated changes induced by a single heavy resistance training session on neuromuscular and endocrine systems in trained athletes, using the same exercises for training and testing. METHODS: Five different groups volunteered: track and field male sprinters (MS, N = 6), track and field female sprinters (FS, N = 6), body builders (BB, N = 6), and weight lifters performing low-repetition exercise (WLL, N = 4) and high-repetition exercise (WLH, N = 4). In training, the work performed during half and full squat exercise was monitored for mechanical power output as well as EMG analysis on leg extensor muscles of the subjects belonging to the MS, FS, and BB groups. Just before and immediately after the training session, venous blood samples were obtained for RIA determination of testosterone (T), cortisol (C), lutropin (LH), human prolactin (PRL), and follitropin (FSH) in FS and MS. In the other three groups (BB, WLH, and WLL), the hormonal profile was limited to T and human growth hormone (hGH) only. RESULTS: After training the power developed in full squat demonstrated a

statistically significant decrease (P < 0.01) in MS and no changes in FS. The EMG activity remained constant during the training session. Consequently, the EMG/Power ratio increased in both MS and FS, although only in MS a statistical significance was noted (P < 0.05). In MS immediately after the session the levels of C, T, and LH were significantly lower (P < 0.05). No changes were found in FS. In both groups and in BB significant negative correlation was found between changes in T level and EMG/Power ratio in half squat performance. CONCLUSIONS: It is likely that adequate T level may compensate the effect of fatigue in FT fibers by ensuring a better neuromuscular efficiency.

Full text of the article is available at:

www.acsm-msse.com/article.asp?ISSN=0195-9131&VOL=32&ISS=1&PAGE=202

I have one question in this technique, what do you do to get to this point of training?
I see the change in intensity and rest, but in November I cannot see a coach asking his athlete to run 23-24 seconds from day one. There is a base period, what do they do to get in shape?

Are you saying that this is not enough or too much work? 23-24 seconds seems quite slow to me.

23-24sec works out to be 83-87% of max speed for a 20sec sprinter

I think 90% may be a little slow with 30 min recoveries.

Smoke has also made an interesting point else where, pointing out the Thanou has not made significant improvements over the last 3 years.

My question is if an athlete runs the first at 85% like a 23-24 sec. Then the rest are at around 21.5 for an elite athlete. Am I correct on this...Then the second session the same thing.

Quote

I think 90% may be a little slow with 30 min recoveries.

Smoke has also made an interesting point else where, pointing out the Thanou has not made significant improvements over the last 3 years.

The better you are the harder it is to get better. at some point you're "mainly" trying to be consistent from year to year. Kederis came from nowhere. He's not going to keep making big jumps in time.

For example - it's not uncommon to see a 10.35 or so perfomer run under 10.15 the next year. However from there to sub-10 is a bitch. And then from sub-10 to the top may be a few more years. The timeline can be skewed by talent, coaching, and performance enhancing drugs.

So Thannou ran like 10.87 in '98, 10.83 in '99 and 10.91 the last two years. So it's likely that 10.80's is where she's at. Maybe if she "puts one together" she might go 10.78 -- but that would be huge.

Once you get to the top improvement is often small.

HSI Stuff

Main points:
All top sprinters are extremely strong.
Cool downs are important, walk a lap like the horses. I liked that reaction time drill with the key. "Drop a key at sprinters shoulder while sprinter is in normal start position. Key should be dropped toward the hand which would come out first from the blocks." At the end, this turned into the precursor to the Greek sprint training thread.

Ato Boldon
Hght 5/9
Wght 180pnd

300m pr 31.7 (fastest of any hsi member)
400m pr 48.54 (highschool)

Ato's favorite book.....
1. Speed Trap

Ato on Recovery.....
1. Massage
2. Whirlpool
3. Ice bath (persistant muscle soreness)
4. 250 grams of protein
5. Creatine...get off... get on
(to receice extra burst at
beggining of training cycle
..... or meet.....)

Ato on proper warmup.....
A. Short Warmup
1. 8x70m strds instead of jogging
2. Stretching (PNF 5-15 seconds)
3. 3xdrill (30m) A-skip, B-skip,High-Knees
4. 2x70m spkes

B. Long Warmup
1. 8x100m strds instead of jogging
2. Stretching (PNF 5-15 seconds)
3. 3xdrill (30m) A-skip, b-skip,High-knees
4. 2x70m spk

Ato on proper cooldown.....
1. walk 1 lap
(John Smith says to take a hint from the horses)

Ato on Sprint traing.....
1. Blocks conducted on tues + thurs
2. Rest day wed
3. Only warmup is done on recovery days
4. Plyos done once per week
5. Improving acceleration....30m sprints

6. Improving Reaction time....
(A John Drummond/John Smith favorite)
Key Drill....
Drop a key at sprinters shoulder while
sprinter is in normal start position,
Key should be droped toward the hand
which would come out first from the
blocks.
7. Fastest time for 100m in practice for
any hsi member....9.8 hand time
8. Improving speed endurance...train
w/ 300m
9. On starting....head down..knees high
.....full extension
10. Practice is open to the public
11. Practice schedule 5 days per week
occassionally sat.

Ato on weight training.....

Coached by Art Venegas
considered top authority in the world

Areas of focus...Hips,Back,Shoulders,Quads

Some of exercises performed

1. Full-squats....all the way down to my heels
explode at the bottom of the lift
Max...did not say (had workout using 345)
2. Flat Bench Press...Max 300pnds
3. Incline
4. Power Cleans
5. Deadlifts
6. Push Press
7. Front Squats
8. Dumbell
9. Narrow grip snatches
10. specific traing for triceps and abs

(I believe not all these lifts were performed everyday)

Trains different body part per day!!!
Rest day Wed.

Only uses knee wraps occasionally
usually when above 80-85% of max

Same thing for using weight-belt
for flat bench press

Ato on What makes a great sprinter....
1. Genetics
2. Desire
3. Pain Tolerance

Not sure if the above workouts are accurate... but it looks as though Ato is rather unimpressive in the weight room. Which is surprising since this Venegas fellow (never heard of him) works with a lot of throwers. But my experience with throws coaches in the weightroom is that the sometimes lifting is overemphasized - from a sprinting perspective - and takes on a life of it's own. But Ato isn't lifting heavy anyways. Maybe he's spreading himself too thin over many different lifts. And using knee wraps for anything over 80-85% - when he's only squatting in the 350-400 range!!!???

Come on.

Other point - Ato seems to have many of the fastest times in practice. Maybe he's killing himself in practice and not saving anything for the competitions. Just the same as when he kills himself in the heats of major events, then falters in the final.

I liked the bit about the horses...

When Ato's web site first came out, his 300m workouts (in his diary) were 3 sets of 3 x 100m with 45 sec recovery between reps, full recovery (8 min) between sets.

It would if he's getting injured in practice. These can be subtle, hidden problems that he takes into competition. Another issue may be that he runs better alone (in practice) but tightens up in close races.

During the World Championships, Michael Johnson was doing some commentary work for the BBC in the UK, and he described Ato as being weak.

Also, he felt that Ato should leave HSI, as he was not the top dog, not even at training, he will be getting beat by Mo, most of the time, and that cannot be could for anyone's confidence.

That's a good reason to do sprint & speed endurance work individually (one after another) and not together on the track. Besides, the coach only has one set of eyes!

Which brings up a good question: How did the Ben's other teammates (i.e. Desai, etc) handle training with Ben?

I witnessed Mo, Ato and Maybank run the curve (100m) in 9.85 - 9.84 - 9.85 HT respectively. John Smith shouted the times.

Why should he leave John, just because Mo beats him (but not always)? Clearly the program is good, both overall and for Ato in particular. Ato has to find the means to maximise his training within an effective training regime. The first place to start is to review training results. For example, how often does Mo lead the practice sessions as opposed to Ato? If Ato is leading a larger percentage of the time, perhaps he is too interested in building his confidence by winning in practice rather than listening to his body. Mo is more likely to feel free to kick back if he needs to, as he is already supremely confident. Ato must do the same, listening to his body first. When the body is ready, the mind will follow.

I also think Ato has a tendency to over qualify in early rounds of big meets. I noticed that John tried to address this by having a contest to see who could get away with the SLOWEST first round!

Hey dmhansen, unimpressive huh. What do you squat big boy. Try and hit a 9.8 fat and well see if you have the right to down Ato. And by the way was it not true Donovan Bailey could only bench 218 3/4 pounds. The name of the game is speed not squatting 1000 pounds. If you want that go to drsquats website ok buddy.

Re Ato's weights. I don't think Derrick meant to be disrespectful, I think he meant these weights should be pretty easy for him (and I'm sure they are). The 9.8 is indicative of what he can likely lift, rather than the other way around. BTW Venagas is well known in Calif. as a strength coach.

As I said in an earlier post, our goals were 1X BW for power cleans, 1.5X bench, and 2X squat (thigh parallel, or "half squat"... assuming a full squat is defined as your ass touching your heels)

It wasn't uncommon for guys by the end of 2nd year College to achieve the squat part... they had mostly trouble reaching the cleans (because of technique?), and some bench.

I weighed 80kg back then (176lbs) and reached the squat goal first, which was 160 kg (without straps) or roughly 352lbs.. (we had 20kg plates back in Canada)

So perhaps our goals with "ratios" need some fine tuning... nobody else on this forum posted their numbers. Maybe they are secret? Come on guys!

Mr. Lane, if you do plan on being the next great sprint coach, you would know - given your vast education in the area of training athletes - that many female sprinters can achieve the squat the Ato is doing (according to your post of his workouts). It is obvious that you are a big fan of Ato's.

However, nowhere did I say that Ato was unimpressive on the track. But given that he has run under 9.9, I would expect that his squatting would be well above what you posted. Perhaps he is not attempting heavy lifts (as cited by Charlie) but repping the 350 lb range with ease. Having not been present at their weight workouts, I couldn't say.

If you have had the pleasure of witnessing Ato's weight workouts, please enlighten us, rather than getting into a pissing contest.

But if you plan on posting more athletes' workouts, prepare to have people comment on it - and not go "ooooh, aaaaahhhhhh, what a great workout plan."

Anytime you are in Vancouver, I'd love to do a squatting workout with you. I have at least 1000lbs worth of weights in my basement, and a heavy duty squat cage. I could even invite some of my female athletes to squat with us, to boost your confidence.

To timothy lane
I really believe that it is NOT true that Donovan Bailey only benched 218 lbs.
I think that the person who wrote that misunderstood Donovan with Oba who is way smaller and who, by the way, told me his best BP is 235lbs.
Donovan doesn't look too big, but believe me he is not small.

Mr. lane,
any sprinter who does weights 2X per week (after a track workout) for 48 weeks, year after year, will easily achieve 2X their body weight. If they don't, then they secretly missed the weight workouts!

The cleans were hit and miss, as some preferred hanging cleans and other power cleans off the floor. We had one guy who loved the snatch (no pun intended) but I think he just loved to show off and slam the weights onto the platform. So I guess it was just a matter of education.

re: Donovan’s size

I've noticed Donovan doesn't look that big either, and was rather surprised when I went to his website bio and discovered he's 90kg! Granted he's 6' tall, but still, 90kgs is pretty heavy. in my world at least

I wonder who was the biggest/heaviest sprinter?

My vote goes to John Regis (and his traps!)

Donovan was definitely heavier than he looked. He usually raced between 190 and 198lbs, but was up around 205 at times in the pre season. I think he said his heaviest racing weight was 198 at the 150m race against MJ at the SkyDome in Toronto Canada. He also had a very dense feel about his muscles, slapping him on the back was like hitting an oak tree.

I would also agree about Regis, he seemed the heaviest world class sprinter that I've ever seen. They list him in his bio at the UK athletics site as 98kg (215lbs). Linford Christie might have been close to Regis at times, but of course he is about 4 inches taller.

Don't forget Seun Ogunkoya, 5'11" at 91kgs.

Linford was incredible for such a tall man!

I read somewhere about Maurices Full Squats being done with a 5 seconds pause at the bottom before exploding up. I don't know if that makes a big difference because I have never tried.

As for Atos strength level as already been said - what are has maxes at.

Since were into the height/weight thing, how tall was Ben and how much did he weigh? (I've seen 5'11" @ 173lbs in speed trap, but Ben's website says he's 5'9" @ 180lbs?)

Do have any of the stats on your other sprinters Charlie? (Mckoy, Desai, etc.)

Ben was 5ft 10 and 173 in Seoul. (We weighed him 4 days before the race). He sometime went up to 178 or so in mid season. That's why so many people were shocked to meet him in street clothes as he looked so big on the track. Desai was about the same. Mark was taller at just under 6ft and around 180 at his biggest. Mark was incredibly thin early in his career. At the Commonwealth games in 1982, he won his first gold at 137lbs!

I think that it is much to individual to worry about making guidelines for weight training. I have never squatted 2xbw, but I pulled (dead lifted) 2.5xbw only a few months after I started lifting weights (3rd time I dead lifted). I power cleaned well more than by the first time I ever tried to use heavy weight (learned the form in 1 workout, then 1 light workout). I haven't benched 1.5xbw - my best yet was about 1.35xbw. Anyway, my long limbs seem to make me naturally good at o lifts and deads, but a poor squatter/bencher.

To clear my name now. Yes I do intend on being one of the top sprint coaches in the world. Given a high IQ excellent, a good comprehension of math and science. Naturally leadership skills and vast variety of other traits God has given me to reach this goal. You see its Gods will for my life. Whatever God says goes. As to whether I thought you were being disrespectful. Certainly I did. In fact this information I have given you has come straight from Ato Boldons mouth. Unless he is lying that is. And in fact a 345 for squats trained ballistically. Sometimes up to 5 second pause leads me to believe that he could at least do 445 for full squat. I repeat at least 445 squat. My guess when he is peaked probably near 500.

What does Donavan squat again. Oh yeah he doesnt do squats. How about Tim Montgomery? How bout Johann Jack from greater Boston track club. A 6.22 for 55meters and never done a squat in his life.

Basically thought the main point is people try and put infomation on here to help other coaches athletes or who ever is interested and I dont appreciate the sarcastic remarks. This is suppossed to be about learning from the greatest track coach ever to live and we are lucky that Charlie has

taken some time to help people like you and me. I dont hear charlie trashing peoples comments.

As for me I weigh 165.... I naturally...Incline press 320, bench close to 395 and full-squat nearly 500. I dont need any confidence from your women athletes cuz no women in the world could post such numbers. Try and find someone who does that naturally and has only do power lifting for 4 years of his life.

As for my starting strength NOT YOU or ANY of your athletes you have ever coached could keep up with me for 40 meters given I have out accelerated 3 people who are world ranked for 60 meters.

Have a nice day.

PS Lifting at home is for weenies.

Question re Ato
When did he do the long vs. short warm-ups?

Quote

NOT YOU or ANY of your athletes you have ever coached could keep up with me for 40 meters given I have out accelerated 3 people who are world ranked for 60 meters.

Mr. Lane,
I frequent the Boston area, and now I am curious who you are. With some speed endurance after 40 meters, what do you think you can run for 60m?

I am Tim lane. I ran for reading high school. Under Coach Hal Croft, which held the national highschool record for a consecutive win streak. Which include 30 years undefeated in the middlesex league. Which was at the time a record for any highschool sport.

With a good finish I would be running professionally.

I don't doubt that Mr. Lane has very good accel. & quickness, but I am curious what his best 40yd time (or 40m) and his best 55m/60m (if he ran indoors in HS) and 100m PB.

Perhaps CF and this forum can help him attain the proper speed endurance he needs (though I think he posted a hamstring problem on another forum)

If his 40yd was sizzling, has he considered a career in football?

I don't think the number of exercises is an issue although I do feel there is an unnecessary abundance of upper body work. I like that he does full squats and front squats, other coaches should take note of this.

I feel other exercises could be useful to increase specificity and offer alternatives to combat monotony and stagnation.

Examples

Hang snatch (above knee)
Hang snatch (below knee)
Snatch pull
Clean pull
Power Jerk

Power jerk from behind neck
Single leg hang snatch
etc

HSI long warm ups/short warm ups. Long warm ups in GPP & SPP. Short warm ups in competition phases.

Short warm-ups are use in GPP too, when it's a day has some hard work scheduled.

Re:Ato on recovery

When would these be implemented in relation to training? Is there any difference between whirlpools and an ordinary spa bath or are they just diff. names same thing?

And does the 250g protein seem excessive to anybody else?

Quote

And does the 250g protein seem excessive to anybody else?

Not to me. That's approximately what I take in each day. Even when I was eating higher carb a while back, I took in more than that. Without protein powders. Meat, eggs, and dairy products (if your digestive system can handle them) should become your friends.

For the past couple of years I have eaten about 200-300g of protein per day and have found that it works pretty well for me (recovery, energy, etc).

A lot of aspiring body builders & wrestlers eat 1 gram of protein per lb. body weight (190-220)... no side effects, no complaints. And that does NOT include the glutamine or BCAA supplements.

Wouldn't this amount clobber your kidneys and liver in the long term , a few health conscious bodybuilders I've met like to fast completely every 1 - 2 weeks for 24 hours to clear the system out .

Not that I hang out with bodybuilders

I always thought *at least* 1 gram per kg body weight, so a minimum of 85g for me.

I like to follow a 60-15-25 (C-P-F) diet, which puts me theoretically at 115g (460 KCAL) as a guideline.

Sometimes, life (or work, to be exact) gets in the way and you deviate from the above (i.e. fastfood, takeout, travelling, etc)

Sorry to change direction but a few posts back Charlie asked when HSI stopped doing their long warm ups.

I only know that when Ato was posting his daily workout schedule on his site, his entry for December 15, 1999, said there were no more long warm ups from this date on.

I take my hat off to Ato for posting such detailed info at the time - very brave and generous of him.

As far as I know the Greek Kederis is doing a completely different training program than Ato and the rest of the sprinters. Twice a day 3x200m with 30min rest between. The first rep is at a 85%, the 2nd and the 3rd max. Every day except WED and SUN. NO WEIGHTS OR JUMPS AT ALL ! Charlie what is your comment on this type of training?

Have heard that Konstantinos Kederis and the Greek sprint squad follow a very unique training system. Would also be interested to read of any info. that forum members can provide.

From European Champs. this year:
(wind: -0.5 m/s)
1. Konstantinos Kederis Greece 19.85 CR =WL NR

Kederis stated after his win at the EC that his performance was due to 9hrs a day training, if he were to omit weights and plyo's then it leaves an awful lot of time with a question mark even if (as it is likely) exaggerating.

The KK camp seems to be quite secretive with both training and competition, so i think any accurate info will be hard to come by.

Based on the times it is highly unlikely that the kinds of examples suggested here are being followed. The only way to know is to watch- if they'll let you!

Apparently the Greek coach is a close friend of the Greek national weightlifting coach, A friend of mine who trained (With the lifters) in Greece said that the sprinters had adopted some of the same theories in regards to small/frequent sessions spaced throughout the day.

One look at his physique tells us that he does gym work.

There's quite a mystique around the Greek athletes. Apparently they are funded to the tune of $1m each a year. But maybe I shouldn't believe that either. I do know they are wild over KK in Greece because one of my friends just returned from there.

Funny that the friend of a weightlifting coach wouldn't use weights! Be careful what you believe, though it is certainly possible to have 3 or more training sessions daily in a training camp setting, where travel and meal preparation are not factors.

What is your opinion on this format of training? I know several international level sprinters who have used this split session format when injured with quite good results. Any thoughts as to how this could be capitalized upon?

It is not a matter to believe or not if KK is doing weights. If someone is running mornings and afternoons for 3 hours, 4 times a week at least, I doubt if there is any time left for weight lifting. Besides the intensities are so high (usually the second 200m is sub or close to 20sec and the third close by), so the use of weights is not necessary (intensity of speed from itself is already strength work) and even dangerous for injury.

The system of running single repetitions with max intensity and long rest is not new. Although they got the tip through the Greek weight lifter coach (and he from Abajiev - famous Bulgarian weight lifter coach), the ex-DDR coaches tried it also. The man who first had the idea of it was Ozolin.

The system of running single repetitions with max intensity and long rest is not new. Although they got the tip through the Greek weight lifter coach (and he from Abajiev - famous Bulgarian weight lifter coach), the ex-DDR coaches tried it also. The man who first had the idea of it was Ozolin.

Quote

The system of running single repetitions with max intensity and long rest ia not new. Although they got the tip through the Greeek weight lifter coach (and he from Abajiev - famous Bulgarian weight lifter coach), the ex-DDR coaches tried it also. The man who first had the idea of it was Ozolin.

Yes, but what are the advantages of doing so?

I'd also be skeptical of any body who said he didn't lift weights.

I'd be more interested to know what KK did for training in the years preceding Sydney -
I know he dropped from 400m, but he must have done a fair amount of short max speed work at some stage to attain his admirable top speed. Would he have totally dropped distances over 60m, then worked his speed end back up to 200m , or continued to run longer distances and just placed more emphasis on max speed work . How should a 200m sprinters training differ from that of a 100m sprinter?

Glad to hear that about the protein. Hows it goin up there in the frozen north? It's just started getting chilly down here - two pairs of tights and 'deep heat' soon no doubt.

Assuming the 200 rep scheme is accurate, and assuming a 1 hour warm-up per session, that's 5 hours a day. What's going on in the other claimed 4 hours? (He could be counting the therapy) Reps with long breaks are the rule for special endurance, not the exception, but everyone is speculating unless they can see the training for themselves. I've been told that te Greek coaches like to keep the workouts closed, so, if you do get in there, let us know what you see- and, of course, the times for the reps.

I just got a Greek connection. And found out Kenteris is training in an indoor facility in Athens, access is limited. Let me know how bad you want to know the training methods they use, we might work something out, but I guess it will not be for free.

I don't intend to bust your chops, but when did you compete at Reading High? I've lived in Boston all my life and your name doesn't ring any bells. Who were the three world ranked 60m guys you got to step on the track with?

Johann Jack is a great talent; in fact I think he has the natural ability to run 10.15-10.20. Unless he allows himself to be coached properly, he'll never get there. If it's true he doesn't squat, that just confirms my point. I watched him bench and it wasn't too impressive. I actually offered to coach him, pro bono, and he declined. He ran 6.22 at BU, and there's nothing but a bunch of distance runners there. Imagine what he could do if he did it correctly.

Quote

**I'd be more interested to know what KK did for training in the years preceding Sydney -
I know he dropped from 400m , but he must have done a fair amount of short max speed work at some stage to attain his admirable top speed .
Would he have totally dropped distances over 60m , then worked his speed end back up to 200m , or continued to run longer distances and just placed more emphasis on max speed work . How should a 200m sprinters training differ from that of a 100m sprinter ?**

He did exclusively 400m type of training. But was able to run 20.50 (Sevilla '99)
He started to train for the 200 right after. But he also had as a junior a remarkable 21.15 in W.J. Championship in Seoul (he was 5th if I remember correct). Speed work as we all know (reps of short distances <100) is not be done by coach Tsekos. The only distances are for the 100m sprinters the 100m and for the 200m runners the 200m. Not 1 meter less or more.

Eccentric Training

Main points:
After reading this, the benefits of 120-150% eccentric training didn't make it seem like it was worth the risk.

What are people's thoughts with heavy eccentric training? Can this overload kill future speed sessions? What are you experiences with this "type" of training? What numbers do people work with to create a safe overload?

I am no way an elite athlete, but, I will give you my 2 cents worth. Eccentric training: I use them sparingly, as I find the DOMS alot worse compared to normal training, and therefore, this impacts when activities I have planned for the next few days. Therefore, if this involves running, then my performance usually is affected, and no-body wants that. So when using them, it is done when I know it will not effect any future training.
|
They take alot more out of you, and therefore, harder to recover from.

What I have read is that eccentrics are good for adding strength, but, not for adding muscle mass.

Sounds ideal, however, West Side barbell rarely use eccentric training as they say they take too much out of you. So if probably the best power lifting gym in the world stays away from them, then I would think as athletes, we should be VERY VERY careful when using them.

However, Charles Poliquin in his latest CD stated that the more advanced the athlete becomes, the more he should use eccentric training. He stated that David Boston (wide receiver of Arizona Cardinals) used alot of eccentrics.

Weights, I think this is trial and error, but, I believe Charles Poliquin recommends low reps for multiple sets. His percentages are 120-150% of 1RM (this is from memory, from an old article). Obviously, you start at lower end and progress up.

Always have good spotters.

Eccentrics can be an effective method for increasing strength, but you have to determine if they fit within the overall context of you program. When would you incorporate them? How would you recover from the eccentrics in addition to the other training? Would you have to reduce another component to allow incorporation of the eccentrics? Which one? Would this be an improvement?

Just because a method is effective, doesn't mean you have to use it. And the effectiveness of training methods can only be evaluated within the context of a given program.

Eccentric training is good for getting past a sticking point in the gym. Probably limit it to one lift and definitely don't use every workout.

"Eccentric strength is the limiting factor especially in more complex high volume and high intensity plyometric training. Without adequate levels of eccentric strength rapid switching from eccentric to concentric work becomes very inefficient... If on observation you see an excessively long amortization phase and a slow switching from eccentric to concentric work then eccentric strength levels are not adequate... The specific goal before any emphasis on plyometric training should be to raise the level of eccentric strength to an acceptable level...It seems that increasing the athlete's eccentric strength of the knee extensors is indicated to not only allow for greater

speed in the approach but also to increase the efficiency of the elastic energy storage... Improvements in advanced jumpers will come primarily from increasing the vertical velocity achieved at takeoff, which is a direct result of increasing the horizontal velocity of the approach... The primary limiting factor in preventing the use of faster approach speeds is the eccentric strength of the takeoff leg. Increasing the eccentric strength of the leg extensors will allow the athlete to effectively transfer the increased speed developed in the approach to a vertical direction at takeoff with a minimal loss of energy... Another effective method for developing eccentric strength may be depth landings, which are essentially depth jumps without the rebound. Dursenev and Raevsky found that the effects of depth landings from heights of 2m or more were effective in developing super-maximal strength ...lower heights may offer appropriate lead up activities while offering the same advantages of depth jumps without the complexity of a rebound jump." 3

"The use of plyometric exercises in the training of athletes in explosive sports and events has increased dramatically over the last few decades. This development has no doubt been due primarily to research showing the performance benefits of the SSC in selected motor skills and, in particular, to various forms of vertical jumping. If further work supports the initial indications (a) that the SSC does not play a significant role in the development of vertical velocity during the takeoff to a running long jump (and perhaps also during the takeoff to running jumps in general) and (b) that the characteristics of the stretching of the triceps surae muscles do have an important role in this respect, such findings may have important practical consequences... It may come to be recognized, for example, that plyometric exercises are beneficial training exercises not because they increase the enhancement obtained from the use of SSCs but because they develop an athlete's ability to benefit from the stretching that precedes the shortening phase of an SSC. Or, to put this in a different way, it may be recognized that coaches and athletes have been doing the right thing (that is, using plyometric exercises) for the wrong reason. It may be, then, that the current emphasis on plyometric training shifts to, or is shared with, training in which the emphasis is on the stretching phase of a movement alone and not on the entire SSC and that exercises like drop or depth jumps (in which athletes step or jump down from a platform, land and then immediately jump upward) are replaced by exercises limited to the first two parts of this three-part sequence -- that is, to the initial drop and landing. But this is, of course, mere speculation. What must be established first is whether the initial indications are supported by further research."

Re Coupling Times
If they are slow, it may also mean that the height of the exercise is too great for that individual, the athlete is not recovered, or the volume is too much. Drop jumps? Can drop jumps provide a positive training effect if executed at the same heights as done for the complete SSC? I don't know. If, as seems likely, it requires a significantly greater height, be careful. Drop jumps from 2meters? There was a world number one shot-putter who did just that. He ruptured his quad muscles and NEVER recovered! To put the nature of work selection into a coaching perspective: "It's a poor tool who blames his workmen!"

I never ever emphasize eccentric loading with weights. This only contribute to make the athlete sore and gain non-functional size.

Applicable eccentric strength is best developed with high intensity plyo drills and the Olympic lifts (there is a significant eccentric loading when catching the bar).

Re Analysis of coupling times. Make sure the "cure" isn't worse than the problem. With Eccentric training the risks are great and extreme care must be exercised in selecting tasks and volume. Weigh the load here against the impact on the performance of other key elements, especially speed. A drop in performance in the other training elements for more than a brief period is a sure sign of overload.

All things in moderation.

I was reading in Supertraining that while Eccentric training improved strength in the squat much faster than normal training. The gains didn't transfer to an improved vertical jump like normal training did. So draw your own conclusions from that.

Re **no v.jump improvement from ecc training**
This is interesting. I wonder if that was because of the CNS killing effect of eccentric training? I find that vertical force production is the first thing to go due to CNS fatigue probably because it is such a "reactive" form of energy, therefore dependent on high speed messages passing down the body. I wonder if vertical jump would improve after eccentric training was ceased and the strength gains in the squat consolidated whilst the CNS is allowed to recover. Would supercompensation occur and the vert jump then improve? Questions, questions!

Yes, probably. The nature and timing of the vertical test must be known- the harder the work- the longer the recovery- so, if you test two different training means with the same recovery period, your results may be skewed. Most studies are set up this way to isolate on one componant. I still think you must monitor performance standards all the way through, but you must also understand this phenomenon.

Ok here are the details -

They found that eccentric training produced greater eccentric, concentric and isometric strength compared to normal training, which produced only concentric and eccentric strength.

Another study found that eccentric training to failure produced marked increases in eccentric strength endurance, but minimal changes in concentric strength endurance.

I'm trying to find the study I mentioned above, but no luck so far

Quote

They found that eccentric training produced greater eccentric, concentric and isometric strength compared to normal training, which produced only concentric and eccentric strength

---

What other training were they doing besides this? That's the problem with isolating training elements during research. Does it have any relation to real training programs? Just a thought.

That's exactly right flash! The deeper you look, you always find more dimensions to a problem. Most scientific studies are very one dimensional, often because the scientists only have a one dimensional view of the problem and are looking for a one dimensional solution. We live in a 3D world, not flattened in the pages of a textbook.

There are always exceptions and elements that interplay to influence the end result. I think Charlie has known this for a long time and I think it is the hardest thing in coaching to master, if indeed any of us will ever master it. I noticed your Q on periodisation and planning in another thread. No wonder Charlie deflected it to his forthcoming book. It's a tough one!

The main problem I have with sport science research (and I think this is Charlie's main gripe as well) is that to perform these studies, you have to establish controls (keep everything constant and examine one factor). In the real world of training, there are no controls.

In Speed Trap, Charlie describes training as the process of putting together a jigsaw puzzle in which the pieces keep changing shape. This is one of the best take home lesson for training in general and especially when evaluating research.

If you constantly monitor your performance throughout the training period, you will know if there's a problem long before you run across a study to confirm your suspicions. This is one of the reasons why speed work must be present during most of the year and why multi-phase annual planning works best.

Quote

I never ever emphasize eccentric loading with weights. This only contributes to making the athlete sore and gain non-functional size.

Applicable eccentric strength is best developed with high intensity plyo drills and the Olympic lifts (there is a significant eccentric loading when catching the bar).

I have to agree with you. I had great results by using deadman's falls to 3 positions low,90 degree and high landing and after 2 weeks the negative portion of my bench felt like 2 pounds.

"Negatives" is a bodybuilding term used to describe the eccentric portion of a movement or exercise.

The problem with negatives such as performed in typical weight room activities, is that the nature of the overload is insufficient as measured against the overload found in sport specific activity.

Think the eccentric phase of a squat vs a box jump

Re: eccentric training/negatives

I've found that negatives can sometimes help athletes improve starting strength (especially for women). I've also found that doing static lifts (BP, Squats) w/pauses can have a dramatic effect on the development of starting and maybe*more importantly* on athletes perception of how much weight they can handle (a key issue with developing women).

1. Habituation to an heavier load. Lowering heavy loads get you prepared to handle them, so when you are doing your regular sets the bar doesn't seem so heavy. When a bar feels heavy and you do not have a lot of experience you have the tendency to "give up". So if you do not feel the weight as heavy you are less likely to give up. You are not so much improving starting strength but by not giving up you make a better use of what you already have.

2. After-effect potentiation. Eccentric loading is hard on the CNS and as such it creates a high level of CNS activity. In subsequent bouts of exercise the CNS is still highly activated and the results might be improved.

While this might be useful to somebody who lifts weights for it's own sake (i.e. to lift the heaviest weight possible - Powerlifting/Olympic lifting) it is questionable if this will be of any help in non weight lifting activities. I would say no.

The amount of weight you lift in the gym is not relevant to your performance on the field or on the track. The benefits of weight lifting are the physiological and neuromuscular adaptations to training. Lifting big weights is only a mean to an end. It is the importance and the quality of the stimulated adaptations that are important. So "tricking" your body into lifting a slightly heavier load might not have a direct effect on performance.

Then again one could argue that using neuromuscular "tricks" to lift more weight in training might increase the importance of the physiological adaptations. But then one could debate if eccentric loading will do so better than other methods and if it's worth the effort considering that an athlete has a finite adaptation capacity.

I'm in the process of writing a book, here's what I wrote about eccentric (90-100%), isometric and heavy eccentric (100%+) training for the athlete:

"Eccentric training (90-100%)
It is possible to produce a greater amount of strength under eccentric (yielding, negative, and lowering) conditions. While the difference between concentric (overcoming, positive, lifting) and eccentric limit strength varies between athletes, it is generally found to be +20-40% in favor of the eccentric regimen. This is evidenced by the fact that you can lower a much heavier load than you can lift.

As such it is possible to place a very large stimulus on the muscles by lowering a near-maximal or maximal load under control for several reps. The effects of this method are very pronounced. It can lead to a very important improvement in tendon strength, in the muscle limit strength capacity and in the nervous system's capacity to activate the muscles. However, this method carries a huge burden on the nervous system and the tendons.

Pros: Can give you important gains in muscle and tendon strength when used properly. Improve the neural drive.

Cons: One of the most stressful training method, both on the nervous system and the musculoskeletal system. If used in excess it can overload the CNS, injure tendons and lead to overtraining. Leads to severe muscle soreness and stiffness after the training.

When to use the method: Near-maximal to maximal eccentric training should be used seldomly and generally in the middle portion of the preparatory period, if it's used at all. Only advanced athletes should use this method and when they do they should do so for very short cycles (2-4 weeks) with at least 2 weeks between cycles. The volume should be kept very low (around 6 total reps per workout once a week).

Isometric training
This method was once very popular in the 60s and 70s but has been disregarded since. It consists of exerting strength against an immovable resistance. The logic is that isometric strength is slightly higher than concentric strength. This method do lead to strength gains, but only at the specific joint angle being worked. It is possible to gain strength in the whole range of movement by doing isometric holds at every 15o but those gains are not readily transferable to dynamic movements.

Pros: Can lead to strength gains at a specific joint angle.

Cons: Not transferable to dynamic movements. Can increase blood pressure. Hard to quantify progress and thus to plan volume. Hard to vary intensity.

When to use the method: Isometric training can be used to strengthen a specific weak point in an exercise (sticking point) and during the rehabilitation process. Generally a few sets of 6-12 seconds are used.

Supramaximal method
These methods are to be delt with prudence. They do carry a greater risk of injuries and can easily lead to neural overloading. They consist in using exercises in which you lift greater weights than you are capable. You do so by either:

1. Doing very heavy eccentric training (120-140%)
2. Cheating to get past the sticking point
3. Doing only partial reps (e.g. quarter squats)

These exercises place a huge stimulus on the nervous system (thus can produce great results or put you into stagnation … it's a very fine line in this case) and on the tendons (moderation will strengthen them, excess will injured them). And it can lead to great strength gains. However, much like with isometrics, the gains are not always directly transferable.

Pros: Can yield important strength gains. Can help you bust through a strength plateau. Make you "used to" handling heavy loads.

Cons: It's the easiest method to abuse. Gains are not always transferable. Important soreness.

When to use the method: Very very rarely! As a part of a shock microcycle it can be good. I would not recommend using any of these methods for more than 2 weeks straight. When used, the volume should be minimal. Only elite athletes should use this method, and never close to a competition."

Supramaximal Method

4. Partner Assisted Reps.

I guess you would classify these within this section or have you placed them in another section?

BTW, your writing style is nice. Clean and to the point. No evidence of "mental drift" from this reader

I give a chart of all training methods at the beginning of the chapter, and assisted reps are included in the supramax methods. But for the sake of simplicity I did not detail all the methods presented, only the most likely to be used in a planned program.

I have found that depth landings are great for eccentric capability even in the bench after deadman's fall for example. I have to agree with you. I had great results by using deadman's falls to 3 positions low,90 degree and high landing and after 2 weeks the negative portion of my bench felt like 2 pounds.

I would classify eccentric-only plyometrics (known as "shock" training) as part of the ballistic method. The ballistic methods have a wide range of exercises ranging from low intensity to maximum intensity. Because shock training can provide the highest loading of all exercises it can also be included in the supramaximal method of training.

The higher intensity ballistic exercises should be used intermittently during the year, for cycles of 4-6 weeks at a time, the frequency should be kept to 1-2 times per week with a relatively low volume of work (more throws, landing and weighted jumps doesn't bring more results than less work … the main effect is on the nervous system which doesn't require a lot of volume to be stimulated). DO NOT start using these high intensity exercises close to a competition, unless the athlete has a long history with them.

a well known effect of eccentric on muscle growth is that it increases the number of sarcomere in a fiber effectively increasing density (In a similar way that the isometric contractions of an EMS unit do). Whilst i don't feel effects of eccentric training would have a direct immediate effect upon [performance on the track (I found that it was a couple of weeks of training post using EMS til i gained the ability to use the strength), but could it have longer term benefits when combined with conventional meathods due to this reason?

You mentioned earlier that increases in tendon strength occur as a result of eccentic loading. Combining this with the information you provided in your Ironmag article on Connective Tissue strength (referring to Eastern Block research etc, which stated that a severe limiting factor in producing strength and power was the actual tendon strength as well as the golgi inhibition

mechanisms) and there is a plausible place for eccentric weights in plateau busting in elite athletes as suggested earlier by DCW23.

In addition, would the high neural intensity increase the Energy Envelope of the CNS?

And just while im thinking about it, the acute soreness could be avoided in part by performing submaximal lifts which have a high eccentric component (walking lunges, Russian curls etc) in order to develop shorter (but mor numerable) sarcomere before hitting the muscles with supramaximal weight. You wouldn't attempt to perform max speed without doing lead up work.

RMT eliminates velocity lifts since he has this crazy notion that sprinting will help the velocity component of power, therefore shifting the f/v curve to the left. My next question what else can reducing or eliminating Olympic lifts do? THUNDERTHIGHS with all of his tact and knowledge suggested, while drinking tea and having a muffin, that because the snatch and clean have different eccentric stresses then back squats due to the elastic response. Could this be an impact in program design? Could eliminating excessive ecentric loading in the training and using different jump/plyo/lifts help with getting the same CNS stimulus but without all of the DOMS and microtrauma. Just a thought.

Regarding eccentric strength, most of this thread has been very favorable for eccentric training through plyometric activities on the track, but there seems to be mixed views regarding eccentric training in the weight room.
"The problem with negatives such as performed in typical weight room activities, is that the nature of the overload is insufficient as measured against the overload found in sport specific activity", (coachmdd).

I incorporate eccentric training in the weight room and feel that there is a direct relationship to sprinting. We know that plyometric exercises produce some of the greatest forces available to us, and sprinting is said to be the best plyometric exercise. My approach in the weight room is consistent with looking at the sprint action and specifically the hamstring and calf muscle. In young sprinters there is a tendency for the ankle joint to collapse during ground contact. This is due to a lack of eccentric strength in the calf muscle and achilles. Also, what is happening to the hamstring during the support phase? The hamstring is lengthening. I have my athletes do calf and hamstring exercises at a 3:1 (ECC/CON). Regarding the responses to eccentric training in the weight room being a body building term, we seem to have forgotten that hypertrophy is still related to the repetitions performed whether ecc or con. I don't have my kids perform eccentric work to failure and I think that is where some may be tying in the body building approach.

Quote

"...subjects with a high percentage of slow twitch fibers produce their best jumping performance when the eccentric phase is longer, movement range is greater and the coupling time is longer."

Would this be a recruitment issue? Seeing that in voluntary contractions slow twitch activate before fast, a longer eccentric phase would enable such an individual to recruit more fast twitch fiber.

Dazed: It's the reverse. When the individual has a small amt of white fibre, he must involve an adequate amount of red fibre to accomplish the task. White has a recruitment vel of about 20ms, while red has an RV of about 80ms, but the white fibre doesn't necessarily give all the red fibre a 60ms head start.

Energy Envelope and Organism Strength

Main Points:
I think these were an attempt to discover why Charlie's method of high/low intensity (75%-/95%+) works so well. The Specificity Spectrum showed how the high/low concept was starting to catch on all over the place. Swimming and distance running were the two major examples.

I was thinking (don't ask when) today about the CNS envelope. RMT was talking about preserving his CNS energy by making sure that most of it is used in sprinting. My question is "can the energy envelope be expanded through training?"
I was thinking that:

A) The CNS envelope can regenerate to the previous size faster though training and be assisted further by recovery methods- so a higher stimulus can be presented later.

B) The Size of the CNS envelope can be expanded to have more intense work done to help with rounds and general training capacity.

Then I was wondering about the *general organism strength* and how those factors that build the organism strength interact with the energy envelope?-

Here's something tangental. Does the improvement in one's confidence through continuous training improvements spare CNS energy? Think about it.

Does a positive mindset (through confidence) make more CNS energy available for training as stress/ worry/ lack of sleep etc. conspire to reduce the CNS energy envelope.

i.e., sort of like plugging the hole v expanding the tank.-

ONCE GROWTH HAS CEASED ENERGY CAPACITIES ARE FIXED AND NOT ALTERED BY TRAINING

Novitsky, S. A. (1998). No change in energy systems power rate production constants over a competitive swimming season. Medicine and Science in Sports and Exercise, 30(5), Supplement abstract 613.

The aerobic and anaerobic energy systems' power rate production constants were studied over a competitive season. Female collegiate swimmers (N = 15) performed three maximal tethered swims (10-s, 30-s, and 90-s) on three occasions during a collegiate swimming season.

Total work for each of the duration-trials or the power rate productions for each energy system did not change significantly over the season.

The author attempted to assert that the changes observed were of practical significance but the fact is the study showed that any observed changes were no better than those that could be by chance (given the small F values and the low probability estimates).

Implication. In collegiate female swimmers, changes in either aerobic or anaerobic energy production do not occur over a season of swimming. This supports the contention that when growth has ceased in trained athletes no further changes in capacity of the energy systems occur.-

Which energy system? Are thresholds fixed, so that training must be adjusted around them, or is it possible, through the selection and execution of work, to alter the thresholds favourably?-

How in the world did Inge de Bruin peak at Syndey without some sort of improvement? Did those swimmers improve time wise? Did they taper and peak at nationals? Also research on swimming power has a hitch!

A swimmer might decrease power output while swimming faster because the more efficient technique requires less force. This is because of the improved mechanics help eliminate water resistance. *As swimmers improve fitness wise so does the ability to maintain efficient stroke patterns, therefore explaining a drop in "power".* Take a look at the fastest swimmer in the world. His stroke requires less work(watts or foot-pounds) then the slower guys next to him, but his dryland strength (weight room and core work) is better then the generation before.-

Does CNS energy refer to the availability of nuro-transmitters or some other nervous system phenomenon?

If it is transmitter related, would the supplementation of L-Tryosine (as mentioned in the powerdrive and supp. threads) be beneficial in the recovery and regeneration of the nervous system. Both here and else where there is plenty of info on muscle recovery, however the nervous system seems to be abit of a grey area.

I completely agree! If we knew where the actually issue lay we may be able to influence recovery with something. I am unsure if it is the actual CNS or if its the peripheral nervous system or what. I am sure each person has felt different types of fatigue after each session also...sometimes a general weakness, other times just dead in the legs.....if you know what I mean.

There are many structures and physiological pathways that can fatigue between the brain and the muscle contracting..... it could be muscle damage, damage of Na/K pumps, decrease in availability of neurotransmitters, too much tryptophan crossing the blod brain barrier, substrate depletion, electrolyte imbalance through loss of electrolytes Dwain Chambers style.

This list is by no means exhaustive of factors effecting muscle contraction.

Maybe if we try and look at the different things at work here and the influences on those pathways we might be able to decrease recovery time...

Running and swimming are quite different in their demands. In running, time improvement shortens the working time of the muscles in two ways. First, race time is less. Second the time under contraction within the now shorter race time is also shortening (the ratio of time in the air versus time on the ground is also changing- more air-time and less ground time)-

After my pina colada, I was reviewing my notes and diagrams I believe that I can word this better. Also another question came about. Let's look at the easier quesion first. This illustration might clear things up.

Let us say a first year athlete can handle 360 meters worth of intense training with two full days of rest to recover.

Year 2:After a year of training will his energy envelope handle 460 meters worth of sprinting with two full days of rest?

Year 3:After two years of training will this be 420 meters with one day of rest?

Then here comes the pina colada question....does this energy envelope evolved to more quality?

Example below.

Year 1:350 meters of 98% max output(100% effort)
Year 2:400 meters of 99% max output(100% effort)
Year 3:420 meters of 99.5% max output(100% effort)

As you can see from the numbers that the effort may be perceived as their best, but their performance times are not matching.

As athletes learn to train at a high effort does the effort and output of the energy envelope get closer?-

The capacity to deliver work and the rate of recovery do not necessarily move in lock-step. They might, in fact, move the other way.-

Are you saying that an improvement in those qualities is possible? I am not stating a specific order, but I am just commenting on my observations.

So can we expand the EE and recover the EE through smart training?

Riddle me this. If the quality (therefore intensity) of work improves, the recovery time would be improved if it remained the same.

What I am stating is that athletes must learn to train at a maximal effort. Here is what I want to show.

It is like the nervous system adaptations to weight lifting. You may increase the ability to recruit more motor units to get better responses but you still need 48 hours to recover from it. What it is is your body able to learn to be more intense.

Charlie riddles us...
If the quality (therefore intensity) of work improves, the recovery time would be improved if it remained the same.

The recovery time would improve if the previous lower intensity work is done.

Example 1

Let us say an athlete squats 400 pounds and needs 48 hours to recover. As he improves to 475 pounds his recovery time for 400 pounds efforts will be maybe less then 48 hours because 400 pounds is no longer maximal CNS work.

Let us say he reaches a peak of 600 pounds of work of maximal recruitment and hits a limit, could his recovery ability improve without increasing the intensity?

It may be the other way. As the intensity increases the evelope decreases in size...

I believe this comes back to the question i asked ealier ... What determines the envelope?

I think it is important to separate the two elements- Training and Recovery. While both improve, it is the intensification of training that is the key, even if recovery must be extended in some cases. Makes a good case with his squat analogy- as far as it goes. A 475 squat capacity will shorten the recovery requirements for a 400 squat. But, that doesn't necessarily mean that the 475 squat wil have the SAME recovery requirement as the earlier 400 best.

I agree, as an athlete get stronger (and bigger) he recovers better submaximal work (given the same volume) and worse (or equally well at best) the maximal one, as the decreased strength reserve (Fmm-TFm) increases the inroad on the body's recovery ability.-

The purpose of this thread is to get a working flow chart of the concept. For me it is easier to visualize with numbers and pictures. I think a detailed break down of the ideas of organism strength and energy envelope can help coaches understand how to properly quantify the CNS stress and learn how much time it may take to recover from it. I am learning individual responses to my workouts but general guidelines can help us eliminate too much trial and error.

Perhaps we may see this concept in more detail in the new manual?

Any ideas how recovery can be related to organism strength....what about general fitness such as the tempo work and GPP in the fall? Can this help with recovery ability of the CNS?-

OK, another question. Are there multiple envelopes? When we lift greater then four hours apart, I notice that the performances are better and the recovery is better from the more intense lifts.

For example let us say we did 8 30m runs in the fall. We lifted legs 6 hours later(8 pm). The numbers were higher in the lifts and people felt more fresh the next day compared to lower scores in the lifts immediately after practice.

In the summer we tend to lift after practice with heavy weights and lower volumes. It seemed that the athletes responded well to Charlie's "hot" concept.

Could we see two compartment envelopes in a general energy envelope? What does the forum think about timing and CNS energy...post!-

Could you take another shot at your last post? Not sure where your coming from. I don't know if this is relevant, but one has to consider the increases in velocities attained AND improved neurological efficiency in the weight room as the season progresses. So, what you might be able to get by with in November could kill you in February. I would ALWAYS separate speed work from lower body strength work.-

I understand your ideas and I will look into some of the details of time between training and CNS recovery.

1) An athlete will come into the weight room in a state of very slight fatigue if the track work is optimal. This may not be a factor during the later phases of training when the recovery times are high and the volumes and units are smaller. During the GPP this should be separated to allow for multiple sessions to increase work capacity or the sexier term "organism strength".

2) Reducing the warm-up sets may decrease CNS stress that is not useful such as 315 x 8 reps. They only add time to training, making the weight room a marathon instead of 45 minutes of work.

3) Perhaps the lifting when the body is "hot" from track sprinting is safer and better then a weightlifting warm-up.

What I like is that the two separate units can be improved the most by allowing for a gap time wise. I like the fact of being fresh for the track AND weight room.-

Charlie Posts in the worth the wait thread...

Ben did a number of exercises that directly and indirectly affected the erector spinae. Among the exercises were hypers and reverse hypers (raising the legs).

This makes me wonder about organism strength in general. Could we get into the details of this idea?

For example:

1) Is organism strength related to work capacity?

2) How do we monitor organism strength? How much is enough? (the RMT question)

3)Does specific work carry over to general organism strength when combined with other elements? Like when Ben doing isolated erector work, bench press, lat pull downs.Does the parts add up to general fitness of the body as a whole?

4) Low intensity work such as tempo and body weight exercises; do we eliminate/change them during comp phases?

5) Does the Organism strength prime the energy envelope in terms of recovery? (not the direct effects such as blood flow for tempo, but general fitness of the body)

I will give my 2 cents worth, my opinion:

1. Yes. Raising the Work Capacity, will allow the athlete to recover quicker and better from the high intensity sessions, and therefore leading to improved strength, e.g. Westside barbell and all their sled dragging and extra workouts are done to raise their work capacity, and in turn, help them recover, get through their 4 main workouts. (Louie and Dave workout up to 13 times per week).

2. Pass. Monitoring body temp and pulse rate in the morning to ensure overtraining and full recovery is achieved. If this remains consistent but the athlete is improving, would this be enough?

3. I would think so.

4. No, why change (to a certain degree, tapering, etc) the things that got you there in the first place. Again, Westside's conjugated method of periodizations versus western method of periodization.

5. Again, I would say yes.

The above are just my opinions. Obviously people that have direct contact with high class athletes may have their own views.
I just thought I'd get the ball rolling.

I also would like to get into the details of organism strength. So here are my two questions.
If weight training is general and we are trying to keep lifts down to a minimum so we don't exhaust all our cns energy, won't the dead lift be the best lift? It hits the upper and the lower body and a heavy load can be handled. Secondly, would there be any advantage in building organism strength by lifting weights only with the upper body and plyos with the lower.

Depending on what plyo's you perform, you will actually get a good upper body training session as well as lower body

Re 's Energy Envelope question
I feel like Rodney Dangerfield in "Back to School" during the Economics oral exam, when the prof says: "I have only one question.... in 27 parts!" This is probably the single most complex area we will deal with, but I'll try to start off with the "Cliff Notes" version:
1: Yes in terms of output but not necessarily in terms of frequency/density of training.
2A: Because we are dealing primarily with sprinters here, the key measure of general organism strength is monitoring times over the distances of interest to sprinting. Perhaps individual segment times (ie 30m time) could be referred to as special strengths/qualities, whereas the overall average of all the segments (ie 30 to 150m times) could be called a reflection of general strength.
2B: By the definition above, general strength is never totally adequate, as we are always trying to raise the bar.
3A: All specific components add to the general organism strength. The best way to think of the effect is by assigning values to exercises, not only by percentage of load, but also by percentage of motor units involved (obviously, a 95th percentile clean has more impact on the general organism than a 95th percentile preacher curl). For example, a reverse hyper might use slightly above 50% of all motor units. It's hard to be very exact but the exercise is worth doing if you want to know whats really going on with the work you assign.
3B: Exercises DO add up, but not in a linear way, as some muscles are specifically worked and strengthened in a general way by the cross-over effect from work done elsewhere and some muscles are strengthened primarily by the cross-over effect.
3C: Assessing the role of specific vs general strengthening. For example, the strengthening of the erector spinae has a very large direct impact on the first extension out of the blocks and a somewhat smaller direct impact elsewhere, though the indirect strengthening of the whole organism caused by the special erector spinae exercises has an impact everywhere.
4: Low intensity exercises do not have to be dropped much during the comp phase.
5: Does organism strength prime the energy envelope in terms of recovery? The intuitive answer would be no, as the increase in power output always has an exponentially higher cost BUT there are some special circumstances related to sprinting:
A: Only some of the actions in a 100% sprint require the muscles to operate at 100%, while most of the cyclical actions are slightly sub-maximal (strength reserve benefits).
B: Increased power yields shorter ground contact times, causing a two-fold drop in working time.
a: because the total race time is shorter.
b: total time under contraction within the new shorter time frame is reduced by a much greater amount than the actual difference in race time.
c: because of the greater ease of movement that power brings, relaxation, which should be present regardless of performance level, is much more likely to actually be realized.
So, to make a long story longer- yes, it will increase the energy envelope in a single sprint, but no it will not improve recovery time from that new level of performance because of increased CNS stress.-

Charlie writes

3A: All specific components add to the general organism strength. The best way to think of the effect is by assigning values to exercises, not only by percentage of load, but also by percentage of motor units involved (obviously, a 95th percentile clean has more impact on the general organism than a 95th percentile preacher curl). For example, a reverse hyper might use slightly above 50% of all motor units. It's hard to be very exact but the exercise is worth doing if you want to know whats really going on with the work you assign.

This is brilliant! When I read Speed Trap for the first time I noticed that you changed your program to include more multi-joint movements to improve this quality. In the King/Francis video my program divided up the lifts to three primary movement patterns/fiber volume to recover the body. Example: different lifts will activate a certain amount of fiber. While Charlie uses motor units(thanks for the homework CF) I have been using fiber for muscle recovery. The reason I did this was when I was lifting heavy to do hypertrophy work and wanted to make sure I split my body parts by size in order to lift hard each day of training. Perhaps we can look at our programs and see how we are loading the athletes body.

In addition, would the high neural intensity increase the Energy Envelope of the CNS?

True stress might increase that specific Energy Envelope. What worries me is what type of training is in the E.E.? If too many non sprinting exercises are involved with the E.E. will the expansion be worth it if we can not tap into it sprinting wise. I know several performance places who helped a few athletes improve power production but they couldn't do anything besides vertical jumps and cleans. Does the CNS E.E. need to be a certain percentage of sprint work? Like 80/20?

I think that few exercises that hit compound muscle groups with few reps and sets would be all you need to gain maximum benefit. Like anything thing non sprint specific, i think a great deal of quality sprint training is necessary to capitalize gains and reaps the rewards.
The problem with any non-specific sprint training is that many people look at it as a major part of making them run fast when in reality it can only contribute and enhance sprinting ability.
And unfortunately, most testing procedures (both scientific and non-scientific) do not reflect this.-

High neural intensity (achieved by ever-more trading of high output volume for intensification) increases the energy envelope for the single session output, for the reasons I outlined earlier. This expansion of the energy envelope becomes critical for further development once deceleration is no longer an issue, and greater top speed is the sole means to better times. Greater speed can only be accomplished by ever-more training in alactic conditions, and this higher intensity is harder to maintain in unfavorable ph conditions.-

"2A: Because we are dealing primarily with sprinters here, the key measure of general organism strength is monitoring times over the distances of interest to sprinting. Perhaps individual segment times (i.e. 30m time) could be referred to as special strengths/qualities, whereas the overall average of all the segments (ie 30 to 150m times) could be called a reflection of general strength.
2B: By the definition above, general strength is never totally adequate, as we are always trying to raise the bar."(Charlie).

Charlie, with the above definition would it be safe to say it was possible for Carl Lewis(who did very little weight training)to have a higher "organism strength" level than say Linford who spent alot of time in the weight room?-

Yes, this is possible.

Charlie, back in 99 an article i read made a big deal out of energy being wasted at the start of a race, citing a Quote by Dan Pfaff that his biggest break through with Bruny came with reducing the amount of energy expended at the start of the race enabling him to have a greater top speed and to hold it for longer. This seems to be reflected by your annecdote regarding Ben's 10.06 in Zurich where he hit 12.35m/s after a poor start and acceleration phase. How could you apply this example of an energy envelope to a race structure, particularly in an event such as the 200m where far more time is available for improvement in the final 30m than there is in the first?-

Not necessarily. The EFFICIENCY of Bruny's start was improved. Claims of delayed acceleration just don't stand up since Bruny's fastest 30m time was in his PB 9.84 in Seville 99. Recognising that the new, faster tracks yield most of their benefit in the first 30, he's faster than he's ever been on equivalent surfaces and as fast as Ben to 30m, yet slower over the second half, even though Ben shut down at 80m.
The 200m is a slightly different story, though the savings with an easier start don't necessarily add up at the other end, as the musculature involved in the early stages (think significant knee movement) isn't all working at the same level over the upright portion of the race. So the question becomes: Is it more efficient to try to make most of your energy savings at the start, or would it make more sense to go for most of the energy savings by smoothing out the average velocity of the upright portion of the complete run?

This is slightly off point but relates to your last point in the "Back to School" answer about relaxation being easier as power increases. I'm assuming this a product of self confidence in the sprinter, since he knows he's getting faster and more powerful, therefore he doesn't feel the need to force it as much, which allows him to run even faster still. Sort of a positive reinforcing cycle. So I guess my question is how do you get the athlete to relax at the beginning when he knows he's slower?

The stronger you are the easier resisted movement becomes, so it has a positive re-inforcement aspect. As for beginners, the key is to work on technique first and not struggle to "get there" or worry about opponants. This is also where the right level of competition comes in. Beginners almost never have PBs in big meets because they fall so far behind the big dogs they lose focus and tighten up. The right level of competition creates the environment for success.

Re Bruny's accel
I found the splits for the 30m and Bruny was 3.79 vs 3.80 for Ben! So much for the delayed acceleration.

Thanks Charlie and others with your thoughts. I guess the forum can understand why Charlie is one of the great minds in sport. I am still waiting for 9.6 people with all of the new concepts. Too bad Charlie's information scared off the gorillas at the SWIS conference! It seems people now want functional training and magic pills.

As far as I'm concerned, the more people who use stupid training methods, the better. It's a lot easier to win when the competition does most of the work for you. It's not like we didn't try to warn them.

Think about it this way. If Charlie gave a big seminar for all of the sprint coaches in the world, how many of them do you think would actually listen to him? Most would probably think he was feeding them misinformation and would deliberately train their sprinters in the opposite manner. God bless stupid people.-

Charlie, you are looking at this from a direct comparative standpoint. Bruny is not Ben. What if Bruny were able to go out in a low 3.7. In determining how much energy is used, it is wrong to compare one athlete to another, is is relative to the capabilities of that particular athlete and that athlete only.-

If you saw the reaction times and splits from the 1999 race, it was apparent that Bruny got the start of a lifetime. He was not holding back. It is unlikely that he could have run faster than 3.79. I've heard some people claim that Maurice managed his energy better in that race.-

"From zero to 30 metres is the drive," he says. "It's hard to explain, but you must run as fast as you can using as little energy as possible".(Bruny Surin)

To me, it seems like nothing more than relaxation.-

From my discussions with Dan my understanding is that the emphasis was on improving his force application and not being "a frequency Junky" in the early stages of the race. So its more a case of being more efficient than trying to save energy by doing anything sub maximally.

Smith uses this same apparent philosophy about not spending all of your energy at once.

My take on it is that it is a clever coaching cue that is not about holding anything back, it's about not trying too hard, very similar to Charlie's waiting for it cue.

The athlete may think that they are backing off, but proportionately, they will be backing off the tension induced antagonistic force component resulting in more nett forward force.

I think that describes the effect, whether it is the intent or not.

"I've heard some people claim that Maurice managed his energy better in that race."

I feel that Maurice was so confident that he stayed relaxed when Bruny got out there. I also feel that Bruny felt the "heat" from Mo and tightened up. Perhaps Maurice did not use his energy on atagonists that only wasted and reduced force.

I feel that THEONE made a good point about terminology. Some people use different words for relaxation.

Bruny's best chance was to catch Maurice by surprise and put pressure on him with a great start- which he did. Maurice stayed relaxed, in hopes that his strength would pay off and/or Bruny'd make a mistake. Bruny made one about 70m where he pushed one of his steps, and that was enough to throw his rythem off slightly.-

Quote

"From zero to 30 metres is the drive," he says. "It's hard to explain, but you must run as fast as you can using as little energy as possible".(Bruny Surin)

To me, it seems like nothing more than relaxation.

What about the actual muscle groups, motor units and tone. Does the proper execution of the drive phase over a longer period of time preserve any of the above components in the Acceleration, Maintenance and Deceleration phases?

In my video analysis of Ben's races his ability to maintain hip departure angles is what set him apart during his acceleration phase. His awesome strength allowed him to maintain

his positions. He had very little amortization at the ankle, knee and hip in comparison to other sprinters. Also, Charlie do you know what Ben's strength levels were in 1992 compared to seasons previous?-

Ben's strength levels (and training in general) were significantly down in 92, as you can see from the films.-

I am currently training for 200m and 400m using a weights routine that is performed in a circuit (vertical) fashion as follows:

Mon: Stiff leg deadlift, Bench Press, Hammer curls, DB row, Abs circuit
Weds: Squat, Military Press, Curls, Ab circuit
Fri: Shrugs, Close grip bench, Pulldowns / chins, Abs circuit.

I perform 4-6 circuits of 4-6 reps resting 2.5 mins between exercises and 5 mins between circuits (except abs which are high reps).

Track sessions are on tues (endurance) and thurs (speed).

Is this routine ok in terms of exercise selection and using a circuit sequence. Or should I be using a horizontal sequence (perform all sets on a exercise and move on)?

After watching my cousin play on his Sony playstation, I looked closely at the power levels on one of his games (energy envelope on the brain). This made me think about energy envelope and *exercise order*.

Is the energy envelope pure? Is the power from the first minute to the last minute a 100%? Or is there a secondary envelope with less maximal power that anc. exercises such as bicep curls and rear delt raises-ect can be done in, and not waste it on non primary lifts?

Will a circuit be fine so long as the large motor unit exercises are not past the envelope barrier? (to many lifts in a circuit may be too much for the envelope, this may have the "meat and potato" exercises spoiled by secondary lifts.)

Or

Should we go highest to lowest in terms of fiber recruitment? So that the highest qualtiy energy in the envelope(early in the workout) is tapped first?-

"...3A: All specific components add to the general organism strength. The best way to think of the effect is by assigning values to exercises, not only by percentage of load, but also by percentage of motor units involved (obviously, a 95th percentile clean has more impact on the general organism than a 95th percentile preacher curl). For example, a reverse hyper might use slightly above 50% of all motor units. It's hard to be very exact but the exercise is worth doing if you want to know whats really going on with the work you assign..."(C Francis)

Would forum members share which exercises they feel would have the highest value in terms of percentage of load and motor units involved?
Charlie could you list your top 3 for a sprinter?

I am thinking cleans, dead lifts, squats.

Tudor Bumpa in his book 'periodisation training for sport' has a list of exercises from a research study conducted by Cornacchia & LaFramboise, 1998 on the effectiveness of muscle contraction as related to limb position. Integrated electromyography (iEMG)was used to establish electrical activity.

The higher the electrical activity, the more effective the muscle contraction. I've listed hamstring, quad, chest. Glutes weren't shown in tables. Don't know if iEMG was performed on trained athletes or general populations or if that makes a difference to iEMG results. If forum has other info please feel free to add or comment.

Rectus Femoris (Quadriceps)

Exercise %iEMG

Safety squats 88
Seated leg extension 86
Half squats 78
Leg press 76
Smith machine squat 60

Biceps Femoris (Hamstrings)

Standing leg curls 88
Lying leg curls 71
Seated leg curls 58
Modified hamstring deadlifts 56

Semitendinosus

Seated leg curls 88
Standing leg curls 79
Lying leg curls 70
Modified hamstring deadlift 63

Pectoralis Major

Decline dumbell bench press 93
Decline barbell bench press 90
Push ups between benches 88
Flat dumbell bench press 87
Flat barbell bench 85
Flat dumbell flys 84

This relates to the effect on individual muscles or groups, not on the whole body's musculature.

What is the relationship between OS and EE with warm-ups? Could a very fit athlete use a longer warm-up(theoretically safer for sprinting)and recover to the same level as the athlete with a shorter warm-up and lower EE and OS?

Carlo, the general fitness for sprinters may be in fact lower. Tempo work is many times eliminated and left out of the training process!
Trust me it happens here at major DI schools.

"2A: Because we are dealing primarily with sprinters here, the key measure of general organism strength is monitoring times over the distances of interest to sprinting. Perhaps individual segment times (ie 30m time) could be referred to as special stregths/qualities, whereas the overall average of all the segments (ie 30 to 150m times) could be called a reflection of general strength.
2B: By the definition above, general strength is never totally adequate, as we are always trying to raise the bar."(Charlie)

Charlie, I ask you before if it was possible for Carl to have a higher organism strength level than Linford even though Carl lifted much less weights. Your answer was "yes, it is possible" and I'm guessing you said yes because using the above definition, Carl probably recorded faster times over distances from 30-150m.

Okay, what's the difference between p.r's and organism strength, e.g. if i run my 30m in 4 sec. and then correct a technical error and improve my 30m to 3.5 sec. and then learn to run in a more relaxed manner and improve my 150 from 16 sec. to 15 sec. could it be said that my organism strength has improved. Maybe I'm wrong but that's what the above definition is suggesting to me.

At the high levels of performance you are referring to, you won't find that much time improvement is available through technical changes. In fact, with athletes at the level of technical perfection of Linford and Carl, you're unlikely to find any. Improvements at that point must be explained as an expansion of abilities.-

Another question,

Since lifting under the 80% will not interfere with the CNS envelope, can we use rep ranges that are higher and increase strength that way so we don't drain the CNS but get strength improvements?

I would say no for a couple of reasons:
1: You'd gain too much cross section if the reps were high enough to actually create any challenge.
2: You'd risk running into the issues of intermediate intensity training.
3: You'd sacrifice an opportunity for recruitment enhancement.-

Charlie,

Please go into detail about 2 and 3. As for cross section I think that is not a problem. I was thinking about the rotator cuff, Seratus Anterior, hip rotators during the GPP phase.

But why low intensity work when we are doing strength? Since abdominal strength can be from indirect sources(squat and sprinting) what about tempo work(if one believes in doing any Tempo work to begin with) and core strength as Dcw23 said in the tempo construction thread. Can we get indirect low intensity work from circuits and tempo and drop the thousands of reps?

What training effect would there be if the weights selected were not pushed to a challenging rep no? (thus cross section)

I think that the large ab nos are a means of covering the low intensity needs- just like tempo. I'm not suggesting that the weights should drop to low intensity, rather, that they should stay in the high int range. I would consider rotator cuff work (if I understand right) to be supplementary to be done like rehab work- if necessary.-

Wouldn't the rep bracket selected be a function of the training age of the athlete(s)? Also, isn't the definition of accumulation different for a sprinter versus the average Joe? You're question about core work certainly brings up a good point. How much is enough??? If core strength work weaves it's way in and out of everything we do, how much volume of work does it really need? I trained an athlete for 3-4 months and we didn't even do ONE REP of core work during this time. I just wanted to see what would happen. I'm not sure I would do it that way again, but we didn't have any problems. Food for thought, I guess.-

The smarter the components of the training, the more the core is integrated.

Craig-I have an athlete that is ripped with no body fat so to him (and myself as well) nutrition was for fat people! My response was that his energy levels and recovery could be better, since never heard him say, "I feel great today". He felt tired and sore a few days a week so sometimes what you can't see is important.

Eight-pack? Who cares about the rectus abdominis, what about the QL, oblique's, and transverse? The money muscles are sometimes the ones you don't see. Also, how strong is his core? Challenge with hard exercises and loading protocols.

Has anyone had an athlete that did little or no ab work, then put them on ab program and then seen results because of the program?
If so, what improvements were made?

I have an athlete that has what looks like an 8-pack and does no ab work. I have tried to convince him so many times to start an ab program, but he always meets me with resistance. I would insist, but his posture is perfect when he sprints and also during tempo runs so, I leave it alone.

OorWullie, if I convince him this season to start an ab program I will let you know if I see any changes.

Charlie,

I must be the exception as I am looking to add them in to my program.
I have a few questions:

1. Do I work all areas (upper, lower, oblique's) every day? Or, do I concentrate on one area one day, i.e. upper abs, then the next day, lower abs?
2. Do I include spinae erector work in this low intensity workout?
3. Can I include press ups.
4. What numbers should I start with?
5. What numbers should I aim for, when my program is up and running in full (bearing in mind I am only a weekend warrior).-

At max speed the force required to raise a set COM must be achieved in a shorter period. This can be achieved in two ways:
1: Increasing fibre recruitment
2: Increasing recruitment velocity (time to max force within each fibre)
Clearly, the second option is the most energy efficient, as GC times are often shorter than the time to max contractile force for much of the available fibre (differences in fibre type,recruitment order, etc).

This is especially relevant where a set sub-maximal speed must be maintained.
There is a clear link between excellence in the jumps (which maximizes option 2)and 200meter performance (Lewis, Myricks,Conley,M.Jones), which might be counter-intuitive at first, but makes sense when option 2 is considered.

This becomes most interesting when you balance out the possibility that more special endurance work might interfere with option 2. Comments?-

How would you recommend building up to these numbers or since they are low intensity, do you suggest that I start doing them now?

Can these be split up over the course of the day: half in the morning, and half at night?-

I'm not answering for Charlie but my 2 cents worth.

Remember that these are of low intensity and should be in place as soon as possible. Along the same lines as tempo training. They should have no effect on the next days speed training. Start off with 500 reps and move up to the maximum of 1000 reps by the 3rd week in base training. On the speed days you could start off with 300 reps and hit 500 reps by the end of the 3rd week. Unless time commitment is of concern then try to do them all at once and in conjunction with your tempo. Do the abs on speed days AFTER the speed is finished. No need to feel at all tired when doing high intensity work.

Most of what I've said is on this forum already and mentioned a multiple of times!-

Charlie, else where you mentioned that some jumpers have great 200m p.rs. because of some relationship between special endurance work and relative strength. Now something else is thrown into the equation: "increasing recruitment velocity". Can you tie all of these factors in with a clearer explanation?-

What happens if we eliminated the low intensity abs? Not to be a jerk but I am not convinced that 1000 crunches of low intensity contractions does anything. If it is not building strength or help with recovery why do it! Also as high intensity work of the core increases wouldn't a thousand abs become even lower in intensity?

More questions

(1)What movements? Just crunches?

(2)How many reps per set?

(3)What would a distance runner do? 10,000?

(4)So why train by fiber type since the gastroc is slow twitch....

(5)Would a slightly higher intensity of exercise replace some of volume without taxing the nervous system? Like doing a jackknife or Iron Cross exercise counting as 5 reps of low intensity crunches? Maybe I am closer then I think?

If you are prepared to accept that tempo has value, why not low intensity abs? Isn't this another means of covering low intensity requirements without the need to raise the volume of tempo? Thoughts?-

I presume I can add push-ups to my morning ab routine, as another form of low-intensity activity?

My thought of ab volume: Is this just another way of increasing the work capacity of the athlete, but, by using a low-intensity method??

Can anyone comment on adding push-ups as a morning exercise? Maybe add crunches with it. I have noticed in the past that adding push-ups gives me more upper body strength than just bench press. I would do 150-200/day and got my 1 rep bench max to 350 with my body weight at 170lbs.

That's a good question, and it's a similar concept to the low intensity GPP stuff that Louie Simmons raves about. For myself, I approach tempo work primarily for recovery, rather than developing aerobic fitness and work capacity. Although I know it does increase these general qualities, that's of secondary importance to me. In tempo workouts I'm just trying to increase blood flow, heat the muscles, and increase metabolic exchange. Adding more ab and pushup exercises allows me to do this without having to rely exclusively on running to get the job done, which saves the legs. Does anyone else agree with my logic on this?

I know it works, I've felt it, I'm just not sure about the explanation. I'll wait 20 years for the scientists to figure out the mechanism.

You seem to have a novel approach to tempo work. However, the problem I'm facing and is my question ....is how do you quantify it? Previously it was suggested that total volume of tempo work per a session would be at least 2000m, now if I followed your suggestion and replaced say my 100m grass run with a low intensity exercise(s), how would I be able to tell if 50 situps or 2x 50 pushups with 30 sec. rest in between is equal to that 100m run. Please help me understand your suggestion since I'm always looking for ways to give my feet rest from the hard asphalt track I run on.

Quantification is always the problem when trying to implement general principles. I think Charlie would be the best person to address your question. I'm sure most of Charlie's volume recommendations are based on actual experience over the years, but it's just a starting reference point.

For myself, I determine quantities by going out and trying it and seeing what happens. Ultimately, this is the only way you will know how much to do. In addition, I always deliberately under train the volume at first, just to be on the safe side and then go from there.

I wouldn't replace the tempo running entirely with sit-ups and pushups; I simply want to get more of the body parts involved. I really couldn't give you an "exchange value" between different low intensity exercises. A lot of it is intuitive, like coaching in general.

If you're running tempo on hard surfaces then you definitely should reduce the running volume and make up for it with other low intensity exercises. This has more to do with saving the legs from wear and tear than anything else.

And I agree that using different exercises will not produce quite the same response as just tempo running, but you have to weigh all the factors when assigning workloads. For example, once you reach 2000m per tempo session, should you try to continue increasing the volume (and workload of the legs) or begin to distribute the work over more of the muscle groups.

Presently, I'm holding tempo running to 1600m per session and increasing the volume of other low intensity exercises because of the lower body soft tissue problems I had during the summer. Now that I'm healthy again, I don't want to risk overstressing the legs by increasing the volume too quickly.

why do you want to continually increase the tempo workload? I have never thought of it this way! What's the rationale for increasing it? I tend to keep it constant so that intensity in other areas can be increased such as speed work.

I wasn't suggesting that one needs to keep increasing tempo volume. I was just giving an example of how someone might want to rely on other low intensity exercises instead of tempo running in order to redistribute the training stimulus. Maybe I should have used a lower running volume example.

I'll wait for Charlie to comment on this recent line of inquiry. I'm not a tempo expert.=

Quote

---

posted by Charlie
RE Motorneuron excitability:
At max speed the force required to raise a set COM must be achieved in a shorter period. This can be achieved in two ways:
1: Increasing fibre recruitment

2: Increasing recruitment velocity (time to max force within each fibre)
Clearly, the second option is the most energy efficient, as GC times are often shorter than the time to max contractile force for much of the available fibre (differences in fibre type,recruitment order, etc).
This is especially relevant where a set sub-maximal speed must be maintained.
There is a clear link between excellence in the jumps (which maximizes option 2)and 200meter performance (Lewis, Myricks,Conley,M.Jones), which might be counter-intuitive at first, but makes sense when option 2 is considered.
This becomes most interesting when you balance out the possibility that more special endurance work might interfere with option 2. Comments?

I would read this as an increase use of elastic energy reducing metabolic cost, so speed endurance improves.
MY QUESTION WOULD BE, WHAT IS THE RELATIONSHIP BETWEEN MAXIMUM STRENGTH AND THE STRETCH SHORTENING CYCLE OR DOES REACTIVE STRENGTH OR MAXIMUM STRENGTH CONTRIBUTE MOST TO KEEPING THE HIPS UP=

AJ You are asking another general vs specific training question. If you believe me, then you will accept that work anywhere on the body will enhance performance everywhere on the body, and that work anywhere on the force/time curve will enhance performance everywhere on the curve provided the nature, extent, and duration of the training means are within certain limits. (Recruitment velocity can be advanced only so long as the severity and duration of maximum strength work is limited.)

If you believe BJSPEED then all work must be specific to each muscle, joint angle, and body part, and recruitment velocity can only be stimulated from the right (max strength).
If you believe me, you must further accept that the one and only unalterably specific requirement for improvement in sprint performance is the acquisition of the capacity to hit the specific speed required, and then the extension of the distance over which the required speed can be maintained.

Paradoxically, if you believe BJSPEED, this is the one and only aspect of training that does NOT require specific work- advancement of strength is enough.
The implications are profound, not only in terms of performance but also in terms of injuries. (If you must specifically stress only the muscles involved directly in the action, your training options and load-sharing strategies are limited.) I don't want to get into names (and please don't try on this site!) but one group which has been successful with a specific style of training has had a rash of career- ending overuse injuries, while top groups with a general approach have not had these problems.

I urge everyone to read or re-read this thread. To extend along this topic line, what about the effect of intensity on the stretch shortening cycle?

I don't know whether this is related, but something I was thinking about recently..

I have observed that the stretch shortening cycle element required in max velocity sprinting can go missing for a few days but there is no impact on max strength in lifts such as clean, bench, squats etc.

This suggests to me that there is an x factor not covered by strength training, no matter how specific it may be.=

I find that my plyometric ability and speed go walk about when i've been squatting or deadlifting alot. Im not sure if its a direct result of a fatigued CNS or simply that the muscles don't react as quickly after they are put on stretch.=

Moving squats and dead lifts to the last workout of the week seemed to help .
I also found that doing plyos on the Wednesday speed session made my legs feel really quick and light on the Friday=

This is why different aspects of work must be included in each high intensity session, which, in turn, means that no one element can be stressed to the max resulting in the exclusion of other elements (unless it is on the track, where the performance is not predetermined by weight or jump numbers and is,therefore, not completely predictable.)=

Quote

---

posted by Charlie
This is why different aspects of work must be included in each high intensity session, which, in turn, means that no one element can be stressed to the max resulting in the exclusion of other elements (unless it is on the track, where the performance is not predetermined by weight or jump numbers and is,therefore, not completely predictable.)

Would you include plyos, explosive med ball, and weights in one session?=

Sure, why not, if the numbers are reasonable?

Would this be an extension of a vertically integrated program where everything is not only present in the micro-cycle, but in every session? With Ben you did work at the two ends of the force curve, max strength & speed work. Would working at all points of the force curve be more advantageous, e.g. sprinting, plyos, med ball, then weights?

They don't have to be present in all individual sessions, however, it is easier for high intensity componants to co-exist when the demand of each is smaller, meaning that these individual pieces must be present more often in a set period to achieve a training volume objective. Of course, even though these componants are present most of the time, the emphasis (and therefore order)can be changing all the time without adaptation problems or stiffness.

Charlie, if an athlete can handle 295lb in the cleans and 325lb in the bench and you had to make the choice of dropping one, which one would you drop and why?
Consider the cross over effect, the number of muscles involved in each exercise, the load that can be handle with each exercise, etc.
The athlete must drop one because plyos are present in the session, the athlete can do either one of the exercise and not feel fried, but can't handle both without feeling wiped out. This is not a hypothetical question, so all practicality would be appreciated.=

Quote

Charlie, if an athlete can handle 295lb in the cleans and 325lb in the bench and you had to make the choice of dropping one, which one would you drop and why?

Drop the cleans, dropping bench will crush your chest

Why does one have to be dropped, and if it does, when? If immediately before comp- drop the clean, if mid training period, drop the bench.

Biomechanics and Physiology of Sprinting

Main Points:
I didn't get through this entire thread. I'm on Section 12 out of 18. I didn't completely understand a lot of it, and I think that's OK, because it cannot be converted to practical training theory anyway. Thus far, this is what I've gotten from the thread:

The power of the foot is much less than that of the hip, but since power of the hip has to be expressed through the power of the foot, development of the foot must occur in lockstep with development of the hip. Along with towel clenching, barefoot runs, EMS, and sprinting, does anyone know of any good ways to develop the foot? I can't run barefoot right now because I live in the Northeast. Dorsiflexion happens naturally, don't try to train it.

Interested in stimulating discussion on biomechanics and physiology of sprinting,

According to Kinetics of Human movement ground reaction forces GRF is the single most significant factor in sprinting speed(Law of Reaction, for every action there is an equal and opposite reaction, when one body exerts a force on a second, the second body exerts a reaction force that is equal in magnitude and opposite in direction on the first body) so horizontal and vertical components of speed are determined by the Force being applied back downward on the track.

How is GRF optimized? what contributions are made by hip, foot, upper body, etc?

What exercises can optimize GRF?

Do you agree that ground reaction forces is the most significant factor in sprinting speed, or the rate of movement through the air?

For the 100m sprinting, how important is the Anareobic threshold, (also known as lactate threshold, and Onset of Blood lactate), do 100m
sprinters need to develop there lactate system, and at what intensity should they train there lactate system?

This is a highly debated subject here. Ground support forces are the #1 indicator of maximum velocity sprinting. Most sprinters reposition their limbs in the same amount of time as others, so ground support forces are a big issue here. If you wish to go faster you need to slap more force into the ground. At top speed net propulsion is zero. Sounds freaky, but when your foot hits the ground backward, downward motion helps propel the body forward, but also touch down causes breaking. Result, net propulsion cancels out and equals zero. Bodies in motion tend to stay in motion. Running at maximum velocity (if your speed does not change takes zero propulsion) Slap more force and you'll get the desired speed change.

Ground support is the key- but don't run off on a tangent. Top speed is a vague concept as there is considerable doubt that any two steps are at the same speed. The fact is, it's academic. It doesn't matter to the athlete! The key is how to set up to insure that available force is delivered. Things happen in sprinting so fast that they can only be influenced voluntarily by the actions you take beforehand. I will be covering this in detail in my upcoming manual.

Charlie, I hate to be a pain about this, but when is the manual going to be finished. Everytime you mention it, it's like a tease. You know we're all dying to read it.

Charlie,

No doubt we all agree with Flash. Can you give us some details??

Charlie
please explain before hand as it relates to max. velocity sprinting?

Believe me I'm dying to get it done, but it (and the website) has to happen when I'm not working, which can be unpredictable. I'm doing my best, though. In the meantime, re-read Speed Trap. You'll find a good description of the FEELING of sprinting fast- which is what must be relayed to your athletes. Yes Daniel , you'll be happy to discover a description of the down action of sprinting vs pushing back, written 13 years ago.

Charlie when you say

"Things happen in sprinting so fast that they can only be influenced voluntarily by the actions you take beforehand"- my interpretation is that you are talking about hip, knee, foot angels,COM etc before contact during support and drive phases.

(Charlie and others)
What movements can be taught to get the athletes, COM of mass higher, and position body beforehand to optimize GRF?

Improve GRF, my view

Most athletes, major flaw in there technque is hips are too low, causing heavy and long contacts:This can be caused by weak hip flexors, abdominals. Weak extensors in the quad and Gluts can cause the Hips to drop when contact is made, weak gastro and soleus can prevent good extension of the foot during drive phase.

clean pulls: strenghten quad/gluts/ham- involving lifting COM. Improve Power output. (look up topic Ben Johnson SL for more info on this exercise)

Hurdle drills with high knee: strengthen Hip flexors , foot extensors, abs, involves lifting COM, i prefer these drills , often drills without hurdles, athletes often still have low COM, and have poor mechanics.

Improve flexibility in hip joint: Poor range or motion limits stride length, influences GRF by limiting pre stretch of glut's, reduces hip torque when gluts cannot pre stretch before shortening.

Reverse leg press: use cable or 180 degree leg press, drive leg backward, similar to drive phase, may improve GRF, (do for 8 weeks, test in week 1 and week 8, need force plates to measure GRF, if dont have access, test top speed and acceleration, compare week 1 and week 8 results, some may need for time for adaptations)

Could you define lactate threshold,its onset of Blood lactate intensity as it relates to sprinting

This may help us all be on one page.

U say slap more force into the ground. is this the result of re-accelerating into the ground, or actually slapping the ground with your foot?

First off, who invented the term negative vertical velocity? If you watch anyone on a high speed tredmill, do you really think they are re-accelerating their foot back to the ground? Or are they just trying not to get thrown off? If you are reaccelerating your foot, you are not going full speed.

Could you provide us with your opinion on the biomechanics of maximal velocity sprinting?
I know you love the Harvard study, so explain what other study you have done in the field, and all the other research that you have reviewed.
How does the Harvard study compare to other theories on Vmax sprinting?

The big difference here is the swing leg. We are speaking of max. velocity here. I just dont see the stepping over and re-accelerating happening. I think this is a result of greater ground support forces.(elastic response).

Every one talks about the huge importance of the hip flexors at top speed. I disagree here too. These muscles cannot in any way shape or form assist a runner in accelerating or applying ground force at top speed.

Accelerating a runner forward requires pushing backward against the ground (there is no other way to do it) - only the extensors move the leg in the direction necessary to do this. The flexors (if active) would impede accelaeration by counteracting the force the extensors apply to the ground.

The same is true at top speed - all the ground force is applied by the extensors and activating the flexors would only lessen the force applied to the ground. They are acitve in the swing phase (flexors), but if they were the determining factor in sprinting, then runners would reposition faster than their opponents. This just does not happen. So are they crucial for running.....yes. Are they what makes you run faster.....no way? Again, it is ground support forces.
Elite sprinters per avg body weight apply more force to the ground!

I was at Harvard yesterday afternoon Dan. Although I didn't see Natalie Portmann, I was entertained by the one of the many debates on philosophy, metaphysics, and morhological science.

First let us go over this subject.

Bodies in motion tend to stay in motion.

Not on planet earth. A vector qauntity will maintain the same value(roughly a straight line) but gravity and friction interactions are far different then what Kepler and Newton were expressing during that period.This is good, because without gravity and friction there would be no movement. The human body wants to stay at rest, this is why we sleep and hit top speed for about one second!

Many of the inprovements in math and science were based on heavenly bodies. No not Suzy Favor Hamilton, but mass in space. Newton states:

Corpus omne persevrare in statu suo quiescendi vel movendi uniformiter in directum, nisi quatenus a veribus impressis cogitur statum illum mutare.

This states that a body will tend to stay at rest, or preserve the motion of a straight line, unless a change of force interacts with it.

In "Swimming Even Faster", The author brilliantly describes how the body creates drag or frontal resistance in order to create propulsion. Exactly what you state up top. While much of the race is acceleration (net propulsion greater then zero), the human body reaches a limit later in the race. Good point Dan, the net at top speed is zero.... but only for a step or two.

The next point is landing and acceleration of the foot.

First off, who invented the term negative vertical velocity? If you watch anyone on a high speed tredmill, do you really think they are re-accelerating their foot back to the ground?

This will be explained in a few short paragraphs.

(1) Negative values. This makes sense to biomechanists and morphologists. Did you read the research article from Li and Atwater from the Arms post? When using radians as values, wou will have negative values when the arm travels **back** and forth....

Even more simple Run a 390m all out and your displacement is -10 meters. 10 meters behind were you started out!

The pectoral fin (fish)(arms millions of years before they appeared on quadrapeds)fires first before the rear fins. MORE ARMS!

What about the foot acclerating down to prepare for ground reaction forces? It happens. Remember the acceleration is slighly faster then gravity, and most of it happens right before foot contact. Look at the research done on Cheetahs and greyhounds during top speed. Humans it's the same. You think the leg is falling from just gravity? This might appear so, but the leg is asleep till it wakes up from ground contact? Not a plesant way to wake up!

Beforehand.

Any EMG testing reveals that muscles turn on before contact correct? So pretensing is something that is happening any way.

As i see it, the body wants to move. Look at people when they sleep. Chart their movement patterns. They are all over the place. The body wants to move! Even when you dont consciously think you are moving you really are.

When we are talking about maximum velocity here, remember its not for long, you couldnt possibly re-accelerate your foot to the ground. If you did, you were not at full speed any way. The amazing fact of this research is that at top speed running, world class athletes swing time is almost identical to that of a much slower runner. The only way to account for the difference in speed is from the ground. If we try to change the way the free swinging leg is moved, we are compromising the spring. A spring by definition is a passive system, only giving back what goes in. If active muscle power, at least as held by conventional speed wisdom, is the factor that determines how rapidly a leg can be repositioned, then the harvard team would have found that sprinters with faster muscle fibers and more power would reposition their limbs more rapidly. This just did not happen

It all happens from the ground up. The limbs moving make the dominnant visual impression but they are just window dressing, however unintuitive this may be.

Any EMG testing reveals that muscles turn on before contact correct? So pretensing is something that is happening any way.

What are you saying here?

As for sleep, yes we do move.(I am part of the Sleep Research Society) But I can walk faster then Ben could move while he was asleep. Yes, there is movement, but your in bed for 6-8 hours. Not much movement overall. And when we die? We don't move much then do we?

When we are talking about maximum velocity here, remember it’s not for long, you couldnt

possibly re-accelerate your foot to the ground.

Yes max velocity is not for long, hence my post!

You couldn't possibly re-accelerate your foot to the ground?

This is way too easy. See long jump Dan.

then the harvard team would have found that sprinters with faster muscle fibers and more power would reposition their limbs more rapidly. This just did not happen

Why don't I go ask them then. I can hop on the Massachusetts turn pike and in 20 minutes have a nice talk with any of them.

As for limb speed do you think that every one has the same jab speed as Ali? Lets get real. True the difference is not much, like how I am only a second behind the world record in the 100m.

Talk to Peter Weyand. he would be delighted to speak to you about it. We are coahces not scientists. He studies eveything that moves (locomotion) I think they understand what propells us forward. It is our job to create and teach traiing methods. Marry the two!(science and coaching)

Look at the EMG signals from muscles during running: sprint or jog, to see the timing of the electrical "on" for the muscles in relation to ground contact - yes, they do turn on and develop force before contact. So why are we advised to dorsi flex?

From your posts, what could the training methods be for max velocity? Get new limbs?

And since you are ONLY talking about absolute maximal velocity, which can only occur at one instant in time, as an absolute maximal velocity is not possible to maintain, how is the study relevant to any other part of sprinting. It is relevant to ONE step, and even then, the only way we could train it is to get a new limb??

Explain here...

Well first off the Harvard group thinks more like 4-6 steps. To me it is acceleration that is key. Tom Tellez once said it is 64% of the race. I could be wrong here so dont Quote me.(it was something like that though)

I just think many programs spend far to much time on maximum velocity mechanics. I think getting the strength through plyos and limit strength through weights aid in the training. Also, running and sprinting in itself are plyometric in nature. Strengthening the lower levers and hip mobility are huge. What about body mass as it relates to strength?
So can we train it?.....yes. Would i spend tons of time on it. I wouldn't!

I will see if I can talk to Peter before I leave for Tampa. Remember no research was done on the elite runner. They estimated swing times from the 1996 Olympic final. No real times here. Yes, swing times are almost identical. But we are not arguing this. Remember I posted the URL on this subject!

Sternlight obtained videotapes of runners at the 1996 Olympics in Atlanta from NBC Sports. She measured the swing times of the best sprinters in the 100-meter dash, including the world-record run of Donovan Bailey, who finished in 9.84 seconds. Remarkably, his minimum swing time turned out to be virtually the same as the slowest of Sternlight's 33 runners.

Can you say virtually? The power of the push-off increases swing time. This strange relationship will decrease frequency.

Harvard writes:
"Reading and talking to experts revealed that differences in muscle power, the most logical answer, was probably wrong."

Harvard writes:
"It turns out that what separates the swift from the slow is the amount of vertical force applied to the ground with each stride. The speedy are also strong, and hitting the ground harder allows them to increase both stride length and frequency, the two variables that, multiplied together, determine speed."

Harvard writes:
These results support the conclusion that running involves little active muscle power. "Much of the work of running is done through passive mechanical processes, in which tendons and muscles act though elastic rebound, much like springs uncoiling," Sternlight comments. "The uncoiling delivers the power to swing your legs."

Harvard is that your final answer?

Dan. I broke the world record 5 times on a treadmill. Why didn't I get a big bonus from Puma?
If it is only elastic then we should take a harvard student and have him towed by a Corvette. Then watch him sprint at that speed for 8 steps? Force in, force out?

Yes, Tellez and the accleration model has similar numbers. But top speed is a important phase in the 100m.

We get so caught up with these tredmill facts that we miss the point. The mechanics of running: stride lengths, frequencies, contact
times, aerial times are virtually identical during tmill and overground running. Harvard developed the best pedometers/foot speedometers
in the world on a treadmill. How, in terms of research can it be that bad. I understand wind resistance, but i think the tredmill is reliable.

The study was done on MJ. The foot pods were placed on his feet at i think the world championships. They actually flew off in the first attempt. Later the data they collected said MJ is hitting way harder than everyone else, yet had the same swing time as the slowest guy in the heat?? You figure it out. You just cant dismiss it. Ask Peter, he would be so much better in explaining it than me. Know the treadmill results came out within in 1% accuracy of the flat ground testing. That’s pretty reliable to me. I wish i could send you a chart that Peter sent me.

Just some rambling thoughts...

1) To me, arguing about what is more important - hip extension or flexion - is simply chasing your own tail. The harder you pull your leg back the more tension you can create in your hip flexors(stretch reflex). This tension translates into a faster and more powerful knee drive forward. The same is true at the other end. The harder you drive your knee forward the more tension you can create in your hamstrings when you extend your foot. So, if you pull back harder (and your body is strong and powerful enough to successfully use this extra tension) then the quicker you can whip your knee forward (and vice versa).

2) I would explain MJ's technique thus - a) he has a strong knee drive (as do all top sprinters) however, b) instead of letting his knee rise towards the horizontal as a result of this powerful drive (as most other sprinters do) he stops his forward drive prematurely with an extremely powerful leg pull-back (his hamstrings must be very powerful to be able to turn his leg around so early!) This

explains the enormous power that he can exert against the track. Stronger stretch = more potential power!

3) I think an interesting point of discussion would be which skill (the knee drive or leg pull-back) is more important developmentally. I would suggest that both should be taught at the same time however a new approch is needed to approch knee drive. Most coaches seem to teach athletes to pull their knee up rather than to concentrate on driving the knee forward from behind the body. I think that we should rethink the way that we teach athletes to utilise this powerful stretch.

Daniel, maybe you can explain something for me.
You wrote that the swing time between world class athletes and much slower runners are almost identical. Therefore, the only way to account for the difference in speed is from the ground. In another post on the same topic you wrote "slap more force and you'll get the desired speed change".
If in order to go faster we must slap more force into the ground, then we can say elite sprinters are faster than slower sprinters because they slap more force into the ground.
Now this is what's bothering me, if force is equal to mass times acceleration(f=m*a) then elite sprinters are applying more force to the ground than slower sprinters by either having a heaver limb(mass) or by having a faster acceleration of the limb.

I'm a little uneasy with your description of the sprint action. The action off the ground is really pretty easy, fluid,and cyclical. Think in terms of allowing the knee to move forward, rather than forcing or cutting off any action. Michael Johnson couldn't be working against himself while displaying such staggering efficiency (in the 200 in Atlanta, splits of 10.11/9.21 which, allowing for the initial acceleration from zero, represents a deceleration of .10 over the ENTIRE RACE!)

Daniel- come on! The forward action of the knee is a contributor to force into the ground, particularly with the rotation of the hip about the centerline. Anyone can understand the role of the free leg in the high jump, how come it's so tough in the sprints. This discussion is getting out of hand. I don't care how many scientists can fit on the head of a forceplate! Some sprinters may be so fortunate that they instinctively know how to prepare for ground contact. Most others (like myself) have to learn it. Scientists seem to think it can't be taught. It can! The problem with these studies seems to be the lack of capacity to understand how far in advance of the action the preparation for ground contact really is.

Lactate threshold and, is a controversial topic within sport science, two ways of defining it are by when blood lactate levels reach 4mmol/l or when La levels have a sudden increase of more then 1 mmol/l, this is also termed OBLA, onset of blood lactate.

Lactate is pryvuate acid with addition of two hydrogen ions, lactate can re enter the kreb cycle for gylcolysis, the problem is the build up of hydrogen ions causing increased breathing rate, (due to increased CO2 in blood). They also cause effect CNS, by impairing nerve impulses.

It is hypothesized, that optimal training gains come from training at your lactate threshold, adaptations increase in glycolytic enzymes LDH and PFK , increase buffering capacity(sodium bicarbonate).

Charlie tempo speed, 75% of max effort, might be at the the L.T, but measuring blood La, would be needed to scientifically prove it.

This area needs significant more research.

Every one talks about the huge importance of the hip flexors at top speed. I disagree here too. These muscles cannot in any way shape or form assist a runner in accelerating or applying ground force at top speed.

Extensors cannot apply max forces if prior phases when executed. Muscles work in pairs, when the hip flexors contract, (hip angels 90 degrees) the gluts (extensors) lengthened, this allows for greater force of extensors downwards, increaseing GRF. This is proven by length-force relationship, in the human body force capabilities increases when muslces are pre stretched(impossible for extensors for max force without hip flexors shortening).

Without Hip flexors shortening, extensors cannot apply max force.

I agree with Charlie, prior phases are important in max velocity

There seems to be a misinterpretation of research here;

Biomechanics can justify and prove the importance of pior phases sprinting prior to ground contact.

Not only the force-length relationship, but also the moment of inertia, in the human body the distribution of mass with respect to axis of rotation can dramaticlly influence the relative ease or difficulty of moving the bodys limbs, MJ had a deceleration of .10 in Atlanta 200m, that would mean he was extremly efficent and moved easily through the air. Example of this during the sprint stride is the distribution of legs mass, and therefore its moment of inertia with respect to primary axis of rotation at the hip depends largely on the angle of the knee, when sprinting max angular acceleration of the leg is desired, More flexion of the knee reduces the moment of inertia of the leg with respect to the hip joint, thus reducing resistance to hip flexion.

By reducing MOI (Newtons 1st law) , sprinters move more efficiently through the air, thus reducing deceleration at the end of races.

Are you’re suggesting that leg swinging can provide propulsion? Maybe you’re envisioning propulsion coming during contact and providing distance during swing. The only mechanism by which sprinters can accelerate forward is by applying force on the ground backward.

It goes back to the speed trainers. one thought was that adding weight to the thighs increases angular momentum of the swing leg, which puts additional stress on the propulsion leg. More force? Nope you run slower.The JAP study makes it clear that ground support forces are critical. Runners who push harder against the ground at any given speed spend more time in the air, and will travel farther during each stride.

Frequencies below the preferred frequency (top speed), as predicted by Peter's and Deborah's hypothesis, the **body will not behave in a springlike manner**. Yes, if the athlete attempts some intervention to the natural spring like function, metabolic cost will increase.
I agree with the Harvard team in that minimum swing times are similar because the repositioning process is largely passive and therefore independent of fiber speed.

The high jump is completely different. Look at the ground contact times?

What do you feel about the arm posts Dan? What do you feel about the arm action and frequency difference? (Same rate, not timing)Please comment.

Did you read the title of the JAP article? Please post it for everyone to see. I look forward to your e-mail on the foot pods and MJ.

Valid point about the ground contact time. But it is more complicated then that.

It is a relationship between physiology and biomechanics,

Increased flexion at the knee,less resistance to movement in hip joint, in both flexion and extending downward.

Equals more efficent sprinting that means physiologicaly ATP-CP stores are less depleted, results in athlete having less deceleration due to greater phosphate stores and therefore being able to sustain ground reaction forces.

According to you view on role of flexor muscles..
". So are they crucial for running.....yes. Are they what makes you run faster.....no way. Again, it is ground support forces."

Yet according to Force length relationship, extensors only can generate Max force, if they have been pre stretched, which involves contraction of hip flexors..so if you want to run faster, by increased downward force by action of extensors, hip flexors must first be shortened, and then force output by extensors will be higher.

Running at max speed, involves agonist and agonist relatioship, between hips flexors and extensors. One cannot work without the other

Running at top speed involves agonist antagonist relationship of hip flexors and extensors. One cannot work without the other

I may be wrong here, but lets take two hypothetical examples:

1. Gumbo athlete, 6m/s maximal velocity
2. Elite sprinting athlete 11m/s Vmax

Ok. So swing times were exaclty the same:
If that is true, and I am assuming it is as they did do some research, and I looked through the paper and coulndt find any discrepancies...

Let’s say the first athlete is 5 foot. Lets say the second athlete is 6 foot.

Since the second athlete gets full extension while running, and has longer limbs, if both swing times are exactly the same, as hyposthesised by weyand, wouldn't the elite athlete be accelerating his foot faster? Since he reaches further out, and extends further back, and still has the same swing time, this means his leg velocity is faster than the gumbo.

Game, set...?

We do need these conversations for every one to learn. Hey i dont claim to be an expert, but i have read the research many times, and am starting to understand that hip flexors or the swing theories have no bang.

So what we’ve agreed upon is that sprinting is plyometric. So, who didn’t do enough hip flexor training: Donovan Bailey at 12.2 mps or the lady in the study whose top speed was 6.2mps? If these propulsive forces via the hip flexors are so significant, then there should have been some discrepancy in swing time. Or are you suggesting that powerfully trained hip flexors propel the body forward yet have no impact on swing time?

I have said this before. You dont want to
teach a pawing of the leg cause it disrupts the spring model and also forces an abbreviated ground contact time which hinders the impulse
(vertical force X contact length). This reduces aerial times which would force faster swing times, and cause the runner to reach his
minimum swing time at a lower speed! (Weyand) The leg will naturally repostion itself.

Basically your ground contact time is set by the support forces. If you try to fix this mid swing, then you will disrupt the swing.

Thanks for your opinion and posts, this is how we find the truth. Too bad it is not on your side on this one.

Charlie writes "**Anyone can understand the role of the free leg in the high jump, how come it's so tough in the sprints**."

This is a biomechanical fact.

Yes the ground contact time is slower. This means that a faster/shorter ground contact time would have a similar reaction. More or less, or not at all?

What do the science guys say?

Peter McGinnis served as a biomechanist for the US Olympic Training Center. He wrote a book titled "Biomechanics of Sport and Exercise". He writes on page 318.

By fully extending the the takeoff leg and rotating the pelvis toward the side of takeoff, a sprinter can add another 3 or 4 cm to this distance.

Charlie, what did you say again about torso rotation in Toronto?

This will interact with the IPHMDM of the hip. My Peter writes

Driving the the free leg and arms upward during the second half of the support phase increases the vertical reaction force as well as the verical displacement of the sprinter.

Page 318-320.

The reason that swing times are close in duration and not in angles is rather obvious.

Take the modified drum from Gary Winkler. Let's say I pull a David Copperfield and want to make money from ignorant parents. I would show how Mo Greene can take almost 5 steps in one second at top speed. I would not tell them that he is moving 33 feet while doing it. I would get lines on the ground for 3 or less meters, and have fat joe run 4.8 steps in one second by tap dancing over the lines. I will get my $150.00 and put it in the Superclub fund. This does not include the 150.00 from Fudgie running 29 miles per hour on the high speed tredmill.

Knee angles have different total distance lengths. Anyone can do a fast feet drill at 4.6-5 steps a second. Go to any Boston Tap Dance Academy and look at the all the kids dancing. The problem is when you apply force Dan.

As for Swing times this is why a short stride/low knee lift is an illusion. Swing times and distances are not the same. This is why the 33 year old women from Bedford Massachusetts can have the same swing time as Bailey.

Also, please post the title to the JAP article.

Joe writes,

Since the second athlete gets full extension while running, and has longer limbs, if both swing times are exactly the same, as hyposthesised by weyand, wouldn't the elite athlete be accelerating his foot faster? Since he reaches further out, and extends further back, and still has the same swing time, this means his leg velocity is faster than the gumbo.

"Are you're suggesting that leg swinging can provide propulsion? Maybe you're envisioning propulsion coming during contact and providing distance during swing. The only mechanism by which sprinters can accelerate forward is by applying force on the ground backward".(Daniel Fichter)

Maybe I am wrong here, but I am suggesting that the downward swing of the leg aids in propulsion.
If I wanted to slap someone I won't but my hand on the persons' face and then apply force. I would activate a little prestretch and then deliver. So I can't see sprinters waiting for ground contact then pushing out the back to go foward. If everything is done on the ground then knee lift (prestretch) would not be needed.

Please explain how to slap more force into the ground.

Faster Top Running Speeds Are Achieved With Greater Ground Forces Not More Rapid Leg Movements" Journal of Applied Physiology, Weyand, Peter G., Deborah Sternlight, Matthew J. Belizzi, and Seth Wright 89: 1991-1999, 2000.

How do you achieve greater force passively Dan! Something has got to load the spring.

hip flexors:
the role of the stength of hip flexors might be to allows the hip extensors to accelerate during a longer course...check out the following study : Jaric S, Ropret R, Kukolj M, Ilic DB.

Related Articles

Role of agonist and antagonist muscle strength in performance of rapid movements.
Eur J Appl Physiol Occup Physiol. 1995;71(5):464-8.
on the role of strengthening the antagonistic muscle in explosive movement..the importance of hip flexor's strength might be more pertinent to hip extension than leg swing....

Pushing backwards:
if we are talking about maximal speed phase and not the pushing phase, when occurs the peak ground force? when center of gravity is right above the foot or when it's gone passed in front? I have an idea but does anyone have data on it?

Hip flexors:
the role of the stength of hip flexors might be to allows the hip extensors to accelerate during a longer course...check out the following study : Jaric S, Ropret R, Kukolj M, Ilic DB. Related Articles

Role of agonist and antagonist muscle strength in performance of rapid movements.
Eur J Appl Physiol Occup Physiol. 1995;71(5):464-8.
on the role of strengthening the antagonistic muscle in explosive movement..the importance of hip flexor's strength might be more pertinent to hip extension than leg swing....

Pushing backwards:
if we are talking about maximal speed phase and not the pushing phase, when occurs the peak ground force? when center of gravity is right above the foot or when it's gone passed in front? I have an idea but does anyone have data on it?

Hip flexors:
the role of the stength of hip flexors might be to allows the hip extensors to accelerate during a longer course...check out the following study : Jaric S, Ropret R, Kukolj M, Ilic DB.

Related Articles

Role of agonist and antagonist muscle strength in performance of rapid movements.
Eur J Appl Physiol Occup Physiol. 1995;71(5):464-8.
on the role of strengthening the antagonistic muscle in explosive movement..the importance of hip flexor's strength might be more pertinent to hip extension than leg swing....

pushing backwards:
if we are talking about maximal speed phase and not the pushing phase, when occurs the peak ground force? when center of gravity is right above the foot or when it's gone passed in front? I have an idea but does anyone have data on it?

Note the information here is correct. Yes the Harvard study was accurate presenting the wrong information.

We are not all on the same page here. I suggest we reread the research and then make sure we use the same terminology. Swing duration is not an usefull measurement. If I ran against Mo in the 100m, then said "hey everybody I ran the same distance as Mo Greene!" nobody would care. This is why I laugh at swing time. The contradictory research was right after all DAN...The sprinters are the "Sultans of Swing".

Look at the back side mechanics of elite runners and joggers. Same swing time. Get Chrissy from Bedford Massachusetts and have her sprint at top speed. Use her fastest 1 second segment. Take that frequency and compare it with Donovan's.

THE MATH DOESN'T LIE.

Recently, I have spoken with an excellent collegiate sprint coach and have read a few articles about the importance of "dorisflexion" at the ankle while sprinting. A dorsiflexed ankle features a "toe up" position of the foot. The "toe up" position will allow a sprinter to have a brief foot contact time with the ground during the push and support phase of the running cycle. This preparation position also reduces the braking mechanism of the foot in the support phase. The dorsiflexed ankle position also facilitates a clawing action with the bottom of the foot which creates "negative foot speed" when actuated on the ground. The sensation of "negative foot speed" allows a sprinter to feel the pull of the track under his foot and makes the sprinter aware of his forward propulsion.

After looking at the starting position of his athletes, would he be a good source for qoutes. He has been coaching longer then I have been alive and he is has is athletes look like that? Please comment on the following.

1) **Driving the the free leg and arms upward during the second half of the support phase increases the vertical reaction force as well as the verical displacement of the sprinter.**

2) Arm Action. Remember the previous debate forum?

3) Femur velocity of elite runners compared to Chrissy from Bedford Massachusetts in the harvard study.

4) Stride frequency of maximal speeds of both elite sprinters and average runners.

I have no fear of change. In fact I am the root of it!

These issues have a 20 year trail in the scientific literature that most have no familiarity with b/c it is outside the sport science literature. It would be unfair for me to try to give it justice with out the background that Peter has.

I don't know of any studies that looked directly at arms in sprinting at max velocity. There are lots of numbers for mechanical work done by the arms, but these are not very informative regarding functional importance to sprinting or speed? If you have some post them. I want to see them.

From a purely mechanical perspective, steady-speed walking or running on an adequate motorized treadmill is identical to overground walking and running; the only difference is the frame of reference for each situation (23). Locomotion on a treadmill with inadequate power or momentum (i.e., no flywheel) does indeed differ from overground locomotion. However, on a treadmill with an adequate motor and flywheel, where the belt speed does not vary, the kinematics (21), ground-reaction forces (19), and metabolic cost (2) of locomotion are nearly indistinguishable from overground locomotion. As detailed above, our motor and flywheel appear to be adequate in maintaining a constant tread speed

This is very nice...

"The problem, said Rodger Kram, now in the Department of Kinesiology and Applied Physiology at the University of Colorado, Boulder, is that treadmills in use today are not very effective, primarily because they rely upon awkward and uncomfortable rubber bands to pull astronauts down onto the treadmill as they run..."

"I have said this before. You dont want to
teach a pawing of the leg cause it disrupts the spring model and also forces an abbreviated ground contact time which hinders the impulse
(vertical force X contact length).

Increased Knee flexion, (when angles shorten at the knee joint), during recovery phase allows for improved knee lift or hip flexion, this sets up the leg for higher force during the down action of sprint due to pre stretch of gluts(length-force relationship).

This action is distinctly different from pawing or pulling, the leg down.

The Harvard study is limited, like other studies in sprinting, force plates can measure GRF, but they cannot measure force contributions of specific muscle groups prior to or during contact, currrently technology does not allow us to measure forces of specfic muscles to during the sprinting.

Science can hypothesize muscle contributions based on known action and Laws of physics.

Extreme Dorsi-flexion of the foot, increases microtrauma in the achillies tendon due to increased eccentric load.

Could you give your view on dorsi flexion of the foot?

RememberI run on a treadmill. Why,it is NEARLY indistinguishable.

Why is this forum? Let's look at this by reading the study with great care. Remember that the graduate student *walked* and *ran* on the treadmill.

Running is not sprinting.

Sprinting increases newtons to point were a AMTI force platform would have no use when the motor (in the study)is only able to go to 7.0 meters per second! When the speeds are at 9 m/s the belt pull will cause an artificial gait change. (Davis 1997) Why friction at top speed is slightly less on a treadmill and each stride is not uniform. Even Charlie knows that(too bad he only attended Stanford)

From a real and practical angle, look at the USATF indoor nationals in 2000. The men's 60m final an athlete (save face here) fell at 50m! This was not at top speed. The demands of the ground contact are so high, even a 100% is tough for the body, never mind a 1-2 cm difference (Kram et all.

This why fat Joe can run on a treadmill at 28 miles per hour when a person has support behind them...

Dan The speed was at 1.25 mps and 3.0 mps. The frequency was almost perfectly equal.What about 11.5 meters per second? No research has been done on this because you need an elite sprinter to be able to jump on a treadmill at 27 miles per hour? Even Neo from the Matrix would have a hard time doing this.

"Woooh" - Keanu Reeves

Page 6 was funny when they tried to put two treadmills side by side to measure each foot independently, but the student look like a cowboy because they couldn't squeeze the treadmills together close enough.

Dan, I respect Rodger greatly. He got his PHD from Harvard in Organismic and Evolutionary Biology. His penguin research and outer space stuff was interesting, but we are sprint coaches, not walking grannies.

Hmmm, every sprinter I have come into contact with will do whatever is takes to avoid running on a treadmill.

I think there's a message in that for all of us

Too bad Harvard(the Stanford of the East)doesn't have the weather to conduct research outside. Surely, this must be the reason they restrict themselves to a treadmill deep in the bowels of the University. Kinda like research into sex- they've heard of it but never done it- want to know more about it -so they've created computer models for study. (More relevent research might justify staying inside)

Dan writes

"Know the tredmill results came out within in 1% accuaracy of the flat ground testing. "

It's only 1%.

If this was ok, then talk to all the blind people from lasix surgery!

10,000 babies given to the wrong parents a year? 99% is not good enough.

99% off of 10.05, 9.94 is close enough for me.

Still the treadmills have a fatal flaw. They are perfect! The human body is not perfect. Take a look at the research done on Merlene Ottey. She slows down during meters 38-40. Why? Perhaps what charlie states in Speed Trap is true about breathing patterns and accleration. So if she is running on a treadmill what do you think would happen if she slowed down slightly at top speed Dan?

This is why the treadmill needs a laser tracking device for the athletes to monitor the COG during sprints so they don't trip or stumble at 27 mph.

Any treamills do that? NO.

Fact.

Kinetics and Kinematics are not the same.

Force plates yes.

Treadmill no.

I am in favor of treadmill testing for lactate threshold and VO2 max testing. But even that work is limited.

As for reaserch on arms use medline for the last name, and date of publishing.

Dorsi Flexion,

The question is does this happen, and if so, how much, when, and why.

This was always a mystery to me. How do you run on the balls of your foot and toe off when you are suppose to dorsi flex? So instead of reading I went outside and ran my sophmore year in High School.

The results and observations I did were clear. The body dorsi flexes the foot before contact.(McGinnis 1998) It hyperextends the gastroc from the suport phase then plantar flexes later. This should be natural, but other external problems may cause a temporary loss of some of that function.

As for pawing action lets look of cats. This seems logical. Humans have spikes to increase friction while a claw is better then we can design for various reasons.
www.cs.caltech.edu/~klavins/papers/NBR.pdf.

While much of the forces generated by the brain are vertical in nature. There is a tiny pull. This is insignificant for training purposes. At high speeds the ground is passing through at 26 miles per hour, causing much of the illusion that we see.

But be warned because there is only a brief explosion, doesn't mean the body is simply bounding from step to step. Because much of our evolution is based off of simple mammals, the hamstring pulls by it's insertion and origin.

In closing. Don't try to pull your way through!

Naturally Dorsi flexion, precedes planter flexion,

However the question is , what angle should the foot dorsi flex prior to ground contact and during support for max velocity,?

To maximise force generated by the agonist during support, it is necessary to minimize amount of co-activation of antagonist and agonist muscles.
(Sports Med, Neuromuscular junction)

Trying to "slap" more force down on the track, will do the opposite, relaxation assists in minizing co-activation, not tension like slaping or pulling.

Most strength gains come from this neural change rather then hypertrophy during the first 8 weeks of training.(J. applied physiology, Hagerman).

Charlie, hi I am new to the board. I was wondering if in fact you feel there is a need for doing skipping and hurdle drills. I see a lot of coaches implement them into warmups...but what purpose are they serving, looks to me like they just waste a lot of energy that could be spent on sprinting. I mean a lot of high school kids need coordination and flexibility to even get them to understand timing and rhythm, but is it necessary to do them when you are very proficient at them?

For the 100m sprinting, how important is the Anareobic threshold, (also known as lactate threshold, and Onset of Blood lactate), do 100m
sprinters need to develop there lactate system, and at what intensity should they train there lactate system?

For the best book on lactate training read the Science of Winning. by the great Jan Olbrecht.

www.lactate.com/bkolbr.html

The solution is simple and I agree with Charlie on 92% of all of his tempo programs. Except for doing two weeks of inter-special endurance runs for 400m runners. Sprint the special enudrance runs at near maximal speed. The distance and intensity of those runs plus the tempo work will overlap all of the needs for a 100m athlete.

If anyone can recall the talk about the 1-1.5 second addtion of alactate work Charlie was talking about (his seminar or the thread about fall training) was spine chilling.

I like this Quote I found in a T&FN from Charles Foster of he said "To run on natural talent is one thing. If you align some of those misaligned motions and then apply the same forces, the clock seems to tick slower"

To maximize force generated by the agonist during support, it is necessary to minimize amount of co-activation of antagonist and agonist muscles.

I don't agree with the minimize part, isn't it maximize during support, then minimize during the elastic phase?

Please break down your thoughts on the support phase in great detail to make sure we are on the same page.

"To maximize force generated by the agonist during support, it is necessary to minimize amount of co-activation of antagonist and agonist muscles."

"I don't agree with the minimize part, isn't it maximize during support, then minimize during the elastic phase?"

Ok, my above statement can be misleading; during support, the aim is to maximize contraction of agonist, and minimise contraction of antagonist. If both where to have equal force, agonist (shortening) and antagonist (lengthening) then a breaking force would be applied, like when you trying to decelerate.

So by reducing eccentric forces within the Hamstrings (antagonist) and maximizing forces in the quad extensors (agonist), GRF will be higher since the leg is not working against itself,

Co-activation is when high forces in concentric and eccentric muscles occur simultaneously.

However the question is , what angle should the foot dorsi flex prior to ground contact and during support for max velocity,?

Let's try this again; the limb is "pre-tensed". This happens with muscles and nerves in almost every situtation beofre a force is applied to any object - there must be 5,000 or more published EMG and other measurements that show
this..... The friggin dorsiflexion muscles pre-tense in the wrong direction - running forces are applied down into the ground, not up toward the head as the dorsiflexors would cause to occur.

Besides, the dorsiflexors also are ridiculously small and weak....
Landing in plantar flexion is not going to hurt the spring. Remember it is a quite natural thing (the spring model). The body, depending on the ground support forces will take care of that.
The force and energy loaded into the achilles by dorsiflexing is a ~ linear function of the distance the achillles is stretched. The force the body's weight exerts on the ground is > 2 times body weight; the force the achilles experiences is probably 5 times body weight and roughly 10 times that the ankle flexors can generate while dorsiflexing the ankle in mid-air. Thus, any dorsiflexion achieved is completely swamped out by the ground forces during the contact phase.(Weyand)

I attatched this part on a different forum.....

Weyand cant see why one would want to dorsi-flex. Again, any force transmitted indirectly (to the achilles and later the ground) from the ankle flexors is trivial in the grand scheme of the ground and extensor muscle-tendons forces that occur in the middle of the stance phase at which time they reach their peak. Furthermore, the force loaded by dorsiflexing in mid-air, if it could be released would be released on touchdown when the horizontal forces are negative and therefore slow the runner down.

This begs the simple question of why one would want to use swing phase muscle action to increase the braking action on landing? The reason the force of dorsiflexing cannot be released in any meaningful way on touchdown is simple and can be observed simply by watching the foot and ankle joint (without any measurements) from a slow-mo video of the stance phase. The ankle continues to dorsiflex through the first half of the stance phase. This indicates that the achilles forces are increasing throughout the first half of contact. In order for dorsiflexion forces and energy loaded in the swing phase to be released, the ankle must move in the opposite direction (i.e. plantarflex) and this does not occur. The force of the body's weight as it loads the leg all the way down to the ground causes progressive dorsiflexion throghout the first half of the contact phase.

As noted above, these body forces exceed the forces the ankle flexor could generate by roughly an order of magnitude and summing does not ocur - i.e. dorsiflexing while loadng cannot increase these forces further. Even if the latter were possible it amounts to madness since it would elevate the force required in the extensors above the outrageous forces they already generate(Weyand).

Does the ankle joint dorsi flex at all during the swing phase?

Naturally, yes I would imagine. But why would it matter. It should be natural.

Furthermore, tibialis anterior is a muscle responsible for approximately 85% of the gait cycle of which 25% is during the stance phase (Mann et al., 1986). These muscles therefore can fatigue easily in high intensity exercise and their true function may be compromised.

See the drawing of the leg in Charlie's older manual, the CFTS.

"Furthermore, tibialis anterior is a muscle responsible for approximately 85% of the gait cycle of which 25% is during the stance phase (Mann et al., 1986). These muscles therefore can fatigue easily in high intensity exercise and their true function may be compromised."

All Flexor muscles in the body, fatigue before extensors do, they also contract at a faster rate, due to higher Fast twitch a fibres. They have lower force capacities then extensors and have higher incidence of injuries(hamstring strain).

Sprint training should be aimed at balancing the strength gap between extensors and flexors.

Movements should not isolate one muscle group e.g Hamstring curls, exercises involving recruitment of multiple muscle groups, develop greater strength gains.

Strengthening the tibialis anterior by dorsi flexion exercises may assist sprint performance, however accentuating extreme dorsi-flexion during sprinting can lead to injuries by increasing load on achillies tendon.

I don't know of any studies that looked directly at arms in sprinting at max velocity. There are lots of numbers for mechanical work done by the arms, but these are not very informative regarding functional importance to sprinting or speed?

While not every research study will tell all of the secrets of the sprints, many will give a great piece to the puzzle. On the arms I have listed both the name and year of the study. I sometimes give the page number to books as well. I even do this with Charlies books.

I feel that anyone who posts in this forum has the right to voice his or her opinion. With this right, they are subject to the review from other members. I use some graphic illustrations to make the point sink in.

For example "**at top speed the arms are not important**."

I responded with a sarcastic remark of "run like a vampire" to use both humor and logic in a clear visual to show that this is foolish.

Even the poor NSCA knows this information! In the speed section Steve Plisk writes:

The role of arm and torso action during sprinting is twofold. One is mechanical, as the axial angular momentum resulting from forward/backward leg movement is offset via contralateral arm action and trunk rotation. The other is neuromuscular and relates to central innervation patterns. In any case, explosive arm action should be approached as means of facilitating leg action.

The references were piggyback (other people not straight journals) so I had to find the direct sources like the my arm section posted in the arm section.

If indeed this is the case, (the faster the pawing/the greater the ground force) then it is difficult to explain how athletes are achieving faster top end speeds when swing times (of which the classic "pawing action" in conventional sprint training models is definitely a part) are virtually the same for athletes sprinting at their highest possible meters per second, which is what the study clearly shows. If active muscle power were the key, you would see faster swing times for sure!(or for that matter why wouldnt we?)

Claiming that the research team has confused swing time with rate of swing, which is what some appear to be doing is really not a valid arguement. Remember that four years worth of research went into this project, and even though Peter's group had a theory as to how athletes achieve greater speed, they did not know where the data would lead them. It all leads back to the ground support forces time and time again.
In the scientific world, if we disagree with something, we do our own study or find studies which refute the findings.

Well it makes sense about rate of swing - doesn't it? If, for example, two people do a vertical jump in the same time, but one has longer limb lengths, there is obviously more power in the jump with the longer legs. How can you dispute this?

So it follows that length of stride also has to come into play, as well as limb lengths. To say that everyone, no matter what their limb length and stride length (which can be affected by many factors as you know) is has the same swing time and thus the same muscular involvement seems preposterous.

Could you explain this one to me?

www.news.harvard.edu/gazette/1998/04.30/StudentSolvesMy.html

For $600.00 you can be a researcher. At a $150 a year for 4 years, did Harvard buy posters of any elite athletes?

Just a few thoughts
1: The greater the sensation of "pawing action", the lower the hips are- therefore the slower the athlete. (This doesn't mean that the action is not back as well as down, it's the way the action takes place.)
2: Dorsiflexion/planterflexion tends to occur as the athlete's swing foot passes over the support knee. This action tends to help shorten the lever, easing the workload. Once the big toe is up however, the ball of the foot starts moving down towards the ground as the leg straightens, enhancing ground contact forces while the toe-up position maintains pre-tension in the foot. At this point, natural ground reaction forces take over, and by the end of the ground support phase, the bigtoe is extended.

Claiming that the research team has confused swing time with rate of swing, which is what some appear to be doing is really not a valid arguement

Clear example using simple math and reason. Let's use the perfect shape so celebrated in ancient history, the circle.

Make the hip a center point of the circle.

The femur is the radius of the circle.

The knee joint is the endpoint of the radius.

Looking at the swing phase of Rupert, the lawyer from Wellesley, Massachusets, on the Harvard treadmill, we see that he has a 115 degree ROM.

Zhanna Pintusevich-Block with an angle of 125 degrees.

They both have the same swing time.

Which leg has the faster swing accleration?

A)Rupert
B)Zhanna
C)Both Rupert and Zhanna
D)Peter Weyand

Movements should not isolate one muscle group e.g Hamstring curls, exercises involving recruitment of multiple muscle groups, develop greater strength gains.

he writes in another thread a day later....

For example during this cycle, i have focused on hamstrings and hip flexors, for this time of year i am producing personal best over 60m, 6.7 to 6.5.

i have focused on hamstrings and hip flexors

What does focus mean? Did you concentrate more on the hamstrings by thinking about them during squats? What about the hip flexors?

Isolation work will help when integrated with multiple muscle lifts.

Isolated a variable to improve. He now runs a 6.5 because of his ability to focus on the right variable.

Movements should not isolate one muscle group e.g Hamstring curls, exercises involving recruitment of multiple muscle groups, develop greater strength gains.

he writes in another thread a day later....

For example during this cycle, i have focused on hamstrings and hip flexors, for this time of year i am producing personal best over 60m, 6.7 to 6.5.

What does focus mean? Did you concentrate more on the hamstrings by thinking about them during squats? What about the hip flexors?

Focus, doing movements that strengthen hip flexors and hamstrings through multiple joint movements, e.g hurdles drills & pulls. Both these exercises are not isolation exercises; they involve recruitment of extensors, adductors, trunk. They strengthened muscle groups across multiple joints.

Isolation exercises for the hamstring can lead to reduced ROM, and reduced force and power output.

Hip Flexors, consist of iliacus, psoas major, pectineus, rectus femoris, sartouris, and tensor fascia latae.

The most important of these in sprinting is the **Rectus femoris** , its a two joint muscle active during both hip flexion (knee lift) and knee extension (support phase). Therefore when training the hip flexors isolating just hip flexion will not result in similar strength gains as hip flexion/extension exercises.

Bicephs Femoris and Rectus Femoris, are highly active during Max velocity, if they are trained by isolated movements then Force and power output is also lower, e.g pulls can generate easily 6000Netwons whilst hamstrings curls you will be lucky to generate 1000Newtons.

Movement across multiple joints are prefer too isolation movements, since they involve elicit higher Force and Power output & strengthen multiple muscle groups.

"**naturally, yes i would imagine. but why would it matter. it should be natural**"

I have been tough on Dan a lot this last week. He has been a great addition to the forum forcing me and others to dig a little deeper to defend our beliefs.

Yes, perfect."**Natural**"

The secret to speed is the big toe. Before people check their feet(no relation to size or ratio of other things) let us think about this one for a minute.

see
Reber, L., Perry, J. and Pink, M. (1993). Muscular control of the ankle in running. American Journal of Sports Medicine, 21, 805-810.

The Tibialis anterior inserts into the the inferior surface of medial cuneiform and first metatarsal bone.

The Extensor hallucuis longus inserts on the distal phalanx of great toe.

Hmmm.....The extensor digitorum longus inserts to toes two - five? Why is the big toe a VIP? Speed.

The key is not pawing action. **Forum search hi and low for my statements on the pawing technique. Did I suggest that was important to speed or did I post about training to do it?**

Back to the big toe. The muscles attach to it supports the medial longitudinal arch and inverts the foot!This is vital since 70% percent of elastic energy is preserved when this mechanism is fully active. The arch is important to speed. Even Dan Leiberman at Havard can tell you that. Charlies post about the toe doriflexing is supported by the known fact that the EDL is the prime mover of toe extension. This happens with other isometric, concentric, eccentric actions of the foot before, during, and after the stance phase.

Dorsi Flexion facts.....

Yes their is a lot of BS out there on Dorsi Flexion. Not here though.

In the Olympic lifts and other movements thread I wrote three months ago the following.

Leg extensions-
1) Places a huge shear force on the knee joint. This will cause structural damage on the connective tissues. Some may get away with little or no effects, but many will have irreversible damage.

2) Programs isolated firing patterns resuting in poor recruitment for athletic movements.

3) Develops leg strength in a imbalanced progression. Other muscles of the leg (glutes, hamstrings, and so on) are not used during that exercise, so strength ratios become out of balance.

4) Time consuming and energy demanding. You have only a finite amount of energy to draw from, and leg extensions will rob you of some of that energy. Although no respecting coach will do 3 x 4 reps of 225 on a machine, even submax work (40-75%)does strain CNS.

Then Flash wrote... (intramuscular vs intermuscular thread in s+c)

I also think isolation exercises might be helpful for remedial development of lagging muscle groups.

Perhaps emphasis is better stated...but sometimes kinetic chain problems might cause the problem that isolation work/therapy will help. Physio work is on a spectrum

This actually goes full circle and backs up what I feel is the best thing I learnt from Speed Trap. The difference between acceleration and speed.

It also backs up Charlie's other observations on the problems of antagonistic force production on speed.

It's all tied up with that great concept of "waiting for it".

i.e. You need to relax to be a spring. From your description, once Tony got the springs, he already knew how to relax and use them to their best effect. I think this further illustrates a concept that eludes so many sprinters. i.e. There is a point where forcing more acceleratoin is futile. You can't force yourself to run faster. Top speed is very rhythmic in nature.

I wonder if the science is again explaining to us something that master coaches and their eager students already accept.

Dan Pffaf tells his guys to bounce at 60 meters. You are correct; too many times we lose the spring because we try to fix it mid-swing.

Don't Quote me on this, but there was a study done to find how humans find their ground contact strike,(elite sprinters closer to their center of mass) and it points out that it is very set. Efforts of trying to elongate it or quicken it compromise energy. It is natural. The more sprinting, the more efficient it becomes. I will look to post that study. Some runners in the study sprinted to a "beat" others tried to lengthen or shorten their stride to force greater impulse. The results were.....higher energy costs

There seems to be a lot of arguing about some pretty minute points here, though,in the main, I think people agree more than disagree. What about a list of points we seem to agree on?

Changes in speed is(ignoring wind resistance)dictated entirely by the forces applied to the ground. Agree or disagree and why?

I agree, although the exact resultant of the forces would be something I know nothing about right now....does anyone think that faster sprinters have a more vertical resultant of forces going into the ground? It makes sense that the faster and individual is moving according to their body position...less and less force is applied backward, ground contact times get shorter, movements at top speed might be considered nothing more than a series of intricate twitches...the question we all want answered is what is the exact feeling of running fast at all phases of a race?

Also, in a previous post there was a question of studies done on arm movements in sprinting. I have filed through some of my resources and found a study of the following:
S. Bhowmick, Bhattacharyya, A.K. (1988) KINEMATIC ANALYSIS OF ARM MOVEMENTS IN SPRINT START. The Journal of Sports Medicine and Physical Fitness. 28(4):315-323

The following was noted in the study:

(1) velocity curves and acceleration curves of sprint starts are individualistic in nature,

(2) swing movement of arms does not increase the forwerd velocity of the main movement directly,

(3) horizontal component of the arm movement helps regulate the leg movement and to increase the stride length,

(4) angular momentum produced by arm movement helps to counterbalance the angular

momentum produced by hip rotation along with leg movement

(5) vertical component of the arm movement creates a favorable condition for getting forceful leg drive and thus helps to increase the foreword velocity of the main movement indirectly.

Here is some more stuff to chew on. A friend on mine helped this along.....

The average velocity of the foot is the same as the average velocity of the runner or the runner's body. What this means is that the fast guy's feet do move faster than the slower guy's feet in the forward direction. It is also true that his feet would move farther during the same swing time. So...what does this mean....really?

Such observations do not get to the heart of the research, 's issue regarding rate of swing and swing time simply comes down to this: swing times and swing rates are inversely related so if one does not differ, the other, by definition, cannot(KJ).

Changes in speed is(ignoring wind resistance)dictated entirely by the forces applied to the ground. Agree or disagree and why?

If you are talking about changes close to max velocity then your are maybe right , but this proposes another question, what joint angles and muscle groups contribute to higher GRF?

Can you explain what inversely related foot speed and swing time means? Who made that law? There also seems to be a forgotten factor here, swing length. If the length changes, then the two swing times cannot be directly compared. Would you compare the jump time of two long jumps, one 2 metres and one 8.5?

Another thing :

Basically, if swing time is the same in everyone at the top level after about 60m, say .3 seconds, then the only way to increase speed is to increase stride length, by increasing GRF. This is contrary to a lot of published material.

Based on this assumption also, it wouldn't matter if our stride length was 2m or 10m, swing time would have to be the same, no matter what.

What then determines maximal speed? Going back to my hypothesis on calf development, could it not be the elastic components of the calf and hamstring (not the quad, as the hamstring according to Lombard's paradox extends the knee at high velocity).

"What then determines maximal speed? Going back to my hypothesis on calf development, could it not be the elastic components of the calf and hamstring (not the quad, as the hamstring according to lombards paradox extends the knee at high velocity)"

The extensors of the knee consist of the Rectus femoris, vastus medialis, vastus lateralis,and vastus intermedius. All four of these attach to the patella tendon, which inserts on the tibia. The Rectus cross's two joints Hip and knee. These muscles extend the knee because of there origin and insertion on bones, when the contract, they cause agonist pull of the tibia and hip joints causing knee to extend.

Rectus Femoris , does both hip flexion and knee extension: its probably the most important muscle to max velocity.

The hamstrings , semitendious, bicephs femoris, semimembranous, flex the knee and cause medial & lateral rotation. There origin is the tuberosity,(back of hip) and they insert at the

proximal and medial tibia, when the contract the cause the knee to flex. **It is impossibe for hamstrings by agonist contraction to cause knee extension.**

The only way the Hamstrings could contribute to knee extension is by eccentric forces, and this in sprinting would cause breaking or deceleration, due to increase anatagonist activity.

What determines speed again is ground support forces!! Those who argue swing rate and angular velocities, etc. are simply pointing out that faster runners do run faster.

It is also true that his feet would move farther during the same swing time. I have no problem with this! Again, we are **not** talking about acceleration here. Only max velocity. maybe four strides.

Quote
It is impossibe for hamstrings by agonist contraction to cause knee extension.

The only way the Hamstrings could contribute to knee extension is by eccentric forces, and this in sprinting would cause breaking or deceleration, due to increase anatagonist activity.

Joe writes :
Obviously you never followed the lombards paradox post, or the posts on supertraining. Nice explanation of terms, although you'd think that someone who knows a little would understand that.

Here is an excerpt from:

Relative activity of hip and knee extensors in sprinting -- Implications for training
Klaus Wiemann and Gunter Tidow
New Studies in Athletics
10(1): 29-49, 1995

from page 32-33:

2.3 The hamstrings as knee extensors

The hamstrings (HS; m. semitendinosus, m. semimembranosus, m. biceps femoris caput longum) also act as extensors at the hip joint. The reason for the hesitant consideration of these muscles as prime movers during the sprint seem to be the fact that the biarticular HS are generally considered not only as hip extensors but also as knee flexors, whereas a knee extension is demanded, during the support phase of the sprint. However, as early as in 1903, LOMBARD drew attention to the “paradoxical” function of biarticular muscles. Fischer (1927), Molbech (On the paradoxical effect of some two-joint muscles. Acta Morphologica Neerlando-Scandinavica. 6: 171-178, 1965) and Andrews (A general method for determining the functional role of a muscle. J Biomech Eng. 107(4): 348-353) described this paradoxical function in more detail, and Carlsoo & Molbech (The functions of certain two-joint muscles in a closed muscular chain. Acta Morphologica Neerlando-Scandinavica. 6: 377-386, 1966), Gregor et al. (1985) and Andrews (The functional roles of the hamstrings and quadriceps during cycling: Lombard's Paradox revisited. J Biomech. 20(6): 565-575, 1987) applied this paradox to the function of the hamstrings in cycling. According to this principle and provided that the free end of the two-link kinematic chain of the leg is guided (inertia, support reaction), the HS have not only a hip extending function but, paradoxically, also a knee extending function. Apart from a short note made by Donskoi (1961), the so-called LOMBARD paradox has been applied only recently to the function of the HS during sprinting (Wiemann 1989, 1990, and 1991). By means of vector splitting and model formation, it can be shown that according to the LOMBARD paradox and unless the knee angle is smaller than 145 degrees, the HS during the support phase of the sprint bring about both a hip

extension and a knee extension. To this extent, the HS organize exactly that movement – namely a synchronous hip and knee extension – which is required in the support phase.

The action of the HS becomes especially clear, if one observes the pelvis from below during a leg position corresponding to the front support in the sprint. One can see that the HS extend, like reins, from the ischial bone to the lower leg, exactly in the direction of the pull of the leg under the pelvis during the support phase.

However, in previous cinematographic and electromyographic studies of sprinting, the HS were either given little attention (Simonsen et al. Activity of mono- and biarticular leg muscles during sprint running. Eur J Appl Physiol. 54: 524-532, 1985; Mero & Komi. Electromyographic activity in sprinting at speeds ranging from sub- maximal to supra-maximal. Med Sci Sports Exerc. 19(3): 266-274, 1987) or they were still treated as knee flexors (Bober et al. The mechanics of the leg swing in running. Techniques in Athletics, Cologne, 7-9 June 1990 Conference proceedings, Vol. 2, pp. 507-510; McClay et al. Muscle activity in running. Biomechanics of Distance Running. Chapter 6: 165-186, 1990). Wood (Optimal performance criteria and limiting factors in sprint running. New Studies in Athletics. 2: 55-63, 1986) who at least regards the contractility of the HS as the limiting factor in the sprint, also identifies the HS as knee flexors. Even Lemaire & Robertson (Power in Sprinting. Track and Field Journal. 35: 13-17, 1989) do not make a clear statement about the contentious function of the HS in the knee joint, although they recommend that more attention should be paid, during strength training for sprinting to the hip flexors and extensors than to the muscles affecting the knee joint. Only Wiemann, on the basis of electromyographic pilot study (Wiemann. Die Muskelaktivitat beim Laufen. Leistungssport. 4: 27-31, 1986) and the results of vector analysis (Wiemann 1989 and 1991) postulated the extensor function of the HS at the knee in the support phase of the sprint. Jollenbeck et al. (1990), in experiments, revealed a relationship between the length and force of the HS and sprinting speed.

From the above we can assume that, in sprinting, the movement of the support leg, from the moment the thigh begins to move down from the high knee lift position to the completion of the push-off, is caused by two muscle ‘reins’, namely

(a) by the HS, which form a long biarticular rein from the ischial bone to the lower leg, the m. semitendinosus and the m. semimembranosus forming the inner rein and the m. biceps femoris caput longum forming the outer rein, and

(b) by a short, uniarticular rein running from the pelvis to the thigh, consisting of the GM as the outer traction rope and the AM as the inner traction rope.

During the support phase these muscle loops produce a force which is directed horizontally backward, the reaction to which propels the body forward. However, the backward rotating torque, in the form of the “sprinter’s forward lean”. It can be assumed that, in the course of the sprint cycle, the activity of the synergistic partners within both reins must be adjusted to one another, in order consistently to direct both the free leg, in the swinging phase, and the knee of the support leg, through the sagittal movement plane.

Remember that not everything is as it seems, even in apparently simple questions.

So Dan, what you are saying is that the faster stride speeds inherent in their faster angular velocities that faster runners have is not due to muscle power, but due primarily to elastic mechanisms? And that muscle power has nothing to do with GRF?

Another supporting argument for hamstrings functioning as primarily elastic models at high speed would be the appearance of some of teh top sprinters very "high" hamstrings, like calves.

Anyone else noticed this?

Let me ask you this.....if active muscle power were the key here, wouldnt we see faster swing times? Mechanical energy is recycled in each stride. Over the course of the stride the active muscles do not need to shorten or perform work. Again, they need to generate support forces against the ground to support the body's weight.

Remember we are dealing with max velocity only. A few strides.

Ok, the 100-meter race is very coachable, as we all know. All phases are intact. The mechanical properties of the muscles shift from pure power from the start to pure force at max velocity (very little muscle shortening). At max velocity, your body behaves like a super ball bouncing on the ground. When the ball departs the hand, it is active muscle power (i.e. the acceleration transition etc.) Once up to max speed, what makes the ball continue to bounce is what makes humans able to (well almost). Humans and most land animals turn on their muscles to function like springs. (Passively) The ball and the runner both conserve forward speed /momentum by bouncing. Again, no NET input of propulsive force required. Bodies in motion tend to stay in motion.
The athlete, as I have stated before, can't really FOCUS on maintaining a short ground contact time: it occurs because of increased ground support forces.

Key points
There really is no metabolic cost of swinging limbs, this is very important. Again, if active power as suggested by lots of people were the sole entity that calls the leg forward, people like MJ would call it forward way faster!

Peter says that the relationship between force on the ground and the displacement of our sprinters center of mass will be the same during the yield and rebound phase of the time he is in contact with the track. "Springs by definition, says Weyand, Have the same relationship between force and displacement on compression and release or stretch release, and this is how the body behaves during the ground contact phase of sprinting"(KJ, Weyand)

The results of the Harvard study was a good starting point. The question is is the swing time limit the same for Rubert as for an elite sprinter? Is there a limit.

Like many researchers, they gave no solutions to increase the power of the sprinter steps. It was a great project, but the difference between swing times are too small to think about training, but it exists. See the JAP article. .

Reading Speed Trap again last night, the "lift" concept that Charlie talks about does not happen at every race.

"The 100m on a head on view looks like a pack of dolphins." (Francis 2002)

This is why swing times are almost the same. The more force you put down(Dan were does this force start from?) the more vertical displacement you get, adding time to the duration of the swing. Showing that most of this is elasti,c and why plyometrics are best for accleration work; because of graound contact times. (Valle 2002) But this also showes that lift has a different effect on hip ROM, this does not add much to performance, but it shows that the **actual values are different**. (Weyand 2000)

Like the rubber ball Dan talked about, when the ball drops, force is lost on each bounce, resulting is lower and lower heights of the ball. This explains why we can only hold top speed for only steps.....

But the question is, does the acceleration phase set up top speed? Is it only elastic? NO. The first step out of the block will have some elastic work, but the highest amount of elastic force is from sprinting at top speeds.

What about different anthropometric measurements including different muscle insertions/structure?

The reason of this post was from the video named "What's the limit?". The researchers stated that the limit to the speed man can attain based on animals studies was only possible by a taller swimmer than Alex Popov. After the 2000 olympics they were very wrong! Not only was Peter shorter, he smashed the record by a huge margin and has dipped the record into the 47s.

What about my earlier remark about pawing. Having run at high speeds myself (albeit 31 years ago!), I can assure you that there is no sensation of "pawing back", only the feeling of moving up and down. The back action is so brief you are hardly aware of it.

Since Top Speed is Elastic, we can design a treadmill to bounce the lost energy from the body back into the stride so that we can run at top speed forever. There would be no metabolic cost to this since it is purely elastic!

Interesting....Daniel, what do you mean when you talk about active muscle power? If the muscles did contribute this way do you think acceleration would be a multiplicative never ending thing....or would it be limited by the rate at which the motor units could fire? So, If sprinting is indeed not caused by muscle activation and by elastic components alone, is this process not regulated by the brain? It kind of sounds like it is regulated by an interneuron if it is based on a stretch reflex. Now, lets remember that a stretch reflex is different than a stretch shortening cycle, is it a possibility that at top speed sprinting the stretch shortening cycle can become more like a stretch reflex?

I have a few appointments for training, but will be back on later. At least we are all talking and learning, that is what i like best!
Hey we have to question each study at the same time respecting it too. The Harvard guys do have a great starting point, now we have to take it from hear as coaches. Plyometric work does look like it has value as well as strength training.
I will post more later. i do think in terms of training, Charlie is right that it is general in nature.(weights)

Oh yes, definately about pawing Charlie. Ok, quick example. Lets Define some things:

(1) The whole reason for people being able to run fast is because they cover ground at a high rate.

(2)The body can only pull when there is a leverage factor.

With this said if I were to pull something myself having a foreward lean, **the object I would be pulling would have the center of gravity (or center of mass in the system, both me and what ever I am pulling) behind me**! So all pawing guru's out there tell me...If in sprinting the center of gravity is suppossed to be slightly ahead of foot contact for acceleration to take place (does everyone agree with me?)...how can I have any leverage to pull or in effect, how can I paw and accelerate? It is not a paw...it is a push, its a complicated push with many torques associated, but it is still a push.

On a previous post regarding the sprint start:

The following was noted in the study:

(1) velocity curves and acceleration curves of sprint starts are individualistic in nature,

(2) swing movement of arms does not increase the foreward velocity of the main movement directly,

(3) **horizontal component of the arm movement helps regulate the leg movement and to increase the stride length,**

(4) angular momentum produced by arm movement helps to counterbalance the angular momentum produced by hip rotation along with leg movement

(5) vertical component of the arm movement creates a favorable condition for getting forceful leg drive and thus helps to increase the foreward velocity of the main movement indirectly.

Well, the angle of a sprint start is ~45 degrees we will say. So a horizontal arm action in one direction cause an equal and opposite leg thrust in the opposite direction by the leg on the same side. Now for an upright runner, the arm action would be more vertical, with a more vertical (or close to straight downward) leg action. And based on the above paragraph. this would lead to more stride lengthening.....Thus...the more power someone can press into the ground (mostly downward but very slightly backward) the more stride length is developed....anyone agree?

Re legs
Just because there is no sensation of pawing does not mean that the foot lands behind what I would call Bottom Dead Center or directly under the hip point. The foot does strike slightly ahead of this point at top speed (closer and closer to BDC as hip height increases.)

Re Arm action
As with the legs,the action is down as the back action happens automatically.

Claiming that the research team has confused swing time with rate of swing, which is what some appear to be doing is really not a valid arguement

Clear example using simple math and reason. Let's use the perfect shape so celebrated in ancient history, the circle.

Make the hip a center point of the circle.

The femur is the radius of the circle.

The knee joint is the endpoint of the radius.

Looking at the swing phase of Rupert, the lawyer from Wellesley, Massachusets, on the Harvard treadmill, we see that he has a 115 degree ROM.

Zhanna Pintusevich-Block with an angle of 125 degrees.

They both have the same swing time.

Which leg has the faster swing accleration?

A)Rupert
B)Zhanna
C)Both Rupert and Zhanna
D)Peter Weyand

Dan could you comment on the longer range of motion with the same duration? The math is clear.

Flash- you requesting about power and flexiblity, this is a great example. When the fibers contract and relax together this is why knee height improvements and hip extension (more of straight line) happens, power! World Class Power.

First of all, let me say I love this forum. Every day I learn something from it.
Thanks charlie, you are bringing some amazingly knowledgeable people here!

I think that the swing times have an inherent minimum value, just due to the positions of the limbs. If the limbs are closer together, you should be able to have a shorter swing time. If they are as far apart as possible, the swing time has to be longer.
This sets up a minimum value.

In the study weyand says that the difference between maximum and minimum swing times was 0.37 to 0.4 ? Correct?

Let's say that the distance covered by the foot is 1 metre, for example.

Since there is a minimum swing time associated with any movement due to the limbs being apart, can we not say with some certainty, that if we took the minimum swing time to be say .3 (an underestimate), then the difference between 0.07 and .11 is huge?

Because the difference over 20 steps is 0.03 x 20 = .6 seconds Total TIME! And thats only from about 60m!

New Studies in Athletics

From this study no strong evidence is presented supporting hamstrings as knee extensors during sprinting, scientific theory requires mechanism of action, and this is not elaborated

Lombard paradox is applied to cycling, you couldnt isolate a more biomechanicly different sport then sprinting.

During cycling no GRF being applied to the foot, toe clip and the pedal help HS to act as knee extensors. Pulling forces are applied to the top of the foot due to the toe clip.

In sprinting , forces are applied to the bottom to the foot, near the navicular and hence GRF occurs.

Antagonist contraction of HS during cycling allow the knee to extend by pulling the pedal up, in sprinting antagonist contraction of HS during support phase would cause breaking forces.

I understand this, but have you read supertraining?

If you have, you will understand that simplistic views of muscles as agonists and antangonists is outdated and limited, and cannot be applied to sports. "Thus, any model based solely upon the sequential or simple alternation of muscle "agonism" and "antagonism" cannot explain much about multiarticular complex movements in sport." Siff 2000.

You will also understand that not everything is as it seems!

Think about it. The hamstrings are so important in sprinting, and the quads are overrated, most people will agree on this. The quads perform extension of the knee, granted, but what happens when simultaneous co-contraction of the hamstrings and quadriceps happens? This is the case in sprinting, where knee extension and hip extension occur.

Another example :

Take the gastrocnemius muscle for example, it can
"(a) flex the knee and extend the ankle; (b) flex the knee and flex the ankle;
(c) extend the knee and
extend the ankle. " Siff, 2000

I'll go over why synergist and neutralizers cannot take the role of agonist and antagonist functions, during knee extension later on.

I've previously stated that sprint training should be aimed at bridging the gap between flexors cannot extensors.

The quads perform extension of the knee, granted, but what happens when simultaneous co-contraction of the hamstrings and quadriceps happens?

When simultaneous co-contraction occurs, there is a pause, since forces counteract eachother, the goal is too minimize antagonist activity in hamstrings, lower forces in HS reduce co-contraction- and hence allows the support leg to generate higher forces.

On my next post, i'll over contributions of

1) Gastroc
2) synergist and neutralizers,

Why don't you do this with the expert, Mel Siff, on SuperTraining. He would be more able to answer your questions. He is the professor and world renowned researcher in biomechanics.

I just think that there is a lot that we have to learn yet, and that we can never say something is impossible, as you did. I think it makes sense that the quadriceps are not involved in extension of the leg at high velocity sprinting, but if not, I read supertraining every day, so post there. Ill be looking forward to yours, and Mel Siffs contributions.

Is what you are talking about (Rate) really the rate of forward speed? Technically then, this is speed or velocity. So, this would mean that if fast and slow runners reposition in the same minimum time at top speed(remember this is important), then their "rate of repositioning" or "rate of swinging" given by 1/tsw cannot differ either.

Michael Johnson's top end is higher than Greene? Show us an official IAAF print-out showing Michael exceeding 12MPS in any segment of any race.
Re Lombard's Paradox. In Law, the old saying is: If you don't know the answer, go with what appears to be the most fair and you won't often be wrong. The same thing applies to the body. If the hamstring COULD work in concert with the quads (in angles greater than 145 degrees), rather than in opposition, don't you think it WOULD? Worth further investigation.

Let us take a look at MJs fastest race ever to make things simple. The 200m final in Atlanta.

Jonas writes

"I have run some simulations which suggest that Michael Johnson probably hit a maximum velocity of 11.6 m/s in his 19.32 s world record race, but was able to sustain speeds in excess of 10.0 m/s for the duration of the race (something no other 200 m runner has ever accomplished, in theory)."

11.6 meters per second..... this makes sense to me. While the 1996 olympics did not have an official split. Bailey was near 12 m/s on his anchor leg at the WC in Athens.....

The key here is not to cut and paste information. Since it may be wrong, (Penn Relays are not peaking contests.)

isb.ri.ccf.org/biomch-l/archives/biomch-l-2002-04/00132.html

What the post was getting to was 96 olympics with BAILEY, Boldon, Fredricks - Not Greene, Boldon, Fredricks. If he was using dunkin donuts, he might have had the chance to go even faster, but LA does not have the culture of Boston to have a Dunkin Donuts at every corner just the inferior Krispy Kreme and pathetic honeydew donuts.

Who cares who is faster. I care what the research says. He flat out repositions in the same time, but has bigger ground support forces. Why is this a problem? You asked me to tell you when he put the pods on, not how fast he ran? At any rate, this information confirms what the Harvard team found at the Field station lab. It all happens on the ground.
Are we moving forward yet?

Thanks for the post on MJ and the footpods. Elite athlete testing was key here.

But the question was the information accurate, not just precise.

(1) I read the research artical hot off the press on a hot day in the Medical Library years ago. While the reasearch stated that the swing times were the same, they are not. Just not enough to worry about it. No sense to drill since it is not going to make you run faster. But I was a little suspicious that the numbers were so close. Too convienent. Perhaps Petter being a 800m runner Peter Weyand had speed envy. Look at all the groupies for Ato and Jon Drummond, I don't see Bob Kennedy getting mobbed at the Hyatt! Just like the Popov example, setting limits is a recipe for disaster. Is 9.84 and 9.86 signicant? Not statistically but it is the real world of track. Again the swing times are virtually the same. Yes more power, more height, more swing time. But the elastic properties are not the same and are not linear.

2) Fact. Taking a look at the IAAF/IOC video analysis of 1988, 1991, 1996, 1999 of the big boys ROM of the hip and ground contact times did not have the exact same value as Rupert the lawyer. Was the difference enough to make changes on a program? No. Are they the same? Is 214.366 the same speed as 214.820? THE MATH IS CLEAR. But this is painfull to those who cling to research that has done nothing to increase ground reaction forces we all now that is so vital to improvement. This is like me wispering "the secret to the 100m is.....speed." Sprinters have been lifting for decades!

I love the JAP artical becasue it was 20 years behind the masters Machalangelo,Smithatello , Pfaffardo, and my personal favorate, Francis. The topic was fresh and well thought of, but the numbers are not magical. "The perfect sphere" or "Golden Ratio" are about it. It's like Johannes Kepler with the harmony of heavenly bodies, great numbers but they found out about the other three planets later with better telescopes; Not perfect anymore. Peters research is valid and important and I am a fan of his work. He is a good man, but no research is going to unlock the secrets of sprinting.

3) Were is the fast swing drill in elite track?

4) The statement was that MJ had the highest force output, more than Bailey, Fredrics, and Boldon. How can that be when his top speed was never the fastest in the last 10 years? Footpods like the treadmills have limits.

What was the result? He conformed right on in terms of the expected Favge/Wb (gained from the ratio of tstr/tc) for his top speed. In a nutshell, Johnson stayed airborne for a larger fraction of the stride more than anyone they tested or the other guys they did

video on (Greene, Bolden, Fredericks), and his top end speed was faster.

What is it people, what mistake is it? The footpods or the estimated video analysis. It has to be one. Maybe both.

I was a fool to look for his footpods on video at all of the important championships. Good work scientists (Yes dcw23 it's Carl speaking)you used an elite athlete instead of some freshman from a university. Tragic Irony! They couldn't get the right event! Like the creatine tests on marathon runners....or Heartrate monitors for Powerlifters.

5) Michael Johnson is not the world's fastest man. Top speed not average. Bob Costas-stay with baseball. It's slow enough for you. And to think they had a "dream team" working on this project.

6) What elite coach teaches the athlete to think during the race?

Who cares who is faster? Every sprinter and every coach (even if scientists don't). If you analyse speed by working backwards from NBC pronouncements you've got a problem up front. Look first at the people who have recorded the documented fastest top speeds and analyse them from film taken AT THAT SPEED ONLY.

Michael Johnson has some special circumstances that don't apply to most other top sprinters. He has had to overcome a leg-length discrepancy, which may go a long way to explain his different running position.

There are parts of this study that are critical (and, I believe, support what I have been teaching for more than 20years)

1: Sprinting is an automatic action, controlled by the primitive hind brain, where almost any voluntary (forebrain) input is NEGATIVE.
2: Ground support forces cannot be increased by any voluntary action DURING GROUND SUPPORT. They can be increased by corrective measures taken in advance of the ground support phase(if,in fact any are necessary). Such corrective measures must be MINIMAL, rehearsed well in advance, and made automatic to keep the action in the hind brain during competition.
Implication for coaches:
1: Think twice and speak once. Never attempt to correct a technical issue that you think will correct itself through the development of greater strength. Never over-explain in order to show how smart you are. You are a coach- leave that to the "Gurus"!
2: Train technical aspects indirectly, if possible (ie med ball work for start development) This helps prevent "Paralysis by Analysis"
3: Practice makes permanent- not perfect. Make sure your athletes are physically prepared for any work that requires technical execution. This means make sure the most demanding parts of the workout occur right after the warm-up, and make sure you prescribe only the number of reps they can handle perfectly.
4: At the first hint of any mechanical breakdown, stop the session and move on to less demanding training.

Take the gastrocnemius muscle for example, it can
"(a) flex the knee and extend the ankle; (b) flex the knee and flex the ankle;
(c) extend the knee and
extend the ankle. " Siff, 2000

There is no evidence supporting the Gastroc as primer mover in extending or flexing the knee, mechanisms need to be elaborted.

It cames down to anatomy, the gastroc originates in the medial and femoral condyles it inserts to

the achillies tendon, by antagonist & agonist contraction the gastroc acts on the foot joint.

It can neutralise unwanted agonist forces on the knee, and assist in stabilize the knee during flex & extension.

I think Siff is refering to neutralise/stabilise action of gastroc on knee and not agonist/antagonist action.

SSC of the gastroc

The alternate eccentric & concentric action of the gastroc, promotes storage and use of elastic energy in sprinting, it acts as a spring, higher frquency is associated with increases spring stiffness.

Research by (Haintuat: Med Sci Sport Exercise)
shows that positioning the blocks at 30-50 degrees compared to 70 degrees angle to the track, increases velocity of the start by added pre stretch on achillies tendon.

The longer strides of faster sprinters occur because the faster sprinter maintains the faster speed he brings into the contact period during the contact period.

The faster sprinter is getting the same aerial time with shorter contact times. Any object with a faster forward speed will travel a greater horizontal distance during a given time interval in the air. Thus-- in faster sprinters we are seeing actual aerial time as the same as the slower sprinters...but with greater distance traveled.

The Harvard research shows quite clearly that the timing of leg movements during the swing phase differs little to not at all among fast and slow at top speed. Differences in stride frequency, therefore, result virtually and entirely from the differences in the time of contact. But by definition the leg does not move or accelerate/decelerate during contact.

"After re-re-re-reading Training For Speed (page 53)I have this question to ask the forum to spark up a little heat....

What is the role of the Tibialis anterior snd the other supraficial dorsi flexors during high speed running? "

I feel that asking questions might lead us to the right direction. Think lateral movement of the ankle....

Tibialis anterior

Looking at anatomy helps answer the question,

Originates (Inner region below knee) lateral tibial condyle and proximal tibia inserts (mid region top of foot) into the first cuneiform and first metatarsal, in sprinting cause's dorsi flexion (toe up) , this muscles is more active during heel strike it absorbs forces on landing by lowering the foot.

Inverts foot, so contacts are made on the outside edge of the ball of foot.

I'll go over other muscles active in dorsi-flexion, later.

But by definition the leg does not move or accelerate/decelerate during contact.

Perhaps other things were going on in the breathing practice while listening to pink floyd. Too many lava lamps Joe (noendurance)

Let us go into the hamstring as a extensor of the knee. I was reading Anatomy of Movement (p.265) and it stated the following.

Interestingly, when the knee is flexed and the leg and foot are bearing the weight of the body, the gastrocnemius and hamstrings combine their forces to become extensors of the knee, ie., returning it to anatomical position. When the foot is not bearing the body's weight, these muscles act as flexors of the knee.

Open chain and closed chain Joe. See www.nasm.org for some good stuff on functional movements. Yes functional, not the standing on physioball stuff, real movements.
We don't need an anatomy lesson, we need answers. Anyone who is interested in origin/insertion, go to www.google.com and type in tibialis anterior.

The role of the tibilas is to "toe up" but we seem to have forgotten its role in inversion, and that it also holds up the medial longitudinal arch (google 2002)

If this muscle is relaxed on foot contact, this would cause longer GCT wouldn't it?

Another interesting point is that its synergist, extensor hallucis longus, tightens the subtalar joints. Does this not suggest another mechanism for decreased ground contact due to force dispersion?

And did noone else read Dr Siffs reply on the link posted? Dan - you had big discussions with Dr Siff on the matter, how come you still believe blindly what they tell you?

Here's a link
students.pepperdine.edu/jdkuske/AnatAnal.htm
This shows that tib ant's contraction state in ground contact is isometric, and that its function is BALANCE (and we all know that decreased balance = decreased speed!)

Heres another link
students.pepperdine.edu/PJWESTPH/LUKENPHIL/400WEBPROJECT/review%20of%20literature.htm

People might also find this interesting
www.education.ed.ac.uk/track-ath/papers/cdj.html

I would also like to ask:

Has anyone ever coached anyone that they taught to NOT have the toes up? Dan, you obviously believe this, now what do you teach? Do they have velocities higher than 10? 11? 12? Or are they not sprinters? Is there increased injury?

Reply

Interestingly, when the knee is flexed and the leg and foot are bearing the weight of the body, the gastrocnemius and hamstrings combine their forces to become extensors of the knee, ie., returning it to anatomical position

According to the above, Gastroc and Hamstrings combine to extend the knee, what type of contraction occurs , agonist, antagonist, stabilize, neutralize,?

Reply **Extensor Hallucis longus**

Joe Writes

"Another interesting point is that its synergist, extensor hallucis longus, tightens the subtalar joints. Does this not suggest another mechanism for decreased ground contact due to force dispersion?"

When the extensor hallucis longus , pulls on the subtalar joint, it causes the foot to invert or pronate, this serves to reduce the magnitude of ground reaction forces sustained during sprinting by increasing the time interval over which the force is sustained. Contact time is increased not reduced.

(Hamill, Med Sci Sports Exercise)

You think at top speed you are dorsi-flexing on purpose? What did Dr. Siff say on Supertraining? I am confused to what you are talking about

So - according to that, GCT is increased when FPL is isometrically contracted!

Is that the final blow? What does that mean in terms of sprinting - and what implications to training does this have?

Dan - well, Dr Siff showed in that one post:

Quote

But, it is the limb that makes contact with the ground. In order to have ground reaction forces the limb must make contact with the ground. Thus, if pawing is not an action used to generate this force, what is? Is it a passive touchdown with the foot? In this case, touchdown should be well in front of the body, not directly underneath the body, which, by the way, is accomplished by pawback. If it isn't, please describe the actions that occur with the legs to get into this position at the moment of contact.

The pawing action is not at odds with the spring model. If it is at odds with it, then the spring model used is strictly a vertical phenomenon; but, you do not run up and down, you run horizontally. It seems the passive and active processes are confused here. It is an active process, but once the foot makes contact with the ground then the spring model takes over, not prior to. There are two distinct actions here, not only one. It should also be noted that on the landing, where there is creation of tension in the muscles and tendons, the return is not passive. It must be a volitional contraction exhibited in the push-off. A spring will automatically return to its original shape, but the body will not. It must be made to do this. Thus, it is very active spring model not a passive one.

It is also interesting how they never brought out what the unique feature of Johnson is. He does something much better than other runners to create the arched bow effect during the push-off and it is not force production - although it is related.

I can appreciate you being impressed with the study and the findings from visiting there and from the clinic; however, I have not seen any sound explanation of the results. Instead, I see some glaring omissions.

As Charlie said, it is all autonomic.

Here is a post from a study

Independently; Watt & Jones (1966) found rather similar results in the lower limb. EMG activity in gastrocnemius began 80 msec before and 40 msec after the landing impact of the foot. They suggested that there is "a pre-programmed open-loop sequence of neuromuscular activity virtually unaided by myotatic feedback." Myotatic reflexes were found to play no significant role in the deceleration for they came much too late

Can you go into

EMG activity in gastrocnemius began 80 msec before and 40 msec after the landing impact of the foot.

What exactly did the gastrocnemius do before contact with the ground? Was it active beforehand or not?

When the extensor hallucis longus , pulls on the subtalar joint, it causes the foot to invert or pronate, this serves to reduce the magnitude of ground reaction forces sustained during sprinting by increasing the time interval over which the force is sustained. Contact time is increased not reduced.

(Hamill, Med Sci Sports Exercise)

, when I did my cadaver review the extensor hallucis longus is VIP to the big toe. Yes it serves to invert the foot, but look at the thing, it doesn't take a myophile to see that it is not a primary inverter like the anterior tibialis. Dorsiflex the big toe.

The foot has 31 total joints! It is a very complicated and well engineered joint. **Joe is on the right track.** Keep thinking Joe, you will have a better understanding later.Yes ground contact time is slowed by lateral movement, so make sure it isn't a week link! The body wants to protect against a medial sprain/break of the ankle by :

1)osteo design
2)Ligament insertions
3)intrinsic muscle interactions

This mechanism has to be strengthened by running barefoot while doing tempo. The research and video shows a slight drop of the foot before contact. How can we have dorsiflexion?

Is the glass 3/4 full or 1/4 empty? The talocalcaneal joint is not 100% plantar flexed except maybe at toe off, this is why a slight active dorsiflexion is present.

The muscles are aware of the next movement and are slightly pretensed (not cocked or loaded, just aware that the next step is going to happen). Nothing to start dancing about. Do this, take inject the nerve with a relaxing agent and allow the small intrinsic muscles to shut off. Sprint at high speeds and see what happens. We did something like this in college with "other" nerves...

So - according to that, GCT is increased when FPL is isometrically contracted!

Is that the final blow? What does that mean in terms of sprinting - and what implications to training does this have

Could you elaborate the terms GCT, and FPL, so we are on the same page, different countries can use differing abbreviations and units.

Quote

The pawing action is not at odds with the spring model. If it is at odds with it, then the spring model used is strictly a vertical phenomenon; but, you do not run up and down, you run horizontally. It seems the passive and active processes are confused here.

One thing to consider about this, while you are not running up and down, at maximum speed you are not accelerating at all in the horizontal direction. However you must provide forces to work against gravity that is accelerating you downward at 9.8m/(s*s). Once you are at top speed, the horizontal work is essentially finished but you must still work maintain vertical acceleration. This is why most elite sprinters do not achieve full knee or hip extension when at top speed, even Ben Johnson. (I would put them on here if I could figure out how to put a picture in these messages) Look at the tapes, in Maurice's 9.79, his thigh barely goes behind the plumb line of his upper body.

That is why I ask you Charlie, what exactly is 'triple extension'?
I would say that full extension of the hip knee and ankle happens within the first 8 strides or so, but after that it is an error to attempt to fully extend these joints at max velocity. Do you use the term triple extension only for the beginning strides out of the blocks?

Also, what is Mel referring to in this part:
It is also interesting how they never brought out what the unique feature of Johnson is. He does something much better than other runners to create the arched bow effect during the push-off and it is not force production - although it is related.

What is this arched bow effect he is referring to?

This is most active during support phase, when the foot is placed under high forces it stabilize's ankle joint, but this flexor muscle does not help the gastroc and soleus to lift the heel,

Extensor Hallus longus :implications sprinting

If the foot overpronates and inverts not only is contact time increased, increased chance of injury in the ankle, knee, hip joints.

The athlete should be tested by video segment analysis , this minor detail would be difficult to pick up by the naked eye.

This is more common problem in distance runners then sprinters.

Could the forum break down their thoughts on the distribution of mass in the start, should the athlete coming out of blocks lean more forward, or be more vertical?

Quote

The athlete coming out of blocks lean more forward, or be more vertical?

Depends how powerful they are. I think that the more powerful you are the more you can make gravity your friend.

Please be more specific. Are you talking about the weight distribution between arms and legs in the set position?

Reply Charlie

How far forward should the trunk be tilted from the first stride until stride number 12 (0-20m)?

I have read from Ato Bolden site that John Smith teaches, knees to the chest out of blocks, whats your view on this?

First, we hear there's no horizontal impetus at full speed. Now we learn that Ben (top speed in Seoul 12.1 MPS, best top speed ever 12.35 MPS, Zurich 1986, achieved on tracks that were markedly inferior to those in use today) should have used the technique of Maurice Green (top speed recorded- 11.9 MPS)

Newtonian Lesson 1: If you push only down, you go only up.

Newtonian Lesson 2:
Corollary A: To go faster, you need more force. The more force you apply, the higher you will rise off the ground.

Corollary B: The higher you are off the ground, the more extended your limbs will be when they strike and leave the ground.

Newtonian Lesson 3: In a relaxed state, with flexibility and sufficient power, you will get full extention, unless you deliberately prevent it by locking your hips in a turned under position, cutting off your stride before completion, or by keeping your foot dorsiflexed at all times- BAD IDEAS!

With top sprinters, extension beyond straight at the hip only occurs AFTER the initial acceleration phase. The photo library will be up and running in a few days. I think some of the illustrations will help clarify the situation. (The pictures will be numbered so they can be referenced in discussions.)

Let common sense be your guide. Be careful that the "arched bow" effect isn't carried to a point where the head ends up in the butt.

Higher leg frequency gives greater acceleration in the first 30m.

From Seoul Bens average leg frequency, from 0-30m was 4.61 at an average length of 1.71cm.

I teach a violent arm action and to “Press the T." Since my expertise is swimming technique and not running biomechancis, this may be just another theory.

I have a far harder time teaching the sprints than any other sport. As Charlie mentioned in the secret weightroom in Seoul a half hour before the finals; "fast sprinting is a hind brain activity"

Swimming for all the "Complexities" is a voluntary sport and fairly easy to coach in my opinion.

When you have the power, reptitions, relaxation, and block techique right, the acceleration steps are a result of Geometry from Descartes.(Rene was the man, Princess Elizabeth and Queen Cristina? Mr. Newton didn't have that much game.)They are a product of power and will cause the torso to rise after pressing the T correctly.

Frequency and stride length are measurements. *What ever they are they are a result* of the the correct training. I try not to coach any step patterns, since it is going backwards coaching wise. It is like playing basketball to get taller!

At what point did Ben post his 12.35 MPS, Zurich 1986. Was it around the 65m mark? 12.35 MPS is faster than .83, that's around .81 right?
What was the race out come?

Cut the arms violently. Drive and punch. Be **patient** with acceleration.

According to Speed Trap it stated that "Ben's first step was down by.4 sec, his third by.8". By looking at these numbers it seemed that Ben was aiming at an high frequency not length. So this tells me that Ben wasn't in the air long during his first 5 steps it was all quickness/ power.

Re Start
Ben's quick first steps were a reaction to the extreme departure angle generated by his initial starting impulse. His feet had to get down quickly to save him from falling. Bottom line... more force out of the blocks= faster and shorter first steps.
Increased frequency at high speed is the result of shortened ground contact, which is controlled by hip height, which, in turn, is controlled by the power delivered. Comments?

LoL, ok tell me this....Siff seems to be a proponent of the pawing action. And I agree with one thing he says about the foot always landing in front of the body. This is a true statement. but there is no...I repeat no pawing motion resulting in a DIRECT acceleration of the center of gravity. This is my reasoning since this topic has been beaten to a bloody pulp.

(1) If the foot lands in front of the center of gravity...and the weight of the body is not on it...then ok, this would be a GOOD definition of what is happening..this is not pawing! More or less the foot is making contact with the ground in front of the COG at the same or slightly higher velocity (or lower in deceleration) than the velocity of COG. It rides along the ground until exactly under or slightly behind the COG, where the acceleration is a result of a push. I believe at higher velocities the push will be more vertical than horizontal...which will make a resultant closer to being right under the COG.

(2) But it is important to remember that no acceleration will ever occur as a direct result of the foot landing in front of the COG. The body is naturally a pushing machine.

(3) And with my new invention (following the magnetic panties strippers wear in Italy to get euro dollor tips) is a magnetic track with metallic spikes.....This will enable the athlete to have to ability to accelerate when having a foot strike in front of the COG. Thus, proving true the fact that you actually can pull yourself along the track.....but...darn won't it also be hard to pull your support leg off of it...o well....

(4) I hope this was comical for some and not offensive, but I hope morso that I stated some decent evidence in expressing my beliefs.

(5) Teaching a young athlete that he/she is to pull himself along the ground is giving the wrong mental cue and a coach teaching this methodology would surely be hindering their athlete.....A better cue would be to pull the track underneath themselves as fast as possible by using a pushing motion....words create images, don't paint the wrong scene.

What IS happening and what the athlete must DO to make it happen are two different things.

Various people write

**What was the result? He conformed right on in terms of the expected Favge/Wb (gained from the ratio of tstr/tc) for his top speed. In a nutshell, Johnson stayed airborne for a larger fraction of the stride more than anyone they
tested or the other guys they did video on (Greene, Bolden, Fredericks), and his top end speed was faster.**

I still do not understand this. I am confused. Dan, Mike did not reach the same top velocity as any

of those guys.

More power=more speed? Wouldn't the fastest have the most height? What is up with the arched bow effect? Please share your definitions.

I was just turned on to this site and I think it is great. I would like to adress some of the conclusions drawn from the recent study done at Harvard. The emphasis, as I understand it, of the study on ground forces or resistance forces & swing times of athletes of varying speeds. I would be very interested to know if there is any video of the athletes used in the treadmill tests. I know that they obtained data from video of the 96 Olympic 100m final. The swing times were said to be very close when comparing video of world class sprinters and treadmill data from considerably slower sprinters. The faster sprinters were said to exert greater forces. A factor in these results has me interested. This may be out of context but the study states "Thus we adjusted the video contact values of the Olympians by 15% to make the appropriate comparison to the force plate contact values of our experimental subjects. This adjustment increased the video swing times of the Olympians only marginally (+4.6%)." Again I may not fully understand the significance of this conversion of why it was made, but.....+4.6% hardly is matginal in my opinion. Also, what is the relationship between the Olympians ability to generate much faster times and greater forces. It has been stated that the ability to rapidly reposition limbs is not really significant in generating velocity. I surmise that the Olympians are repositioning their limbs rapidly and correctly and the test subjects are just repositioning their limbs rapidly. This would, in my mind explain swing times being similar but forces generated being different. Again, I love the discussion and the sharing of ideas.....I want people to run faster.

Another interesting thing I just thought of while reading the study. Their statistics seem to be flawed, but maybe its just me, what does everyone else think?

What they fail to mention, and in my opinion is very significant is:

There has to be a “Perfect” Swing time in maximal velocity running. From this minimum, lets say it was the average of the smallest seen in the study (which was at the inclined level), 0.331 seconds.

Now, lets say that we take a 0.4 and a 0.37. These aren’t significant in themselves, and weren't in the analysis, but if we take away the runners “Perfect” swing time, which serves as a measure of the fastest possible limb repositioning, we get the difference between 0.069 and 0.039. Looks a little more significant to me.

Think of my reasoning like this:

If you were to take two subjects, and compare them, it might make sense to compare their raw times. Let’s say a 10.2 runner, and a 9.79 runner. These values, although seem large, we might see no significance depending on the type of statistics we use. Does this mean that the runners aren't different? Hell no!

Look at it from another view – the perfect 100m could be 9.60. Lets say it is for this case.

Now, determine the distance from perfect, and what do we find?

0.19 Compared to 0.6. We see a three fold difference in the values here, and that probably equates to about how different a 10.2 runner is from a 9.79. But, that was hidden just because we did not use the correct statistics.

Weyand and the guys from Harvard have overlooked a very important aspect of measurement and statistics in my opinion.

"Violent arm action"- tight elbow angles and rapid rate?

Arm action during the acceleration/drive phase is more influenced by the cerebellum then the arm action at top speed. The reason for this is that the speed of the body is increasing from no movement to high speed. Remember that the precommand areas are integrated with sensory motor areas of the cerebellum. What we want to do as track coaches is limit the basal ganglia interaction because of probable cognitive functions.

What I teach is nothing. My cue is "get violent". One problem with not being with athletes from different cities is that when you come they feel that they have a finite amount of time with me and want to please the coach with good technique. In fact using voluntary movement usually screws up the natural technique of the athlete. This is why I say "just run don't worry about your technique."

Fast arms with no worries about flaws in technique. As for arm action none of the 50 people I have worked with has had a problem with angles(even my NFL lineman can do it). I do see some pathetic running ability with middle class kids, since playstation has eliminated moving around except for their thumbs.

What is interesting about Charlie's concepts is that he is on to science that is 10 years ahead of today, and this was in the mid 80's.

Just because I worked with 3 Olympians does not make me a good coach. In fact I think working with elite people is far easier then getting a college kid to run fast.

I have a question. Looking at many elite sprinters (from behind and straight on)I see that the deltoid abducts the humerus slightly during acceleration and closes to a narrow posistion during top speed. Why does this happen? It only is a few inches but most of the sub ten guys do it? What is the purpose and should I make sure this happens.

About the arm angles...my guess would be is it has something to do with balance. Possibly since ground contact times are longer at the start of the race, more balance might need to be obtained, so by making the angles further out to the sides it may increase stability...kinda like a tight line walker. Also, since the knees are at smaller angles during the first 3 or so steps than say at top speed when the force is transmitted, I believe strength has a lot to do with balance at this point. Does this make sense to anyone?

Charlie you said earlier in this post that Michael Johnson had a leg-length discrepancy, what do you mean by this, does it mean one leg is longer then the other?

Perhaps the strip clubs have put moved blood flow to other areas then your brain. Good post. This might make sense to you but could you be more specific? Here is the paradox. Less ground contact time increases stability. Anybody else....Dan what does Harvard say about accleration.

You may be on something important....

Kenny
Top speed was 60 to 70 meters in Zurich. After a rather casual start, he was barely ahead at 50 meters, but a tremendous burst opened up a 3.5 meter lead by 80 meters on the best field of the year, with a fist raise and a total stop over the last 10 meters (final segment over 1 second!). Final result 10.03 (second 10.26). You're right, that equals .81.

Your correct in stating their is a pradox, and my explaining wasn't that great. Well, I have never seen someone stumble at top speed unless they hit the aluminum coping in lane one, yet I have even seen Maurice Greene stumble out of the blocks more than once. His first reaction was to put his arms out further to the side just like anyone will do to attain balance.

While the contact time may not be directly related to balance, do you think that because ground contact is made longer there is more of a twisting torque put on the body during the first 3 or so steps? Also, it makes good sense to me that movement in the sagittal plane (as far as foot landings further to the sides) would cause an equal and opposite reaction on the other side of the body causing the arms to be further outside of the body.

As the athlete reaches his/her "critical velocity." Foot landings can be almost exactly in the sagittal plane of the body, and thus, directly under the center of gravity. e is taken from a poor angle to determine what I am talking about. But it would be safe to say that Ben's arm displacement off the right side of his body is equal to the sum of the forces and displacement of his left leg in the support position. If not, he would sway from one side of the lane to the other losing some time. Do you agree?

Also, I am not sure that I believe that more ground contact time will increase stability. Possibly because the COG is closer to the ground during the first few strides, it may not matter what time is spent on the ground.

As a basic mental illustration. Your goal is to balance two pencils on your index finger. Which one will be easier to balance?

(1) Say we have a pencil with a uniformly distributed weight of 20g, it is also 20cm long. (pencil a).

(2) We also have a pencil with a uniformly distributed weight of 20g, but this pencil is 15cm long. (pencil b)(stick with me here).

(3) Pencil "a" has its COG at 10cm when in a vertical position and Pencil "b" has it's COG at 7.5cm when in a vertical position.

(4) Now Pencil "b" will always be harder to balance than Pencil "a" strictly because it's COG is is closer to the base of support.

(5) The only time it might be easier to balance is if it were given rotational inertia this would increase it's ability to be balanced.

Likewise, when coming out of the blocks the COG is much closer to the base of support than when in full stride...this factor alone may make balance harder. The less of an angle the athlete comes out of the blocks, the closer the COG will be to the base of support (first foot fall), and the more of an acceleration will be necessary to keep the athletes balance. The only thing that makes balance capable is the fact that the COG is accelerating at such a great rate. When any type of blocking of acceleration of the center of gravity occurs, the athlete will stumble.

Also, next time you see your athletes having arm action that is further to the outside of the body...take note of their foot landing on the opposite side of the body too. If my theory translates, the foot should be out their on the side of the body when it makes contact with the ground.

Also, I do not see why the Harvard study is given presedence over most the theories on this page. I know everyone on here at least has a gist of whats going on in sprinting and many are extremely smart guys. But, as far as Im concerned treadmill running has no application to normal running stride. It has an extremely different nuerological component in that the treadmil is always running at a constant speed.

As a homework assignment I encourage someone to carefully run fast on a treadmill. Then hop right off of it an run through your fitness club. It will feel wierd as hell.....why, different neurological

pattern. Like lifting weights before practicing freethrows. It will feel awkward because it is a different neuro stimulus.

Just my opinion, but it would be like comparing an open sea swim versus a pool swim. Or a run on the beach with a run on the track.....And beach running I love, but the data analyzed from a beach run, even if videotaped or whatever, could never be transfered to a track.

You are getting very warm.

This is why I ask the questions velocegatto. Let's look at birds of prey at take off. Perhaps the best picture is the the old splash page with Ato Boldon with wings in his home page. Although it is no longer on his site, a good picture for this visual is Bens photo above. Perhaps fish and birds hold secrets that we can help with track.

Take a look at the stride pattern from overhead. You will see a skating effect during the first few strides then the foot will fall in a line after the Torso becomes more errect.

Here is the paradox. Decreased ground contacts increase stability.

Faster speed improves stabilty.This is why airex pad work is many times foolish. I was looking at a gyroscope and saw the reason why this works. Reciprocal radial movements create a gyroscope like improvement in stability. Take a look at a Top. When it slows down the stability of the device decreases.

Back to the Arm elevation. I feel that the lift is SRM program that still remains in our brain since the early periods of evolution. This must be a hind brain activity that may be enhanced with technique work to limit the basal ganglia interaction. The elevation from the deltoids may in fact be cued to improve the acceleration of the sprints.

As a homework assignment I encourage someone to carefully run fast on a treadmill. Then hop right off of it an run through your fitness club. It will feel wierd as hell.....why, different neurological pattern.

Faster speed improves stabilty. I was looking at a gyroscope and saw the reason why this works. Reciprical radial movements create a gyroscope like improvement in stability. Take a look at a Top. When it slows down the stability of the device decreases.

If you've ever taken a motorcycle up to high speeds, this comment will be confirmed. The bike seems much more stable at higher speeds (at least my crotch rocket did). Of course, if you hit a pebble at that speed, you will become a colourful skid mark. Needless to say, I sold the bike as I didn't enjoy having to constantly keep changing my underwear.

Thanks Coach I know you was up set at that mistake of Ben's celebration!

Coach Francis writes.....
Kenny, Top speed was 60 to 70 meters in Zurich. After a rather casual start, he was barely ahead at 50 meters, but a tremendous burst opened up a 3.5 meter lead by 80 meters on the best field of the year, with a fist raise and a total stop over the last 10 meters (final segment over 1 second!). Final result 10.03 (second 10.26). You're right, that equals .81.

Quote

---

(1) Say we have a pencil with a uniformely distributed weight of 20g, it is also 20cm long. (pencil a).

(2) We also have a pencil with a uniformely distributed weight of 20g, but this pencil is 15cm long. (pencil b)(stick with me here).

(4) Now Pencil "b" will always be harder to balance than Pencil "a" strictly because it's COG is is closer to the base of support.

You people are funny
The above statement has just said that shorter people have a poorer sense of balance than taller people. Not really true is it! In reality, a lower centre of gravity improves balance.

Is closer with his bird take-off meanderings.

To put it in simple terms, we have better balance when we are standing upright than bent over. Squat down and lean forwards. Your arms will come up for balance. Stand up straight. Your arms will go down. You are at your most straight in the sprint position and you are no longer fighting gravity. Remember, it's all about making gravity your friend. This involves a lot of arm waving initially but matures to pleasantries later in the race.

I love this board You guys throw so much out there that makes me think. Lol, I am seriously curious about the treadmil thing too, has anyone seriously tried it, because everytime I try it, I end up with a sensation that my footsteps are really off balance?

I think that most people improve the width of the base of support in some way when the COG is lower to the ground, but if base of support is kept the same in the pencil demonstration....then stability would be worse...is that a better statement?

Proportionally, shorter people have about the same base of support as taller people. This is hard to visualize in a person, but in the pencil visual, if the pencils COG was made closer to the base of support in elevation off the ground, the width of the base of support would have to change to be wider in order for the same balancing properties to occur.....anyone agree?

I totally agree about the gyroscope, this is an interesting topic....

The above statement has just said that shorter people have a poorer sense of balance than taller people. Not really true is it! In reality, a lower centre of gravity improves balance.

The center of mass when accelerating is beyond the hips from leaning forward. So balance decreases. Then we have the fact we are moving forward! When you are moving the rules become different, this is why you can hold that position when running but not when still. Standing up straight improves balance not because the hips are higher but his center of mass is balanced...

Is this voluntary or automatic?

I have a question. Looking at many elite sprinters (from behind and straight on)I see that the deltoid abducts the humerus slightly during acceleration and closes to a narrow posistion during top speed. Why does this happen? It only is a few inches but most of the sub ten guys do it? What is the purpose and should I make sure this happens.

When the arm is abducted, its becomes horizontal extended, this means larger torque are developed by the shoulder joint, the glenohumeral joint sustains compressive forces estimated over 50% of the body weight, based on this during the acceleration phase higher torques may be required across the glenohumeral joint to overcome inertia.

Poppen, Forces at the glenohumeral joint in abduction, Clin Orthop

Is there more torque at Top speed? If it is more why does the joint drop, and if it is less why does it change if the torque is higher?

Good post, can you dig deeper and extend to more details? As for voluntary vs automatic I don't think we should think as absolute. Just percentages. The goal should be as automatic as possible, but in reality their is some voluntary interaction.

Less torque at top speed , lower comprehessive forces on the shoulder joint, most probably since higher torques at the hip joint are needed at top speed as opposed to shoulder torque which is higher in acceleration.

Shoulder joint torques are higher in acceleration to overcome inertia(resistance to movement). In the start intial velocity is zero, rapidly swinging arms obviously assists the body to accelerate, at top speed GRF is more significant, this comes down to hip height and hip torques.

Automatic verse voluntary, this is neurophysiology, i'll get to this later.

Contributions of the abdominals and throaic wall in sprinting?

The deeper the angles during early acceleration, the more likely deflection will occur as power demands on the athlete approach (or even exceed) his capacity. It is also likely that the arm drive will go farther back than necessary, during extreme effort, throwing off balance and rhythm (arm action is front biased at the start as maximum effective extension is straight from head to toe and the knee rises much closer to the torso than in the full upright sprint position). The backward and upward arm drive at the start also forces the torso down which can exacerbate any balance or power deficiency problems and make forward arm recovery more difficult. Many times the backward and upward arm action is deliberately exaggerated at the start to keep the torso down.

"The deeper the angles during early acceleration, the more likely deflection will occur as power demands on the athlete approach (or even exceed) his capacity".

Charlie, can you please explain the above.

The more force you deliver in the blocks the lower the departure angle and the farther ahead of the CG your torso gets, therefore the deeper the knee angles and the more force each subsequent step must deliver to keep from stumbling or even falling. On the edge of control, the knee often wows out to the side, causing unwanted sideways motion.

Charlie, I thought Donovan Bailey held the land speed record at 27.1mph. Ben's 12.35mps converts to 27.6mph. Is Ben's record not recognized because of his + test?

Charlie writes.

Many times the backward and upward arm action is deliberately exaggerated at the start to keep the torso down.

During the start, isnt the goal to lift the torso higher, which in turn gives greater hip height and therefore quicker contacts and GRF.

I have seen no official split on Donovan and the discussion is that it is an assumed maximum speed from the fastest point of the fastest segment rather than an average for whole 10 meter segments as Ben's were. For this claim to stand up, there would have to be at least one official 10 meter segment faster than .83. In any event, it's moot as Ben ran

9.79 while easing off over the final 20 meters, while Donovan ran 9.84, running wire to wire. The fastest officially recorded segments were the .83s recorded by Ben and Carl. Each ran 20 meters at this average speed, and as they entered and left this zone at a lower speed and reached their highest speed in the middle, the peak speed there had to be significantly faster. Ben's .81 in Zurich was done from film analysis, not from official IAAF splits.

Quote

---

posted by Charlie
The more force you deliver in the blocks the lower the departure angle and the farther ahead of the CG your torso gets, therefore the deeper the knee angles and the more force each subsequent step must deliver to keep from stumbling or even falling. On the edge of control, the knee often wows out to the side, causing unwanted sideways motion.

Charlie, shouldn't your departure angle be set regardless of force application.(eg 45 degree)
Like you said in an earlier post, there is a 1:1 horizontal to vertical ratio with a 45 degree angle departure. If a 45 degree angle is used wouldn't this take care of stumbling or even falling? And is 45 degree the optimal angle for starting?

The departure angle at the hip is determined by force available and is not universal. A beginner wouldn't have remotely enough force to handle a 45 degree angle. 45 degrees is, simply, an easy way to illustrate the effect of distance from the blocks on hip height- (1/1). Ben left at around 43D- no one else.

Quote

---

posted by Charlie
The departure angle at the hip is determined by force available and is not universal. A beginner wouldn't have remotely enough force to handle a 45 degree angle. 45 degrees is, simply, an easy way to illustrate the effect of distance from the blocks on hip height- (1/1). Ben left at around 43D- no one else.

I always felt a 45 degree departure would be something easy to achieve. I guess my "natural eye geometry" is not that great.
Charlie, can you give a list of a few athlete that achieve a 45 degree or less departure angle from the blocks so I can get an idea of what it looks like(and so I can but away my protracter).

WE do drills on acceleration days where we have someone hold us at 45 degrees and then let go and we run from there. While we can only maintain that angle for a few steps, YOU ABOSOLUTELY FLY!! (well I notice the difference because my start is traditionally quite slow). Anyway, we do that drill regularly to get the feel and hopefully as our power develops we can not only maintain that angle for longer, but transfer it in full to our starts.

Charlie you have said , that departure angles should be at 45 degrees, so we are on the same page, are you talking about departure angles of the trunk, front hip or rear hip, ?

Are these angles in set position, or just before the first contact?

Re departure angles
I'm referring to the angle at the hip but I'm not suggesting that everyone should start with this angle. This is a function of power and everyone should start from a block position that is effective for them and the departure angles will take care of themselves in large measure.

What is desired higher hip angles or lower hip angles in set?

Hip position in the blocks can be individual, but as a rule, a higher hip position allows the majority of athletes to get a better start.

for our 45 degree starts we have a person stand in front of the starter and take them down to 45 degrees. The support person then gives them a 3-2-1 countdown and releases them. Obviously they have to step out of the way quick, but we notice that it has helped us get a feel for the rght angles from the blocks....especially as I am a poor starter and have recently changed feet its been good for me.

There are other drills that also help that we use including running off the ground and variations of the 45 degree start. We always finish with some blocks starts which I have noticed I can at least now feel if I am in the correct position.

Holding the 45 angle for 20 or so meters is another thing but hopefully we will get there one meter at a time as power develops.

If you are held at 45 degrees and then released, won't you drop to a position below 45 degrees before you can react?

Isn't the departure angle really just a natural product of power development, similar to hip height at full speed? As the sprinter becomes more powerful, he or she should be able to gradually lower the departure angle. I would be worried that attempting to deliberately coach such low angles in sprinters that did not have the requisite power would result in bad technique that would later have to be unlearned once adequate power was in place, because a weaker athlete will have to compensate for the lack of power in order to maintain balance. And I would image that a weaker sprinter would straighten up too quickly in order to maintain balance, which will kill the acceleration.

Charlie,

hmm, that could be true. In practice we see that each of us usually just preceeds the let go with some movement and generally holds it pretty close, there is no change to the eye. As we have improved the first movement has gotten quicker and we have noticed that our starts are feeling better and are slowly improving out times to 30m.

Flash,

yes, straightening up does occur sometimes. We do not do heaps of this drill its just one we do to get the feel before we move to either runs from the ground or out of blocks. As we get stronger we will be able to hold the position for longer and at least we know what it feels like to be in a correct position even if it cant be held for very long. That is my opinion anyway. Please feel free to add your comments.

Technically, we see the main problem is that we tend to break at the hips and catch ourselves from falling, but as confidence grows this has improved. The other thing is that our first few strides have a very good shin angle relative to the track. Running from this position produces what feels like much quicker times over 30m which cant be a bad thing, just have to transfer it to coming out of the blocks

Charlie
Here is a question.....
With your elite guys that you coach, How many stumble in their starting practices?
Just curious

Virtually everyone stumbles from time to time. This is nothing to worry about. When you use lightly resisted starts (sled etc) interspersed with free starts, your athletes will all

stumble the first time because they are so shocked by the force they deliver. You have to teach them to "scramble out of there" concentrating on arm action and not to worry about foot placement. Technique will smooth out with time.

See, I think all good starters or accelerators have no fear of falling. It should happen! I tell my guys to be aggressive coming out. When their feet catch up, hey we have a great start

Has anyone researched the *cross extensor reflex* in humans? Dr. Hill states this is why the arms fire first before the legs.

I then was reading Andrew Weil's book Spontaneous Healing and he talks about the importance of walking in the neurointegrity of the brain. I looked up research to confirm Weil's arguement(to make sure that Dr. Weil was not smoking too much weed in the seventies) on how babies develop their mental abilities rapidly when they learn to crawl. Perhaps the rhythmic tempo runs (at 75%) do more then we think....

Revisiting Dorsiflexion.
I have spoken with lots of people about this issue. Here are a few points maybe worth discussing.

1/Dorsiflexion pre-contact allows for a later contact under the body and this is important when an athlete has high hips and is upright. Athletes who swing out in front in an obvious pawing action will contact early creating a need for them to lean forward more to decrease the effects of overstriding.

2/ The calves in flexion are a slow muscle.. try to jump with just the concentric action and you will see just how low powered they are. The only way that they can contribute is elastically and with a quick contact. This means going very close to hitting heel first with a pre-stretched calf on impact. The more an athlete plantar-flexes the further in front they will hit and they more this may transform them into a leaning foward and pushing runner.

2/ Millions of kids are still being taught to run UP on their toes and respond by pointing their toes downward well before impact. This is why we see millions of hamstring injuries in sports worldwide.

3/ The value of a high knees lift is that there is then more space to accelerate the lower leg in a flinging action. With the lower leg loose at the knee and foot dorsiflexed then there can be large amounts of negative foot speed generated. As Charlie has already said the athlete notices only the up and down movements but the effect is to create a fast backward moving foot (without pushing out in front)

4/ I have heard that John Smith has worked hard on shortening recovery and aims to minimize having athletes swing their femur behind the plane of their trunk. This can be noted in the images posted in another part of this forum of Maurice Greene. I am not so sure Charlie that Maurice does fully extend at maximum speed in that image- It is blurred and I think he foot is already in the early stages of recovery. I believe the way that Maurice is recovering is to try to maintain dorsiflexion or rapidly require what is lost of it after the support phase. Because this aids in speed of recovery which is a stepping over the knee action. Not a pulling up action.

5/I can see the value of plantar-flexion in acceleration but not at maximum speed.

6/ The technique I have outlined requires different strength development than a "grab time on the ground technique". To run like Maurice requires massive power output from glutes, hamstrings etc where running with just a slight change of emphasis may require more input from quads.

Reply Dorsi flexion

dorsi flexion increases the time interval of ground Impulse, I=FXT, it therefore increases contact time during the support phase, this is desirable during Jumping events but not in sprinting.

When the foot is dorsi flexed it causes the knee to flex during the support phase, as a result muscles elascity is lost, contact time increases and GRF are reduced.

Research by **Bosci and Komi** supports this view, that increased knee flexion decreased the muscles elastic behaviour, and the potential elastic energy stored is consequently lost as heat.

. Potentiation of the mechanical behaviour of the human skeletal muscle through pre stretching A. Phsy Scand

Unfortunately coaches employ excessive volumes of toe up drills which is time consuming & ruins contacts.

The toe-up position is required PRE-GROUND-CONTACT to create elastic conditions in the foot. The ball of the foot is moving down just prior to foot strike as the knee straightens. At GC the foot turns over and the toe extends naturally.
I have heard that John Smith has worked hard on shortening recovery and aims to minimize having athletes swing their femur behind the plane of their trunk.

Could you go deeper into this?

Reply Toe Up

Like you said it **happens naturally** ,
Incorporating large volumes of toe up exercises can ruin this natural foot plant and cause flexion of the knee, the net results equals loss of muscle elasticity.

Research by **Saxton and Donnelly**, indicates muscles can generate higher F, when they are slightly stretched by 120-130% , the foot only needs to Dorsi flex to slighlty less then 90 degrees to achieve this.

Higher F when muscles are slightly pre stretched, when muscle length is significantly pre stretched loss of F results.

Length-specific impairment of skeletal muscle contractile function after eccentric muscle action in man, J.Biomechanics

The athletes being bent at the knee would be a result of their entire system. Most athletes simply have not done the postural strengthening to keep hips up. They also may not be strong/powerful enough to prevent sinking on impact.

Dorsiflexion allows for quicker contacts because there is less slack. It also allows for a later contact which results in less loss of momentum in the early stages of impact.
Dorsiflexion as early as possible in recovery tends to assist the ease of the stepping over effect. Try doing this with a floppy ankle , it is a longer lever and it is certainly slower.
In Australia we have Kangaroos (not in our cities usually) and they are a very bouncy animal. No slack in their feet and their calves would be prestretched on impact. They are a very tightly tuned animal.

I think for 30years far too many people have been taught to run UP on their toes and to lean forward. This creates pushing running who run too much off quads. They have a late recovery action and have to lean forward to prevent massive loss of momentum from overstriding. In many cases the same athletes have been taught to pump their arms up high which add excess lumbra

curve into the system. Lowering hips further and making millions of dollars for physiotherapists in treating hamstrings each year.

I have heard (from afar) that John Smith aims to minimize recovery time behind the body, keeping hips up and not allowing the femur to go very far behind the plane of the trunk. This prevent hamstring problems and creates a situation where what is lost out the back is gained in hip height --> Knee Height --> The end result more vertical force production by glutes in the early phases of it and more negative footspeed which along with dorsiflexion before impact.
Try to accelerate your knee downward from a good sprint position with your toes pointed down and see how it feels compared to with dorsiflexion. The comparison is like flinging a rock with a bent arm javelin like throw as compared to a straight arm throw. The foot can be flung backward as an effect with less pulling if the foot is held up and the athlete is loose at the knee.

1: Kangaroos have big feet (though I havn't seen yours). The idea of "running on your toes" has confused a lot of people over the years. Yes you want to cock the big toe up before foot strike but the ball of the foot is moving down towards the track during the leg-straightening phase, particularly if you have excellent hip height.

2: The foot is fully extended at the end of the contact phase with all top sprinters- far beyond the average.

3: There is plenty of time to cock the big toe as it passes over the support knee. Any attempt to maintain dorsiflexion throughout the stride will lengthen ground contact times (as will any other non-automatic action).

4: The concept of restricting movement behind the torso at full speed is a mis-interpretation of a real phenominon. As athletes deliver more force, their hips rise higher over the ground. If the hip is higher the foot will have a smaller contact patch in front and behind the torso(think of a pendulum in this case. This a natural outcome of the additional power required to go faster. Any attempt to alter the natural action of the stride by cutting it off prematurely will result in a dramatic loss of performance.

4: The concept of restricting movement behind the torso at full speed is a mis-interpretation of a real phenominon. As athletes deliver more force, their hips rise higher over the ground. If the hip is higher the foot will have a smaller contact patch in front and behind the torso(think of a pendulum in this case. This a natural outcome of the additional power required to go faster. Any attempt to alter the natural action of the stride by cutting it off prematurely will result in a dramatic loss of performance.(Charlie)

I definitely agree with the above and would like to add something. Elite sprinters do have much less backside mechanics than your average sprinter, but this is not the result of cutting the stride short. It is the result of correct force application.
Many sprinters have excessive back side mechanics because there is an overemphasis on horizontal force application.

Charlie,
How would you teach the athlete to cock the big toe at the right time? I doubt you would just say "cock the big toe as you step over the knee" because that would make the athlete self-conscious. On the other hand, all of the toe cocking drills seem to teach cocking the toe at the wrong part of the stride (ground contact).

I'd tell him exactly that - cock the big toe as you pass over the support knee. But I'd do it as part of a series of training runs where this was the only technical emphasis. One thing at a time.

Okay, so how would you make sure the sprinter doesn't hold that cocked position too long, which would prevent full extension? More coaching cues? Or does the extension happen naturally as long as the sprinter doesn't try to maintain the cocked position? How does he relax it in time so as not to cut off his stride too early? Am I making sense? We want to cock the big toe at the right time and let it extend at the right time. But these time frames are so close together, getting the timing down might be difficult if the athlete is consciously executing these techniques.

"I have heard (from afar) that John Smith aims to minimize recovery time behind the body, keeping hips up and not allowing the femur to go very far behind the plane of the trunk. This prevent hamstring problems and creates a situation where what is lost out the back is gained in hip height --> Knee Height --> "

Hip height and higher COM is not achieved by early recovery, this is achieved by higher ground reaction forces. Applying Newtons third law, the support leg applies more force down which in turn
projects the COM higher.

During swing phase cutting the stride will lower ground forces since the time interval for the leg to accelerate is reduced.

The key to sprinting is accelerating the leg back down to the track without increasing contact time,

Impulse= Force x time, increased the force during contact but not contact time.

Force= Mass x acceleration, higher force by accelerating the leg down.

The main problem is strength, during the support phase the elasticity is lost by bending the knee. The body needs to be strong enough to be act like a stiff spring during contact, a failure to do so will result in loss of elasticity.

Faster speed results from ^ muscle power & ^ strength in angles specific to sprinting, coaches waste time doing non specific drills and
teach poor mechanics by wrong cues.

This forum can be the catalyst, for the dispersion of information to further track and field.

COMPARING PEAK HIP AND ANKLE TORQUES

Joint torques of the ankle comparing dorsiflexion and plantarflexion during sprinting shows

1)Dorsiflexion, joint torques 10N-m, angular velocity 5 rad/s
2)Plantarflexion, joint torques 200N-m, angular velocity 15 rad/s

When the foot is extended down , it has 20 times joint torques (angular force) and is traveling 3 times faster then DF.

Comparing plantarflexion, to hip torques shows

1) Hip torques during extension, 200N-m, at angular velocity 8rad/s.
2) The foot when extending down, generates the same torque as hip extension, but it travels at a faster velocity.
3) During hip flexion, joint torque at 110N-m, angular velocity of 10 rad/s.

Conclusion: Foot extension develops equal torques to hip extension; it generates higher torque then hip flexion, same torques in extension but greater angular velocity. Basicly the lower leg extensors are equaly important to hip extensors.

It is common belief that during sprinting hip extension contributes more to speed then foot extension; however it is clear from film and force platforms analysis that foot extension is equaly important indicator of sprinting velocity.

Implications for training:
Depth jumps, using light weights , extending the foot down and reacting explosively off the ground is excellent way of developing more powerful foot extensors. Coaches need to evaluate the risk of injury when employing such exercises.

Substantive issues in running. Biomechanics of sport, Kozey

"It is common belief that during sprinting hip extension contributes more to speed then foot extension; however it is clear from film and force platforms analysis that foot extension is equaly important indicator of sprinting velocity."

The larger range of motion, the greater distance over which torque is applied. I think this is why Charlie has stated that the hip extensors contribute to sprinting 7x more than foot/ankle extension.

It has been claimed for years that foot extension equalled or even exceeded hip forces, but peak angular velocity at the ankle is not a reflection of total output (though it is a very good reflection of why the foot must NOT remain dorsiflexed during ground contact!). Think about all the movement around the hip joint and the amount of musculature involved, and draw your own conclusion. Otherwise, we'll have studies to prove that top sprinters should have calves like Popeye and butts like Olive Oil.

I think we are all agreeing on the important aspect - i.e. you will be a slow ass if either foot or hip extension is not developed in synergy.

The big difference in the lower leg is that energy is stored and released, which means it has to store its energy from somewhere. Think about this. Where is this energy coming from... now, would it be hip extension by any chance?

Now think about how you would best integrate this into training. Bugger me if it doesn't go back to the CF concept of developing this through sprinting and other non direct activities.

This of course assumed synergy is in place. Sometimes lower leg/foot development will lag behind for one reason or another and will need to be cleverly integrated to bring the athlete "up to speed"

Science at its best again.. I'm sure I said something somewhere about understanding the questions to get the right answers

Yes, The hip action sets up the lower leg action.

Science at its best again.. I'm sure I said something somewhere about understanding the questions to get the right answers...

Oh Dunkin Donuts give me the power

Key factors here

(1)Evolution of Homo
(2)Segmental analysis of the hip, knee, and ankle
(3)Torque expression-including radians and watts

(4)Elastic and insertion properties of muscle
(5)Plate limitations and video analysis
(6)Olive Oil glutes vs Jennifer Lopez glutes

Let's make it simple for people that don't have the time for science that has no valid arguements.

Two important joints in sprinting: The hip and ankle. Who is stronger? **Who can generate more force? Who can express more force?**

I spent too much time trying to get a citation that said "Hip is stronger then Ankle in Human Locomotion". So I took a break and thought of the vertical jump.

Try doing this at home. Like the NFL, tape your ankle so no movement is possible.

Do a vertical jump.

Then take the tape off and stand up strait and let someone wrap your legs up like a mummy. The only joint available is the ankle.

Do a vertical jump with just your calves.

Results? Please post measurements.

This is pure FORCE PRODUCTION. This is generating force not enhancing or transfering it like in movement.

Another point. Take the shotput. This event is a great example of summation of forces. The legs extend from the ground and transfer that force to the the abdominals, they then twist violently and load the pec and that pushes....finally the wrist adds a little extra for that last few feet of the throw.

The highest output of force during sprinting is toe off.(Enoka 2000) The highest ouput in the shotput is release (Morris 1996). This is true because the slower and larger muscles are acting first and other joints acts as a rocket booster. Take the Saturn V rocket. The top rocket is the product of the boosters, they can't take all the credit. The most N force is the soleus because of eccentric work and elastic support, not active force.

You don't see Adam Nelson doing 1 Rep Max work on a wrist curl!

True the force output of the plantar flexors is the highest. But the hip and knee are the work horses here.

(A)As for radians take a look at the force arm of the femur and foot, how can you compare different class levers?

(B)The achilles tendon is also a player here! The hip does not have a spring ligament that will transfer force.

(C)Ground reaction forces of plates can not do segmental work.

(D)Jennifer Lopez and Jenny Adams have great glute development. This has nothing to do with this argument but sometimes just posting this brings a smile to my face.

Reply Hip extension Vs ankle extension

Charlie writes *"Think about all the movement around the hip joint and the amount of musculature*

involved, and draw your own conclusion. Otherwise, we'll have studies to prove that top sprinters should have calves like Popeye and butts like Olive Oil. "

Sprinters dont have massive calfs because the achillies tendon allows the gastroc to generate high elastic energy & joint torque, using muscle size as the only indictor of joint torques ignores the importance of fiber archtecture and the effects on muscle elascity.

The foot generates equal torques as to hip extensors because it has greater elastic properties, the series elastic componment (SEC) resides in the achillies tendon, this allows the lower limb to act like a spring.

The gastroc, is composed of parallel fiber arrangements, when tension occurs a recoil effect occurs thus promoting the SSC, hip extensor musculature is composed of pennate fiber arranagements in which the fibers angle lies at an angle to the muscles longitudinal axis which means the hip is much less elasitic then the lower limb.

It is widely agreed that elasticity, or recoil/spring effect is critical to sprinting, foot extension equals hip extension since it has higher elastic properties. Muscle size is not a good indicator of muscle elasticity but rather fiber architecture.

"The big difference in the lower leg is that energy is stored and released, which means it has to store its energy from somewhere. Think about this. Where is this energy coming from... now, would it be hip extension by any chance? "

The energy that is stored in the lower leg, is stored in the achillies tendon, this is a product of SEC and the energy comes from tension produced by foot extensors which are parallel to the achillies tendon, thus a rapid recoil effect happens.

Transfering elastic energy from hip extension to the lower limb does not occur since the hip and ankle are not biarticular joints, elastic energy resides in tendons, for hip extension to act on foot extension a tendon would be needed to allow energy to be transfered from the hip to the ankle. Obviously no such tendon exists, if it did humans would run alot faster then 9.79.

Do a vertical jump.

Then take the tape off and stand up strait and let someone wrap your legs up like a mummy. The only joint available is the ankle.

Do a vertical jump with just your calves.

Results? Please post measurements.

This is pure FORCE PRODUCTION. This is generating force not enhancing or transfering it like in movement

1)The lower limb generates elastic energy when muscles are slightly pre stretched by 120-130%, to do this the knee must bend, by preventing the knees to bend, it does not allow the achillies tendon and Gastroc to be pre-stretched.

The segment analysis of vertical jump would indicate concentric values of foot extension, it does not measure elastic properties or SSC of foot extensors since the knee is taped.

Using the same experiment, wrap the ankle and knee so no movement is possible at these joints, extend the hip, post results (No vertical displacement)

2) the wrist does not have a long tendon to store and release elastic energy.

3)Torque is ,FxD(perpendicular distance to the line of force from the axis of rotation), different levers means the line of forces changes, this does not mean that joint torques cannot be compared. What it shows is that some levers have a mechanical advantage, moment arm (force)/moment arm resistance.

It is widely agreed that elasticity, or recoil/spring effect is critical to sprinting, foot extension equals hip extension since it has higher elastic properties. Muscle size is not a good indicator of muscle elasticity but rather fiber architecture.

Why don't we see Kenyans lined up in the 100m final? Perhaps we will see guys like Randy Barnes and CJ Hunter doing Marathons. Structure is a valid way to identify talent. Mysosin heavy chains AND neural addaptations.

The lower limb generates elastic energy

elastic is not isolated power. Who else in this forum sees that problem with *GENERATES ELASTIC POWER*. Perhaps transfer or directs is a better and more accurate term here.

Using the same experiment, wrap the ankle and knee so no movement is possible at these joints, extend the hip, post results (No vertical displacement)

The ironic thing here is that my mistake enhances my orignal arguement. Isolating joints creates problems.

Playing the devils advocate, let us say is right here. How does that research change modern training?

2) the wrist does not have a long tendon to store and release elastic energy.

So does the wrist aid at all during the shotput? The point is summation of forces.

this does not mean that joint torques cannot be compared. What it shows is that some levers have a mechanical advantage, moment arm (force)/moment arm resistance.

Movement arms will change joint/muscle peformance. Remember when the Nazies changed the insertions on dogs and humans to give mechanical advantages? The muscle was the same but the joint changed. What has happened is we are looking at the higher values from an end product. It is like giving tires the credit and saying the engine is weaker!

Quote

Transfering elastic energy from hip extension to the lower limb does not occur since the hip and ankle are not biarticular joints, elastic energy resides in tendons, for hip extension to act on foot extension a tendon would be needed to allow energy to be transfered from the hip to the ankle. Obviously no such tendon exists, if it did humans would run alot faster then 9.79.

Of course its not direct. It happens through a sequence of events.

That's like saying that if , , Charlie and Dazed were playing pass the parcel that doesn't pass the parcel to Charlie because it has gone via .

Come out of the tunnel.. it's sunny out here

You have confused elastic energy with Impulse & angular momentum.

Elastic energy is the capacity to do work by virtue of a deformed bodys return original shape, the lower leg muscles are stretched, elastic energy is stored and released via the achillies tendon, the foot extends powerfully downwards.

Elastic energy from the hip, to knee and ankle is not transfered since no common tendons exists & fibre architecture is not parallel in hip extensors.

When angular impulse acts on a system, the result is a change in the angular momentum of that system. The impulse-momentum relationship can be exemplified by sprinting takeoff, increase ground impulse and therefore increase angular momentum of the free leg during swing phase.

Hip extension increases Impulse by ^F, elastic energy differs from Impulse FXT, it is the ability to rapidly deform and return its normal shape.

Science requires the mechanism of action to be explained, according to your statement elastic energy extends from the hip to knee and ankle,

"**Where is this energy coming from... now, would it be hip extension by any chance? "**
..... **"It happens through a sequence of events**. "

If you want this to be more then opinon, then explain the mechanism of action (how is elastic energy transfered from hip,knee,to ankle?) then you will have a scientific hypothesis as opposed to opinon.

I dont think it is sunny outside but rather Bliss.

"*Why don't we see Kenyans lined up in the 100m final? Perhaps we will see guys like Randy Barnes and CJ Hunter doing Marathons. Structure is a valid way to identify talent. Mysosin heavy chains AND neural addaptations*."

1) I wrote **fiber size is not a good indicator of elasticity** great example J.Edwards built like a tooth pick yet has elastic energy.

2) From research early strength gains comes from neural changes as opposed to hypertrophy,

3) Nerve innervation is crtical to movement this independant of muscle size. Increase nerve impulses activate faster contraction.

"*Elastic is not isolated power. Who else in this forum sees that problem with GENERATES ELASTIC POWER. Perhaps transfer or directs is a better and more accurate term here*"

1 Increase elastic energy, increase potential energy. Strain energy or elastic energy follows

SE= 1/2 x Kx squared
k= the materials relative stiffness or the ability to store energy.

x=distance in which the material is formed

In the lower limb elastic energy is stored and released, it needs a parallel tendon and fibers.
The store and release of elastic energy results in power hence the term elastic power.

"*Movement arms will change joint/muscle peformance. Remember when the Nazies changed the*

insertions on dogs and humans to give mechanical advantages? The muscle was the same but the joint changed. What has happened is we are looking at the higher values from an end product. It is like giving tires the credit and saying the engine is weaker!"

The evidence that you present strengthens my arguement and the hypothesis , the achillies tendon gives mechanical advantage to the foot, the hip doesnt have such a tendon. As a result of this mechanical advantage the foot is able to generate equal torques to the hip during extension.

It is common belief that during sprinting hip extension contributes more to speed then foot extension, however it is clear from film *and* force platforms *analysis that foot extension is equaly important indicator of sprinting velocity.*

This method is usefull because elite sprinters don't like long metal tubes in their bodies. I agree with Dr. Gordon E. Robertson with his feelings with inverse dynamics. Some benefits and details:

1) noninvasive with videography (Film) kinematics are determined

2) direct measurements of external forces are often necessary (i.e., force platforms)

3) can be applied at several joints, simultaneously

What do we know about the limitations of Inverse Dynamics Doc(his words)?

1) results apply to conceptual structures not true anatomical structures

2) cannot partition results into contributions by individual anatomical structures

3) no direct means of validating

well forget the methods of the research and get to the point of real world training. Work backwards of what methods work the best. Then use science to back up the stuff that sounds logical. If you go the other way, you could be the poor soul who is still using Royal Jelly!

Summation of forces....

Mechanical output from individual muscles during explosive leg extensions: the role of biarticular muscles.

Jacobs R; Bobbert MF; van Ingen Schenau GJ

The main result of this study is that biarticular leg muscles contribute significantly to the work done at joints, due to transfer of power during explosive leg extensions. In particular, a net power transfer was shown from hip to knee joint during jumping and sprinting. Seven elite athletes performed explosive one legged jump and spring push offs. Kinematics, ground reaction forces and electromyography (EMG) of leg muscles were recorded. The mechanical output of six individual muscle groups was estimated by using Hill-based muscle models. The EMG and kinematics served as input to these models. For jumping as well as for sprinting, the model estimated similar results for the relative work contribution done about a joint due to transfer of power by the biarticular muscles. Rectus femoris showed a power transfer from hip to knee joint, while in contrast hamstrings showed a power transfer from knee to hip joint. Regardless of these opposite directions of power transfer, a net transfer occurred from the hip to the knee joint. These results support the hypothesis that the action of biarticular muscles contributes to a net transfer of power from proximal to distal joints during explosive leg extensions. This action of the biarticular

muscles causes an efficient conversion of body segment rotations into the desired translation of the body centre of gravity.

Net transfer. Net is a total, not partial.

I am still looking for more research that is clear and valid. Not much out there! I will keep trying. The key with my posts is not to have a private scientific argument with one person. My goal is to explain it in simple terms like Charlie does so it tattoos your brain.

These results support the hypothesis that the action of biarticular muscles contributes to a net transfer of power from proximal to distal joints during explosive leg extensions. This action of the biarticular muscles causes an efficient conversion of body segment rotations into the desired translation of the body centre of gravity.

These are biarticular muscles, eg the hip extenors cross two joints, the achillies tendon does not share such properties.

The hypothesis is transfer of power this is a product of joint torques Impulse,angular momentum. Elastic or strain energy is different; the hypothesis does not state that there is a transfer of elastic energy across non biarticular joints (hip, knee, ankle).

In brief
1) Yes transfer of power across biarticular joints,

2) No transfer of elastic energy across non biarticular joints, in sprinting this is unique to the lower leg.

3) Inverse dynamics do share such problems, technology does not have non invasive methods yet,

4) applying scientific methods is the most effective way to train; the problem is application of science to training. This is where people go wrong including most scientists

How does that research change modern training?

This is more relevant to us on this forum,

1) speed bounds are not good for sprinters, contacts are too long, rear foot contact ruins the elastic response.
2) Most unilateral bounds, foot collapses, again ruins the elastic response. Unless the athlete can bound more on the front foot, which i have never seen.
3) Plyometrics training should, be
-foot extending down, pre-stretch before toe up
-find the middle ground, between horizontal and vertical distance, so contacts are rapid
4)The lower limb needs to be appropriately strengthened, not by conventional calf raises,single leg toe raise at angle of 45 degrees
5) the key is when contact time is too long, elastic energy is lost,
6) elastic energy is optimal when muscles are slightly pre-stretched 120-130%, during contacts do not significantly bend at the knee, elastic energy will be lost.
7) Many tests, distance covered by 10 speed bounds or single hops, are not a accurate reflection of increased elasticity for sprinters, try testing height from depth jump.
8) Test athletes based on the above principles.
9) Functional progression in plys training, elastic response ruined by advanced exercises early on.

You have become so caught up in a rather obscure hypothesis that you are missing the big picture, stuck in a tunnel (with no light at the end i might add) so to speak.

Your description of speed bounding is woefully inaccurate, and watching some of the jumpers you mentioned to me earlier demonstrated that you haven't observed them in full detail. A speed bound, does not strike with the heel first. It is a flat or middle foot plant, as this is the most efficient way to maintain speed through a bound.

Some athletes do strike with the heel first, but will quickly find that they have to take several weeks off for a bruised heel.
As for bounds and hops being detrimental to elasticity, maybe if that is all your plyometric program consists of, how ever they are fantastic for development of power at the hip in an extended range of motion.
And finally, although bounds and hops may not be an indicator of sprint ability(although i know that when im bounding and hopping cleanly i will also run fast) niether is a 3.6 meter standing long jump.

The hypothesis is transfer of power this is a product of joint torques Impulse,angular momentum. Elastic or strain energy is different; the hypothesis does not state that there is a transfer of elastic energy across non biarticular joints (hip, knee, ankle).

(1) Where does the force produced from the glutes and hamstrings go?

(2) Must force be elastic to transfer to distal joints if generated from the hip?

(3) Do the glutes and hamstrings have any elastic responses to loading?

(4) Does the anatomical and or neurological adaptations must take to the lower leg before high speeds can be possible?

(5) Would unloading traditional exercises such as cleans and squats be smart.

(6)Could you go in detail about your calf training. I am not a purest(some training might be advantageous) so we do some calf training.

Reply speed bounds:

Quote, by Charlie in another thread

"**The best plyo drills for top speed are vertical in nature, ie hurdle hops or hops initiated from a slight height, but stay below 30inchs! Anything higher will kill the elastic response you're looking for. Watch the volume as well. I like to keep the number of contacts down to around 30 to 40. I don't like speed bounds, as the ground contact (the only thing that matters) is longer**"

I think this reiterates my piont and the research on elastic/strain energy.

Dazed writes

"*A speed bound, does not strike with the heel first. It is a flat or middle foot plant, as this is the most efficient way to maintain speed through a bound*"

1)Flat foot or mid foot plant will ruin the elastic response, elastic energy is lost as heat due to bending of the hip,knee,ankle.

2) This type of foot plant differs significantly from sprinting; in essence the foot is being trained to elicit less elastic energy.

Does it ruin it, or just not involve it.
How long have you been using this line of thought in developing your training?

This is the pit-fall of classic periodization. The introduction of componants sequentially, freeing them of conflicting demands, holds the promise of allowing the maximization of each componant. The problem is, sprinting success is the outcome of the successful integration of ALL the required qualities. So the maximization of any one componant won't matter, as some of the level obtained must be given back when all the conflicting demands of sprinting are re-integrated.

Additionally, for individual muscle fibre to benefit DIRECTLY from an activity, it must be in a state of tone that will allow it to participate (read not stiff). Rotating componants serially in and out of a program guarantees that stiffness will be a major factor for a time after every training change, allowing much of the fibre to benefit only INDIRECTLY.
Sprinting itself is a mix of qualities which are hard to improve and require subtlety and a prolonged training exposure.

Reply Pitfall periodization

The program outline above is not set in concrete.eg,

This week
3 times OL
3 times plys
5 tempo
no speed

next week
2 times ol
2 times plys
tempo 3
speed 1

I intergrat the program according degree of fatigue: CNS fatigue is the main danger. Next week is more a unloading microcyle.

Reply

After talking to some Biomechanics guru's: the following

1) hip extension, summmation of forces which ^ angular velocity of the foot
2) Elastic energy, cannot be measured, it is the non contractile elements within tissues.
3)Transfer of Elastic energy cannot be measured nor can elastic segment contributions, hip,knee,foot.
4) if an athlete has powerfull extension through the hip and knee, if the foot collapses then elasticity is lost(measured by reduce distance or speed) .

What is the conclusion of the debate hip vs ankle torque.?

You can't have one without the other, powerful thighs and hips are useless without a powerful lower limb, too much is lost when the foot
collapses.

Looking at the leg as a pendulum, hip extension ^ angular velocity of the foot. Using Ben as a model, great hip extension and angular velocity of the foot however if the foot collapsed on contact then the net power would have been wasted.

Athletes should train the lower limb, if they dont then what is gained in hip extension will be lost by bending at the anke.Ben probably had a natural good foot plant so those muscle got strong from just running, however most athletes do not, they often have poor foot plant as a result of

1) drills
2) non specific plyometrics
3) poor sprint mechanics

At age 13 my was standing long was 3m, so i dont have to squat much or develop extensors strength in the hip & thights its naturaly very high.
The weak area is the lower limb, it collapses like most athletes, so enournous hip & thigh power is wasted.

The next question is how to train the lower limb for sprinters

Conventional methods dont do it for sprinters....

Charlie writes

"**Additionally, for individual muscle fibre to benefit DIRECTLY from an activity, it must be in a state of tone that will allow it to participate (read not stiff). Rotating componants serially in and out of a program guarantees that stiffness will be a major factor for a time after every training change, allowing much of the fibre to benefit only INDIRECTLY.**"

Could you expand on this, are you saying that tone is preferential to stiffness for fibre development?

Perhaps we should look at a breakdown of our motor unit recruitment in our strength training. What lifting programs work and why. The lower limb preparation is vital, but how is it trained? Are the methods by Charlie enough? Is the back squat and it's effects on the extensors of the hip a major cause of Ben's success?

I think we should work backwards from performances-->coaching methods-->to scientific rationale and see what is up. The only way and I can prove our beliefs are what we or our athletes do at WC or OG. I can show evidence of contrast showers (certain protocols work) and smarter people will show why it doesn't work phyiologically. Just like warm-downs during the 60s in swimming, it takes time before the scientists can validate something. One problem is the poor communication between science and coaching. Both think the other side are idiots.

Reply Pitfall periodization

The program outline above is not set in concrete
eg,
This week
3 times OL
3 times plys
5 tempo
no speed

next week
2 times ol
2 times plys

tempo 3
speed 1

I intergrat the program according degree of fatigue: CNS fatigue is the main danger. Next week is more a unloading microcyle.

Reply

After talking to some Biomechanics guru's: the following

1) hip extension, summmation of forces which ^ angular velocity of the foot
2) Elastic energy, cannot be measured, it is the non contractile elements within tissues.
3)Transfer of Elastic energy cannot be measured nor can elastic segment contributions, hip,knee,foot.
4) if an athlete has powerfull extension through the hip and knee, if the foot collapses then elasticity is lost(measured by reduce distance or speed) .

What is the conclusion of the debate hip vs ankle torque?

You can't have one without the other, powerful thighs and hips are useless without a powerful lower limb, too much is lost when the foot collapses.

Looking at the leg as a pendulum, hip extension ^ angular velocity of the foot. Using Ben as a model, great hip extension and angular velocity of the foot however if the foot collapsed on contact then the net power would have been wasted.

Athletes should train the lower limb, if they dont then what is gained in hip extension will be lost by bending at the anke.Ben probably had a natural good foot plant so those muscle got strong from just running, however most athletes do not, they often have poor foot plant as a result of

1) drills
2) non specific plyometrics
3) poor sprint mechanics

At age 13 my was standing long was 3m, so i dont have to squat much or develop extensors strength in the hip & thights its naturaly very high.

The weak area is the lower limb, it collapses like most athletes, so enournous hip & thigh power is wasted.

The next question is how to train the lower limb for sprinters

Your comment on a good foot plant is important for top end performance. However you also need to consider the reasons as a whole that cause poor foot plant. Consider some Australian women sprinters as opposed to the top American or European sprinters. Our top female sprinters (not all) have poor foot plant which leads to mediocre performances in the shorter distances. Consider the reasons that lead to poor foot plant. (Youve considered 3).

Tightness in the shoulders when sprinting.
Poor arm drive from tight shoulders.
Poor core & pelvic strength.
Rotation of the hip causing splayed foot drive.
Feet coming up below the opposite knee.
Power through the hip extensors is weakened by poor sprint technique rather than a poor foot plant.

The same athlete may actually have better mechanics at 95% top speed, than 100% speed, as they are more relaxed. If we look at Gail Devers.

Relaxed shoulders
Good arm drive
Good core strength
Ankle comes up over opposite knee
Good foot plant as a result of good sprint technique.

Drills are important for novices, as they may have little body awareness or experience.

Regarding plyometrics, as with weights it is aimed to complement sprint training, and is secondary to sprint work in priority unless you play volleyball. As far as specific plyometrics are concerned sprinting as opposed to running is the most plyometric exercise you can do. Block starts; med ball accelerations are pretty explosive & work well with strength training. Barefoot tempos will also aid foot strength.

Regarding poor mechanics, you are correct. Once technique, strength, speed, regen, training system is set, foot plant should not be an issue.

Consider other aspects. Is my foot plant weak because of.

Poor tech (as you stated)
Weak core
Not enough regen.
CNS fatigue
Trying too hard to run fast.

Who knows , Get a gold medal & everyone will be listening.

Covered a lot but havent covered everything. Interested to know what others think.

So you address the speed issue by varying it from one speed session per week to no speed sessions per week? Top sprinters today are getting above 60,000 meters per year of speed work, devided into tolerable sessions. As for transitional stiffness, I'm not even going to bother arguing with you about the idea that having tight muscles is bad. We have a fundamental disagreement. It is, of course, possible that you're right and I'm wrong- the results will decide in the long run.

As for calf work. The suggestion is that all the hip power Ben developed would have been wasted if his foot had collapsed. Obviously, it didn't, so the work was sufficient. The calf is involved in so many actions in sprinting and drills that the question isn't: How can we train them more? The question is: How can we prevent them from over-training?

Charlie writes

Top sprinters today are getting above 60,000 meters per year of speed work, devided into tolerable sessions

This could be a fundamental reason why the world recorded has bettered 9.79 over the last 14 years. Even though tracks are faster, and having the previlage of 14 years of additional knowledge.

Large volumes of speed work, results in

1) CNS fatigue

2) injury
3) technical breakdown
etc

So you address the speed issue by varying it from one speed session per week to no speed sessions per week?

The stop watch answers all, faster top end speed since droped speed work & ^ volume of specific plys.

Currently in prep phase, increase volume of speed during pre-comp, comp.

As for calf work. The suggestion is that all the hip power Ben developed would have been wasted if his foot had collapsed. Obviously, it didn't, so the work was sufficient. The calf is involved in so many actions in sprinting and drills that the question isn't: How can we train them more? The question is: How can we prevent them from over-training?

The calf is only appropiately trained if the athlete has suffiencent power/strength to plant the foot at the right angles, there is a continual overload and adaptation. However most athletes cannot hold these angles, forces are not applied to the calf in angles needed for sprinting as a result the calf lags behind in developement. Its like Bens start to hold 43 deg hip angles, you first need enourmous lower back & hip strenght, this came from specific training of the hip and lower the back, applying the same line of thought the lower limb needs to be trained first before it can execute the right angles in sprintings.

As in drills, they dont elict the elastic response to benefit the lower limb for sprinting.

Sprinting requires large forces over a short time period, drills dont do this.

Sprinting without proper mechanics wont strengthen the lower limb appropiately therefore it needs to be specificly trained.

What are you saying? You blame Charlie's theories as the reason that the record hasn't been broken for the last 14 years, yet Ben set the standard and Charlie coached him. Ben was doing 60,000m of speed work annually by 1986, yet I've heard his average daily session was 500m. Hardly onerous compared to some of the programs I've seen. While the record hasn't been bettered, the sprint world has sure closed in a long way in the intervening years. Look at the number of sub-10 performances since Seoul. In no small measure, as a result of the information gleaned from Charlie (It's no coincidence that John Smith trained with Charlie in 1980 - see Speed Trap. Also, Dan Pfaff worked with Charlie on the preparation of Charmaine Crooks - 50.35 in the 400m - prior to the 1984 Olympics, when Dan was at UTEP).

You lecture Charlie about calf development, pointing out the strength that Ben developed within his erector spinae, but of course, Charlie coached Ben's whole body. You say that drills aren't sufficient to develop the calf. Isn't this why Charlie did all that speed work?

We're all prepared to give Steven Hawking his due, but from whatever dimension you have come, exchanges of coaching information are not debates. They are an exchange of the details of what was done, and with what result. Of course, you should follow your own instincts and concepts, in an effort to enter a new dimension of coaching and performance. But, you can't suggest that what happened, didn't happen.

I prefer not to get into a debate over the WR and its progression over the years.

Regarding speed work, speed work wont develop the calf sufficently unless the athlete has good

mechanics, like Ben did.

MJ probably has the best foot plant i have ever seen in a sprinter, however he probably never trained the lower limb specificly, and the strength gains came from running itself. However like Ben, his running mechanics meant that strength gains from sprinting was sufficed.

Unfortunately for others without this natural foot plant, this is not the case additional work is required.

Training the lower limb has had benefits on my performance, i modified Plys and calf work so the foot is planted and released in angles similar to sprinting.

If this was Survivor Canada, I think I know who would be first to be voted off!

After 40 or more posts nothing has evolved from this thread. Sharmetheus thinks he has given us fire from Olympus!

Plyometrics should have short ground contacts!

Kangaroos hop at different speeds (on guess what...treadmills) but still burn the same calories and die later in Harvard from a brain illness!

Usefull information of Biomechanical properties of the Achilles tendon of guinea fowl!

They use force plates to measure power from Wild turkeys!

You can get away with not doing secret calf training if you are born with a natural foot plant! (Look for a red birth mark on butt to know if you are born with this gift)

The purpose of the forum is to exchange ideas and training methods to improve performance. Not to validate if Charlie is right or wrong. I don't do all of Charlies suggestions and this is ok. So don't think if you have a idea different then Charlie's beliefs it is not allowed.

Many members are far more educated and smarter then I will ever be, Still, advancements in training should be clear. I know that thousands of people view what I write so I post information I think can help. If you want to prove your manhood another free site has a great message board.

The Shift Paradox

Main ideas:
I didn't get through this entire thread. I'm on Section 12 out of 18. I didn't completely understand a lot of it, and I think that's OK, because it cannot be converted to practical training theory anyway. Thus far, this is what I've gotten from the thread:

The power of the foot is much less than that of the hip, but since power of the hip has to be expressed through the power of the foot, development of the foot must occur in lockstep with development of the hip. Along with towel clenching, barefoot runs, EMS, and sprinting, does anyone know of any good ways to develop the foot? I can't run barefoot right now because I live in the Northeast. Dorsiflexion happens naturally, don't try to train it.

Since I have been eating low II/GI/GL for a while this can of coke is having my neurotransmitters flood my brain like a supernova- I say I only have a 45 minute window before I have an insulin crash so here goes..

Charlie writes...

Perhaps this is a means (or, at least, one of the means) of explaining an observable phenomenon. Clearly, these individuals are able to maintain qualities in two areas that, at first glance, would seem to be mutually exclusive. As, eventually, a shift in workload significantly to the left (power) or right (endurance) WOULD bring about a loss of performance in the direction shifted away from, yet MIGHT NOT yield benefits in the direction shifted towards, this is another consideration in the decision-making process.

Thanks to Charlie we have gone into a four plane shift in power that in my opinion can happen to elite sprinter if they are going into a zone that allows for the lift phenomenon.

A) Each plane happens at once in four directions and in four dimensions.

B) The shift can occur in endurance and power or both the same time.

For example take a look at how both world record holders in the marathon train. They do an extensive series of plyometrics, since doing endurance will make the shift drop - not farther left or right. They do 2.5 hours of massage with a top notch physio (not Tim Lanes guy-he's working on mr.ed) and their cortisol levels are nil.

A shift from SE will help the power curve early in the race as well as later. We are blessed to have this information. This explains the 1.0-1.5 time extension with alatic work.

The common theory is that you can improve both strength and endurance to a point, then the two will clash when reaching closer to both sides of the spectrum, hurting the endurance or strength abilties. Strength will fatigue the CNS interfering with the economy of long distance running from decreasing contraction velocity/motor unit recruitment-therefore raising the energy requirements of the run, reducing the endurance performance of the organism. Strength would be compromised by the "fiber conversion" and "slow" biochemical adaptations that impair strength and power.

Ben, Angela, Mark, Tony, and Desai demonstrated that low intensity will create a delicate

harmony and balance of both qualities(power and endurance) that become products instead of decay constants(less then 1). Their fitness and capilirzation of muscle tissue will improve power from heat conduction of the nerves.

In Thermodynamics by Enrico Fermi he writes about the Entropy Constant and temperature. He writes...

One can see from the figure that the atomic heat actually vanishes at absolute zero. At higher temperatures, C(T) approaches a limiting value which is nearly the same for all solid elements and which lies very close to the value 3R.

This is clear to me now, I wrote it down while under stimulants so I hope it makes sense Saturday morning.

Perhaps Charlie will expand on his statements and lead the investigation to the shift paradox by asking the right questions. This is an important factor when balancing your weights, running work, and tempo training. All of my strength levels have increased while doing more circuits and tempo training. Maybe some of the senior members will make comments on the statement that Charlie Francis made up top.=

Charlie
Administrator
Forum Moderator
Posts : 1495

8/20/2002 : 10:28:49 AM

I don't know directly, but it certainly seems that speed endurance has played a big role in a lot of long jumpers' preparation, perhaps playing a role in the strength to weight ratio. Aside from Lewis' prowess in the 200m, Larry Myricks ran 20.02, Mike Conley ran around 20.10. There are many other examples.

Charlie
Administrator
Forum Moderator
Posts : 1495

10/15/2002 : 10:42:40 AM

this post has been edited 1 time(s)

RE Motorneuron excitability:
At max speed the force required to raise a set COM must be achieved in a shorter period. This can be achieved in two ways:
1: Increasing fibre recruitment
2: Increasing recruitment velocity (time to max force within each fibre)
Clearly, the second option is the most energy efficient, as GC times are often shorter than the time to max contractile force for much of the available fibre (differences in fibre type,recruitment order, etc).
This is especially relevant where a set sub-maximal speed must be maintained.
There is a clear link between excellence in the jumps (which maximizes option 2)and 200meter performance (Lewis, Myricks,Conley,M.Jones), which might be counter-intuitive at first, but makes sense when option 2 is considered.
This becomes most interesting when you balance out the possibility that more special endurance work might interfere with option 2. Comments?

Charlie
Administrator
Forum Moderator
Posts: 1495

10/15/2002 : 9:14:21 PM

Re link to recruitment velocity:
This is a chicken and egg type argument. Perhaps this is a means (or, at least, one of the means) of explaining an observable phenomenon. Clearly, these individuals are able to maintain qualities in two areas that, at first glance, would seem to be mutually exclusive. As, eventually, a shift in workload significantly to the left (power) or right (endurance) WOULD bring about a loss of performance in the direction shifted away from, yet MIGHT NOT yield benefits in the direction shifted towards, this is another consideration in the decision-making process. ?

I figure I would place all the major post that lead to this topic in one place, so everyone can be up to speed. Some donuts and coffee may also help.

This topic is very important, it relates to volumes and integration of may components in adaptation. So maybe we can spend some time and try attacking Charlie's post a bit so we can understand topics that many programs fail to address, never mind apply methods to improve the balance of force shifts.

I think one thing to consider when looking at horizontal jumpers is that it is imperative for these athletes to accelerate well on the runway while staying in control and relaxed. Perhaps a pure sprinter is better at accelerating (and achieving a superior top speed) but the jumpers have an ability to accelerate to a slightly lower top speed, but with less energy burn. It is not in the interests of the jumper to burn all of their energy on the runway, as their intended maximal effort occurs at the end of their run.

Perhaps jumpers also have an enhanced ability to generate force quicker and more powerfully, and are able to relax (more than an average sprinter) when generating power for accelerating down the runway. And all the work to the left of the energy system spectrum makes the alactic work much easier for them, allowing them to get farther into their runs in an alactic state, and resulting in a much more relaxed lactic period for runs exceeding 100m.

It's interesting to note that I was watching some old meets on video from 1988 and saw Bruny Surin and Glenroy Gilbert competing in the long jump (their primary event back then). Both were jumping over 8.00m at that time. Did their jumping careers assist them in their sprinting careers that followed?

Derek excellent lateral thinking in the first paragraph!

Extending on this thinking, maybe they aren't better at producing force, just better at producing less antagonistic force because their event mentally conditions them this way. It's a conditioning that does not take place in a sprinter's training. It's not just about being able to produce the force but producing it in the right direction!

Maybe the focus of the impending jump causes greater relaxation that carries through to all elements of their sprinting? i.e. It stops them *thinking* about sprinting and makes it more hind brain.

This is another dimension (the 5th dimension) and it relates to how the production of energy is

channeled. You can produce 20% more than your competitor but if you are using it to fight yourself you can end up with less net energy.

I remember Charlie writing something about this very topic.

I think both Dcw23 and Derek are on the right path. I remember Tellez saying something along the line of Carl learning not to rush his acceleration on the long jump runway and then transferring the lesson to the track. Maybe, the 200m has more to do with optimal speed like the run ups before a jump than max speed.

Another thing to perhaps consider is the transferring of energy from the horizontal to vertical. With a pure sprinter, the vertical is minimal, though extremely important in regards to the hip height. With a jumper, the one-time force applied is much greater, and may therefore require a greater energy reserve.

This might seem obvious but what role would this play in hurdling?

You have just opended up a whole new can of Whoop @$$. At least for me anyways. You have gotten me thinking about vertical hip movement in hurdling as opposed to horizontal. For one reason or another, I never thought of the actual hurdle takeoff as being vertical. If the action for pure springing is Down with the legs, then upon hurdle takeoff, this down motion should also be to focus. And, I do not think the hip height would differ that much between and elite sprinter sprinting, and an elite hurdler going over a hurdle.

This makes things so much more simple. Hahaaaaa! My whole life has just changed because of this. Gollee, that $500.00 bucks I spent on going to the Vancouver Charlie Francis Seminar was nothing compared to what I have already gained in knowledge.

Further still regarding the energy used in the hurdle take off...with the down motion, countless 10ths will be taken off my time, simple from my having a greater energy reserve. I can already feel the difference. Now I will be able to sprint over the hurdles instead of whatever it was I was doing before. Why wasn't this site around 10 years ago?!=

RE: jumping and sprinting
Remember that Carl Lewis first made a splash as a long jumper, not a sprinter. His sprint ability came later. In fact, when Carl first arrived at Houston, Tom Tellez told him that he was primarily a jumper that also sprinted.

Carl did run a 9.3 100yards at age 16! It took a while to get an electronic equivalent for the 100 meters- but the speed was there.

The long jump is only part of this continuum. Think in terms of the height and breadth of speed-related qualified, and how they inter-relate. Examples on this continuum might be: Flying 20 at 12.1mps for up to 1.66sec. or, 150 from stand at 14.65 or approx 11.0 to 11.1mps for up to approx 10sec of the run or, 300 meters from stand at 31.0 or approx 10mps for approx 28sec.

**Why is the exposure to relatively higher velocities so important despite such short exposure times and the need to lower other training elements to achieve them?
How does this change as the athlete develops year over year? Thoughts?**

It is important as you are "burning in" the ability for this speed. You are programming the mind, the body, the psyche.

As the athlete develops the greater cost in all elements requires that this programming time be

reduced. A Hyundai might get 30mpg at full speed but a Formula 1 will only get 4mpg. When the tank's empty you have to stop.

Neural patterning only requires ONE episode. The point I'm trying to make is that the use of "flying 20s" is, by definition, almost always SUB-MAX, due to the difficulty in getting PBs in this narrow area, and because it works as a learning tool by lowering the breadth of exposure rather than raising the height.

I have spoken to witnesses who saw Flo Jo run 2 times 640m runs at 400 m splits of 50.0 and 49.7 from a stand- and keep going at a similar pace to the end and walk away without bending over!! (approx 45 min break.)

Also 6 times 160 meters (not 150) in 16.4 from a stand with a 240 m walk recovery! What else needs to be said!! Truly as amazing as her races in Seoul- still running 48.0 after all those races!

Can increasing the breath of exposure at a certain % of max be a key to developing the appropriate levels of organism strength needed to improve max velocity.

In weight training we stay with low reps(3-6) at 85% and above to elicit strength gains. We don't go in the weight room put on the max we can bench, start trying to knock out singles and expect to make continued gains. Is not, doing flying 20 the same as doing singles.(we can only hold max for 20m).

On the other hand if we go for 20 reps we have to lower the % of max we can use, and as a result receive less if any gains in strength(maybe some in endurance). So maybe the art is in finding the right rep at the right % (6x160 at 16.4)

Quote

---

posted by Charlie
Neural patterning only requires ONE episode. The point I'm trying to make is that the use of "flying 20s" is, by definition, almost always SUB-MAX, due to the difficulty in getting PBs in this narrow area, and because it works as a learning tool by lowering the breadth of exposure rather than raising the height.

Lowering the breadth or sharpening the focus?

I wasn't just referring to neural patterning, more the total combination of confidence, conditioning, focus and accumulated skill that such training can build!

The Specificity Spectrum

I decided to post some information on a General program with different ways to integrate high intensity work can be a huge factor in swimming.

Take a look at the two fastest female swimmers in the world-Inge de Bruin, and Therese Alshammar. Why are they faster then everyone else? My opinion is the general/CNS work being done in the lifting programs and dry land training.

Take a look at my swimming weightlifting program. First most swim coaches are obsessed with pulling bands and tubing. I do this as well because it works the general muscles used in the sport but we don't try to simulate or get too sport specific. But the volumes are moderate and we spend most of our efforts and time doing 4 exercises of the following in the weight room.

Squat Variation- Barbell, bodyweight, lunge, and dumbbell squats.

Pull Series- Pull-ups, Hammer Rows, and Lat pull-downs

Extend Movement- Any tricep exercise (barbell, cable, or Dumbbell)

Push Series- Bench with Bar or Dumbbell, Push-ups.

With each movement we do stretch for the muscle group that you are working during the rest period, except for tricep which is a calf stretch.

We do three sets of 6-8 reps for weights, 10-20 reps for bodyweight exercises. As a team you must do 3 x 20 of your own bodyweight before you can touch a bar. We do an abdominal circuit for 15 minutes to warm-up the body safely while getting some core work. I do the circuit with them after getting turbo charged with my Dunkin Donut coffee and Creatine jelly filled munchkins!

One day a coach asked when I would get sport specific with various equipment. My response was the following.

1) Why? We get sport specific in the water every Day.

2) We are trying to improve strength by improving force production, not doing more sets and super high reps. Let us work the endurance part in the pool. Strength training is STRENGTH training, not event replication or conditioning.

3) Who is going to buy the equipment? Me?

4) We change our program by lowering the reps(peaking is late february) and making the third set a series of pulls with the tubing. We have enough choices such as order of exercises and exercise selection to prevent the kids from getting stale. Also we have Jamming 94.5, so the hip hop gets us going in the morning!

Is this method foolish? Most swim coaches think I am recycling my workout cards from PRO football! In fact my workout cards are the close to the cards I used for football players. The reason is a general program can help any power/speed sport. So I looked at what Dirk Lange and Paul Bergan were doing. They coach both Inge and Therese, so maybe they know what they are doing.

Let us take a look at Inge's weight work again. I posted earlier on this a few months ago but lets look on why se is the world record holder in THREE events.

First all her weight training is rather general. She does some rope climbing and other swimming exercises but she lifts like a banshee.

MAX BENCH 1997(155) 1998(165) 1999/2000 (190)
MAX DIPS 1997(18) 1998(32) 1999/2000 (44)

Her weight went from 128 to 145 while getting leaner each year. I believe the reason for here fantastic body comp was from doing less swimming and more general conditioning such as biking. I think the stimulus for swimmers should be out of the pool to make them leaner. I feel that the body adapts too much to the swimming and needs a shock or different stimulus to loose fat. Also the high intensity work burns fat at a faster rate then swimming, so a good lifting program will help keep athletes leaner.

Inge also had TWO massage therapists, an exercise physiologist, and a nutritionist. Clearly a

team approach can work if the coach directs it, not sports medicine.

Therese also worked on intensity with both short sprints and lifting. She does intervals of 10-150m of sprinting on the track! I think with the squats this is why Inge and Therese have such nasty kicks. Doing the hip flexor work that some ASCA speakers suggest is a waste of time, and of course DOESN'T WORK. She lifted 10 x 100 at Nebraska, but then switched to near max work and can bench 3 x 145.

"*With Dirk I got an Individualized program. He believes in hard training, then regeneration. That's the secret most people don't get. Everyone trains like they're distance swimmers. But with Dirk, it's build up and rest. Build up and rest. Make sure you don't get too tired but train full out. Why do you train slow? You don't want to swim slow."*

We will see more records fall if people follow this program in swimming.

Perhaps it's worth mentioning at the outset where general conditioning (swimming lengths at LOW intensity) fits in- before everyone asks. Do these programs follow the high/low intensity principle, avoiding medium intensity, as my program does?

Stepping over

I didn't get through all of this either, because it seemed to be turning into Biomechanics and Physiology of Sprinting part II and because I lost the sheets it was printed out on. But, I think that most people agreed that stepping over is an effective cue after you've gotten violent with your arms and are a little into the race.

charlie and everybody,hi all.been away for a while and had alot of reading to do when i git back.can anyone tell me what this STEPPING OVER is during the leg action.it may have been described before but sorry for asking again.

The foot of the swing leg passed over the knee of the support leg.

won't this theory end up in an athlete sprinting with a darting effect.any chance of more details

It's not a matter of raising the knee to step over in the conventional sense. It refers more to flexion at the knee. If the quads are flexible enough, the knee should close fairly tightly during recovery, which allows the foot to travel over the support knee. Charlie might provide more detail.

I'm inclined to think that it's more an observation item for a coach to check the overall sprint position of their athlete.

Very few, if any elite sprinters actually have their foot cross above the supporting knee. The foot most times passes at the side of the knee. "Stepping over the knee" is only a cue and that's all.

Stepping over is usually cued after the main accelleration (0-30) is over. If the athlete has driven through the start, then they will continue hip extension at top speed, even if the athlete tries darting. How ever all stepping over does is takes the emphasis away from driving back and into a stride that allows the hips to rise and faster contacts.

"Stepping over" is also a function of flexibility. the top athletes do have a shorter lever during the recovery phase. Stepping over at the knee is the minimum level.

Maybe I am arse about then but I use stepping over for observation only, not as a cue. If the head, hip position, core and arm position are right, if flexibility is right and strength is right stepping over will be a bi-product that informs the coach that the above elements are correct.

Mostly it's a cue for the athlete. It can allow them to feel the full range of motion or feel the "openness" of the stride.

most of the step-over action, per se, comes from what the athlete did on the ground in the previous stride(s). That is, if the didn't apply ground forces correctly stepping over is somewhat of waste...

w/some athletes i tell them "step over-step down"

the idea of stepping over or making the thigh go through a "full" range of motion can also help to conserve posture and hip height throughout the run.

but it's velocity specific, too... i don't believe that you can step-over in tempo runs or maybe until you're running at 85% percent or more.

Yes, save the technical work for speed days.

Boy we are still missing it here. Look at MJ on video. Is he stepping over? Its purley an elastic response to the ground contact forces. That is just his way to do it. What is the explanation for this? If you believe this is a trainable entity give me sound science why hew is so ugly in what he is doing. Does stepping over decrease minimum swing time? The extremely precise coupling of contact times and speeds strongly suggest that attempting to change or alter by coaching cues, the angle at which the leg strikes the ground, is not a good idea.

Hmmm, interesting! Are u suggesting that there should be no cues...rather the sprinter should continue to run naturally and let the leg movement be a "elastic response to the ground contact forces."

That's interesting because I have found over the years that the more relaxed and natural the run is the better the times!

Quote

Hmmm, interesting! Are u suggesting that there should be no cues...rather the sprinter should continue to run naturally and let the leg movement be a "elastic response to the ground contact forces."

That's interesting because I have found over the years that the more relaxed and natural the run is the better the times!

Whilst racing yes, but there's more benefit to be gained from developing correct technique during training, than letting every run just happen.

Right! Good point! The question is: how technical do u want to be during training. Also could giving one too many cues be detremental to their racing times?

After all we are training to run faster times and not the other way around!

Quote

Sorry Dan, the camera doesn't lie
www.sporting-heroes.net/athletics-heroes/displayhero.asp?HeroID=329

Yes dcw23 that is foot over knee, But is it a "purely an elastic response to the ground contact forces" as opposed to being cued.

I remember MJ saying that other coaches wanted to change his unconventional style of running; but, he knew that his style would bring him success. It would seem Clyde and MJ obviously had some foresight!

CH (MJ's coach) once said: "Maybe athletes should concentrate more on moving forward as opposed to moving up." This was in response to a question about MJ's lack of "knee lift" comparing to other traditional sprinters.

Quote

Yes dcw23 that is foot over knee, But is it a "purely an elastic response to the ground contact forces" as oppossed to being cued.

I don't use it as a cue, only as an observation. If his ground contact forces were wrong, we would not observe him stepping over.

Understood! So in other words it could be a natural occurrence that is causing the foot over knee as opposed to a deliberate one!

That is garbage! What part is that? That foot could come right down from there. I hardly consider that stepping over. At any rate, it is the ground forces that set the swing lerg into motion. Don't tamper with it. You will set your own impulse. The stiffer the leg the better the spring! Your theory can't possibly explain everyones form. Do you see my point? It is not possible.

Nobody answered my question...does cueing "stepping over" effect minimal swing times?

I think you know the answer is no. Therefore it has no value. Here is at cue.....Bounce at 60 meters

As I am concerned. Developing natural stride patterns combined with superior conditioning and very little technical work is the key! I can guarantee u that my natural speed is superior than 99% of these so-called elitist knowledgeable guys that think their crap don't stink!

Quote

posted by Daniel Fichter
nobody answered my question...does cueing "stepping over" effect minimal swing times?

I think you know the answer is no. Therefore it has no value. Here is at cue.....Bounce at 60 meters

iIs the purpose of cueing "stepping over" the knee to affect swing time? Charlie cues pulling the arms down and not driving the elbow back; this does not mean the elbows don't go back on the back stroke of the arm swing. It just helps with getting the right arm action. A cue is a cue and that's all it is. What ever cues help an athlete achieve the right positions and technique, use them.

RE: Bouncing.

I am not exactly sure what "bouncing" means, but it sounds as though it would result in the hips collapsing. It seems as though the hip height would be overdone with this cue. Sprinting is alot faster than any bouncing I have ever encountered.

For what it is worth, I am not a fan of "bouncing".

Again, hip height is the result of greater ground support forces not the other way around.

Yes, but it is a matter of communicating this to an athlete, if you tell them to raise their hips by applying more ground force, you will invariably get the opposite result. However tell them to step over the knee for instance and ground force of the support leg will increase. It's just like cuing driving with the arms when starting to increase ground force during acceleration, sometimes the key to improving an element of sprinting is to get the athlete to focus on something else.

Trying to minimize swing times is waste... what i mean is -- what's the purpose. unless you see something really off in that area (like an air time of say .18). But if that's the case you've probably got bigger fish to fry than talking about swing times.

Shortening the lever in the recovery phase isn't to reduce swing time, it's to reduce the work load on the hip flexors.

Ben shortened his lever so fast that I never noticed it until I watched him in ultra slow motion. I made the mistake of copying his technique, which caused me to slow down the heel to butt process considerably, and caused my hips to sink. On video, it looks nothing like Ben, however, it did in my mind.

RE: Stepping over.

I feel that it helps to focus on this cue during 25-40m. It has alot to do with balance. The torso is changing angles so much that I personally found myself pushing after 25m rather than "stepping over" thereby allowing far greater relaxation for both my quads and hip flexors. It also reduces ground contact time during this phase considerably. The balance aspect comes in here. "Stepping over" allows one to continue to accelerate. Without this feeling, I was stepping in front of my COG, subconsciously putting on the brakes as I did not want to fall on my face (all though I am not 100% sure this is the reason my subconscious put on the brakes, I rarely talk to myself anymore, and it has been a while since I answered myself anyways).

Shortening a lever has nothing to do with aiding forward propulsion during max velocity sprinting. That is what drives the so called "technique work" coaches. The hip flexors play no role in terms of ground support forces.

Its all about the extensors on touchdown. On the tmill vs ground front - there really is no need to replciate the experiment(Weyand et al) b/c there is no sound reason (at least that the Harvard group is aware of) for swing time findings to differ(if there is let me know). They step through this logic in the design section of the methods in their JAP paper when they point out
that the mechanical relationships the study quantifies are the same on level treadmill, level ground and inclined and declined treadmill.

More simply, why would minimum swing times of guys running on the track be any different than when they run on the treadmill -they are swinging their legs through the air, presumably as fast as they can, in both instances correct? They even have research from three top notch sprinters on level ground that matches the tramill findings? Go figure.

Have you guys read the entire research paper yet? I would suggest you do. If you disagree that is fine, but lets all be on the same page. I think the study by Weyand and the work of Farley is really pointing to something here

Bear with me...but I'm wondering...How can running on a "level treadmill" be similar to running on a "level ground?"

For one it would seem that a treadmill can be manipulated; therefore altering ground contact times (and swing times accordingly) unlike running on the ground.

Read the post before. Minimal swing time is minimal swing time. I do not care how you do it. The test wouldn't have matched up when it was done on level ground then. Why was it the same? Please read the research so you have an understanding of the study

Again the Harvard study....

Perhaps the research that Tom posted a few months ago can remind us that treadmills are not perfect.

As for stepping over cue and swing times I feel that cues are not only ways to have an athlete do something. For example elastic responses are mostly spinal/reflexive so over coaching is a problem. But cues can be used as ways to teach the athlete not to do something! Stepping over at 24 mph will transfer over at maximal speeds. Look at pitching in baseball, the index finger is making modifications of a flight path of a ball at 100 + miles per hour. The wiring of athletes are not perfect (see baby training and crawling) and the brain is able to make a changes at incredible speeds. What we are taking is running in the jungle to running on a mondo surface. Artificial mortifications for a artificial event.

So how do we improve force application, I don't mean strength and power levels, How do we make sure we are applying force correctly.....

Well for one thing, force x avg body weight is important.

So **conditioning** is a huge part of it.
Trying to make the leg a better spring is what seems to be the best way(stiffer). Do a test with single leg hoppers. You will see that 99% of the time, the faster the runner, the faster the single leg hop. Why?, they are able to apply more force. Nothing to do with mechanics or swing time.

Train acceleration
Sprint at max speeds (training in itself)
Plyometrics

I just think that too much time is spent on something that we have no control over.(swing mechanics) Don't coach it so much is what i am getting at. Sprinters will find their own pattern the more they run. Sprint , sprint and more sprinting! has access to the research right? I am not getting upset; i just wish people would get off the treadmill haters club. In terms of what we are looking for (minimal swing times) The time it takes for the leg to reposition does not matter if the ground is moving under you or not.
Swing time= Time from foot up to foot down. Who cares what goes on underneath. if you are doing other research sure things will be different, but the Harvard team knows that. I never run on a treadmill either, but it surely does not mean we can't learn from it.

You advocate making the leg stiffer to increase ground forces and that's the key to sprinting. So would it be fear to say that eccentric and isometric strength in the leg extensors should be the focus.

I think elastic/reactive, not eccentric or isometric, strength is the key to making the legs better springs. And Dan, I totally agree about the one leg hop speed correlating with sprint speed. As you've said before, it's what happens when the foot touches the ground, not what happens in the air, that is key. Hence the illusion of hang time with jumpers when it's actually just getting off the ground quickly, etc...

I'm interested to know more about the swing of the stride. Although the swing time between elite and non-elite athletes is similar, how do the limb velocities compare?

Also, I'm curious as to what you mean by "bounce".

No offense taken. I coach football in college and have been a high school track coach for about 10 years. I love the sport of track and Field. The college football gig is something that is helping me to attract Different athletes in football and track who want to run faster. So, yes i do coach track.

I'm sick and tired of this one-trick description of sprinting. If the sprinter- ANY SPRINTER, doesn't step over the support knee, whether through conscious action or not, his form will turn to crap in a matter of steps. Those steps- the athlete struggles with knee lift that would otherwise be automatic, arches his back and/or leans back in compensation, the hip drops causing a loss of ground forces. Ground contact forces are key- BUT they are dependant on set-up in advance of foot-strike. This is the reality with which every world-class sprinter is familiar, and coaches ignore at their peril!

Sprinting is not a one word explanation. There are so many variables, i understand this, but too many coaches are trying to out think their athletes. It happens naturally! Increase leg stiffness and the runner will be able to run faster! Great vertical forces. Why are people getting mad. Charlie in essence, you agree with ground support forces!

Quote

---

posted by Charlie
Daniel. I'm sick and tired of this one-trick description of sprinting. If the sprinter- ANY SPRINTER, doesn't step over the support knee, whether through conscious action or not, his form will turn to crap in a matter of steps. Those steps- the athlete struggles with knee lift that would otherwise be automatic, arches his back and/or leans back in compensation, the hip drops causing a loss of ground forces. Ground contact forces are key- BUT they are dependant on set-up in advance of foot-strike. This is the reality with which every world-class sprinter is familiar, and coaches ignore at their peril!

Charlie, how about "stepping down". I now you advocate cocking the big toe for ground prep, is that all that is needed. Do you think there is a way sprinters need to attack the track or do you just let the foot drop.
I know if hip height is good the lower leg could sweep closer under the c.o.m., so the question in not where the foot should land, but should it be active?

The action feels primarily up and down at top speed and there are many ways to describe the action, but what can't be done is to just rely on dumb luck to achieve the correct technique- or to maintain it at all times even after you get it. The solution may be therapy, training load adjustments, or cues. When you step down from a sufficient height, the backward component occurs automatically in a time frame that is too short to think about, so in that respect, it is "active" but requires no conscious input.

Charlie, in your reply to someone above you talked about hips dropping. My girl always looks like she is sitting just a little when she runs. Could this be a possible culprit

Quote

---

posted by Charlie
The action feels primarily up and down at top speed and there are many ways to describe the action, but what can't be done is to just rely on dumb luck to achieve the correct

technique- or to maintain it at all times even after you get it. The solution may be therapy, training load adjustments, or cues. When you step down from a sufficient height, the backward componant occurs automatically in a time frame that is too short to think about, so in that respect, it is "active" but requires no conscious input.

Good info! Carl Lewis also describes top speed running as an up and down feeling!

Quote

It happens naturally! Increase leg stiffness and the runner will be able to run faster!

Dan, the reason I asked about the track experience is what you are saying above only happens if you are very lucky. Some people can do this naturally. The majority can't.

As far as the acceleration phase goes, then yes, increases in power and strength will allow most anyone to have great acceleration. However, when the acceleration is done what happens then? This is where the technical mastery of the coach comes in. Knowing how to suggest just the right amount of info/therapy/training to the athlete is an absolute art.

I do not think it is a simple Loren Gamgrave type one size fits all technical prescription. It is a complex art.

I do not think it is a simple BJ Fichter power and strength prescription. It is a complex art.

The skill is in putting the program together and getting the results without describing "ground force", "swing time", "foot plant" and anything else to the athlete. The master coach will achieve this without the athlete needing to get mentally messed up with terminology and worry.

Quote

I do not think it is a simple Loren Gamgrave type one size fits all technical prescription. It is a complex art.

I'm not trying to diss you, but I think that's a misrepresentation of Loren's ideas of sprinting. I've had many conversations with Loren in the last 10 yrs or so. He's always been helpful and i've never gotten the impression that he had a one size fits all approach.

The stuff on the tapes is the quick and dirty version -- like what can you fit into one hour that's marketable and flashy.

I wasn't actually referring to him directly. Just the style of coaching that is presented in those type of tapes, articles. There's many out there.

My only experience of him directly is his tapes which I think are very formulaic.

I wasn't trying to criticize any individuals, just to emphasize a point.

Actually, just received an email today from Loren. He is very busy with the selling of Velocity Sports. He is a nice guy to talk to. I remember back to a conversation i had with him that he wanted to change the video series because of new developments that have occurred since the tapes have been out.

Loren is a very nice guy; I hope he is enjoying the Florida sun and the punk tennis brats! Seriously he has been very open for questions and some of his stuff has some good points....

But my question is Dan, why doesn't everyone run fast if they lift heavy and sprint frequently? Is there any cortex involvement at top velocity or is it just reflexive?

Obviously there is a a talent component. You can lift, sprint, and run all you want... but w/o any talent there's nothing to develop. That's why sometimes it annoys me when people call us up and say "I know with college coaching my kid can be really good...."

DCW23 made a great point about putting together a program without worry. One of the most important things I learned from Charlie at the Vancouver Seminar is to keep your damn mouth shut when discussing technical matters with an athlete. We have all made technical "Suggestions" to our atletes and set back their running for weeks. Don't lie, you know you've done it!!! On the topic of stepping over... Give me a break! Any one who as ever sprinted with any confidence has had the sensation of stepping over mid race. Oh.. Don't step over in your drills a la Loren... no time to fit it in. I have had much better success with the step over cue with Cone drills, ins & outs, whatever you want to call them. Thanks Charlie!

Also, when talking about making someone faster, there are a few ways one can do it. From a mechanical stand point acceleration and maximum velocity sprinting are two distinct phenomena. When we cue the "Step Over" we are saying that it is an active process. I don't believe it is. Like i said in previous posts, if this were the case, you have probably not reached max velocity speed. We all say that teaching an athlete not to over stride is important because they will spend to much time on the ground and alter hips lalalalala, correct? Well, i believe the same thing happens with trying to abbreviate the impulse. You ruin the natural impulse your own body has adopted through running. By this i simply mean vertical impulses= vetical force x contact time. Again, if active muscle power was the case in pulling the swing limb through, you would see huge differences in swing data...Correct?

All people don't run fast because the huge component of RFD involved. Hey Ben was strong! Swing times don't vary, but they do impose a limit to top end speed. Aerial time decreases as top speed is approached. These aerial time reductions are the result of decreases in foot ground contact, which are larger than the increases in effective force. Why aerial time similarities? Equivalent vertical impulses. Faster runners apply greater forces during briefer contacts. Slower runners apply lesser forces during longer contacts. Decreases in contact time, which we have already agreed upon are unavoidable with speed increases, reduce the aerial time available to reposition the swinging limb. When aerial times diminish to the minimums providing sufficient time to reposition the swinging limb (ie. the minimum swing time) we have all agreed we have reached our top speed, and hip flexor strength will not change that. I will end the debate here.(or what we think is a debate) we are saying the same things, but we are getting their with a different eye. I suggest you all read the study and do what you will with the research. Charlie, the way you explain things sometimes, it sounds like you are in complete agreement. Trying to cue to many actions is not the way to go. Why?

I am comparing elite to elite, not some dinky HS athlete to a Tim or Mo....

I will post later.

Also while most were sleeping last night I of course was reading research, with all respect to Harvard, the data on swing times is incorrect. Instead of having some undergrad guess on radian measurements with a low end video system, spend more then 500 dollars on the study and wake-up. We in the sport of elite sprinters understand that there is a huge difference between a 99-100%. Any standard statistic will say that there is not statistical difference between Chambers and Montgomery in Paris but for those who are not limited by a piece of paper from people that think MJ is the fastest man in the planet. Let us understand that swing times are not a factor to train, but we must realize that the CPG alter the landings even at 12 meters per second.

Why then tell an athlete to bounce? Isn't the landing passive?

The crux of the argument is that it really does not matter how you compare the swing data. Swing time is swing time! With all do respect, I really do not think that Harvard screwed up the research, besides there are more studies that support the spring mass model than the one we are talking about. Bounce, because you allow the spring to be just that, a spring. Continue to alter and you will slow down or compromise the spring.

There are two approaches possible here.
1: You can wait till an athlete comes along who can do everything right.
2: You can teach all your athletes to maximize what they have by intervening where necessary.
Those who choose option one should be prepared for a long wait, for, with few exceptions, they'll be waiting till hell freezes over before that sprinter they've been "waiting for" comes along.

Again the saga continues.....

Let us start with history and facts instead of extrapolating information from a woman from Bedford with a body fat percentage of 21% and comparing it to a grainy DAT tape of the Olympics and estimating radians with a undergrad using pathetic biomechanics measurements with no significant figures. Again Dan fails to explain why Harvard thinks MJ is the fastest man in the world when it is very clear that other sprinters have attained faster top end velocities. When one hole in the ship starts, others soon sink the $500.00 boat latter when the facts "leak" out.

Dan expresses and clings to research that has not helped ANY elite coach improve his program.

(Question) Dan is *cueing* his athletes to bounce when other cues are lies from false prophets. So the athlete is **consciously** thinking bounce (since it is the spring model) and will run faster then the other cue "stepping over". So Harvard cues of bouncing are superior to coaches with no PHD's telling an athlete not to delay ground contact times (applying more force and having the hips drop) by concentrating on the ease and speed of contact.

"The hip flexors play no role in terms of ground support forces. Its all about the extensors on touchdown. "

The intramuscular firing patterns of ground support show a proximal to distal timing, the Rectus Femoris and hamstrings increase eccentric forces during late recovery and early support when the COM is behind front foot strike. The knee extensors show low moment force till –100ms.

Through a transport mechanism mechanical energy is transported from the Rectus Femoris (hip flexor) to distal joints, it is stored as negative work during early mid support and released during toe off.

Insufficient hip flexor strength on touchdown will cause the hips to drop and power will be reduced on toe off. Before extensors can fire they are preceded by large eccentric forces in hip flexors. Numerous researchers adhere to this conclusion(listed below).

Jonhnson MD, Buckley JG, Muscular power patterns in the mid-acceleration phase of sprinting. Sport Sci, 2001

Velso A, J Abrantes, Estimation of power from leg extensor muscle in the acceleration phase of the sprint start. Symposium in sport 2000

Jacobs Schenau, Intermusclar co ordination in a sprint start.

Reply Harvard Study

I have said this before, the Harvard researchers measured the wrong variable. They measured swing time but they did not look at the acceleration & velocity of the swing leg, measuring only time does provide insight into the velocity and acceleration of the swing leg.

The relationship is a general ratio based on vertical height and the passive reflex. It is conviently very close, but no cigar. Good posts.

Here is an interesting article.....

Advances in Ambulatory Monitoring: Using Foot Contact Time to Estimate the Metabolic Cost of Locomotion

Reed W. Hoyt and Peter Weyand
Why do Contact times set metabolic Rates?

The implications of this intriguing result brought Taylor and colleagues back to the experiments and questions of Hill almost 70 years earlier and provided an attractive link between the classic response of muscle in in vitro and in situ preparations and their operation in living animals. The explanation for the constant relationship between the rate of force generation and metabolic was simple. The inverse of time of foot ground contact and corresponding rates of force generation dictated the speed of the muscle fibers recruited to generate the required force. As running speed increased, the rates of force generation (tc) decreased and the rate at which force was developed (1/tc) increased. The proposed links among running speed, rates of force generation, and fiber speed was consistent with what was known about metabolic cost of force generation in isolated muscles (Rome et al., 1990: Woledge et al.,1985) and fiber recruitment patterns in whole animals (Armsrong and Laughlin, 1985: Henneman et al., 1965 : Walmsley et al., 1978) The explanation also was supported by the close agreement between the ranges of 1/tc and those of the maximal shortening velocities of the muscles reported for both individual and different sized animals (Rome et al., 1990). Furthermore, the constant rate-normalized cost indicated that the muscular activity at different running speeds was equivalent. If running faster was achieved through shortening the muscles faster, as Hill had suggested, the metabolic cost of force generation also should increase as it did in isolated muscle, but this was not the case. This explanation also was consistent with with relative constancy of the mechanics of support across running speed. The simple relationship between rates of force generation and fiber speed provided compelling explanation for how mechanical properties of muscle on molecular, cellular, and tissue levels operate within the lever systems of animals to satisfy the mechanical requirements of running.
Why is the Metabolic Cost of Generating Force in Same in Large and Small Animals

The truly remarkable finding was that the rates of force generation could explain completely the metabolic cost of force generation in running animals, not only across running speeds but also across the entire spectrum of animal sizes. It indicated that both the activities and the volumes of muscles recruited by different sized animals was the same. This was curious given the identical need of large and small animals to support their body weights and the more crouched posture of small animals. These postural differences required higher muscle forces in small animals to generate the same ground reaction force. Biewener (1989) defined the ratio (ground force/muscle force) as the effective mechanical advantage (EMA) and qualified it by measuring muscle moment arms (r, the distance from muscle tendon insertion point on the bone to the joint axis of rotation) and the perpendicular distance from the ground reaction force vectors during running to the joint axis of rotation (R). He found that EMA scaled with body mass to the 0.80 power. How then could small animals generate higher forces, which required greater muscle cross sectional areas, with the same muscle volumes? The only possibility was for smaller animals to generate this force with shorter muscle fibers. Indeed, nature had provided this solution Alexander and

colleagues (1981) had shown that muscle fiber length changes with body size, scaled with body mass to the 0.20 power, exactly offsetting the size difference in EMA and muscle forces to result in the same muscle volumes being recruited by large and small animals to generate force against the ground (Biewener, 1989)

Summary

In conclusion, nearly a century of experimentation produced considerable progress in the understanding of the relationship between energetics and mechanics of exercise. The work of running was not related to metabolic cost, as Hill and others initially hypothesized, because the muscles of animals running on level ground performed very little work. Rather, metabolic cost was set by the forces generated by the muscles to support the weight of the body.

Reply Peter Weyland,

I have reviewed Weylands research in great detail and the apparent flaws i have previously mentioned. A strong implication of the research is that coaches are trying to improve unchangeable entities.

The premise of Weyland research is that mechanical energy required to reposition the swing leg is provided through a process of transferring elastic energy between body segments and not by the power generated within muscles.

Yet this premises that max velocity is mostly passively elastic and does not involve active muscle power is NOT supported by research.

Science currently cannot estimate the active and passive contributions of body segments.

Weyland and Sternlight research may provide great insight into the design of prosthetic's yet applying these concepts to the training of sprinting leads us

1) acceleration is trainable
2) top velocity is untrainable

Is this the case?, I'll let you all draw your own conclusions.

Hi all, on this again are we?

Dan, could you post the other research, that not done by Weyand et al, that supports the theory?

The research does have to be repeated, just like all research. Read the study. Can no one else see potential flaws? Look at the methodology!!!
Specifically - top speed was reached at 50 m for exactly 8 top elite sprinters, through 25fps video of a race??? How likely is that, all 8 reaching maximal velocity at the same point in time?? Does anyone have the tape, or split times so we can corroborate this?

What about the differences between the angles of the treadmill and the theoretical maxima this should provide?

What type of statistical analysis was provided? Did you look at the actual data? a 0.05 difference is a big difference in swing times, when comparing something that is INHERENTLY a small value.

Why did they choose Michael Johnson, a runner with an atypical technique?

I think that they MAY be onto something, and I don't like to close my mind to anything, but when people start telling me how it is based on 1 research paper (which formed incorrect conclusions from the data in my opinion), it hints to me that it might be wrong. Clinging is bad, keeps an open mind and promote the gospel of the Charlie Francis Training System.

There are other options.

If swing time is a constant entity, by some manner, either elastic or a combination of elastic and muscular activity, regardless of form (as we can guess what the lady running at 6m/s from the data would have looked like on the treadmill), then cueing stepping over instead of low knees SHOULD not change that ability, but instead, allow one to have better technique while maintaining leg turnover. Phew!

Basically if that was garbage (which is highly likely as my brain is fried from exams and proposals) then I was trying to say:

If swing time is constant at top speed, you MAY be able to change your mechanics (leg position) without changing swing times. Why? Produce more force into the ground, and you will go faster. Put your leg in a better position to produce force, and you will apply more force. Apply more force, and here is the crux, AND swing time stays the same.

So, maybe this data can suggest that you can apply more force by cueing better leg position, and maintain turnover due to the rubber band effect. Anyone?

So maybe training cues isn't so bad after all?

Just some random thoughts before bed.

To be honest the spring mass model has been around for sometime now. Most all biomechanists understand the theory and do not debate it. Again, by studying animals and the energetics of running we are able to establish what might happen in human runners. With this idea, we move forward to human testing, and low and behold we found the same things. These theories apply to all four legged animals, and the basic principles carry through to just about anything that runs. In a sense the Harvard group learned that certain muscles dont act the way we think they act.

Researchers like
Taylor
Farley
McMahon
Gonzalez
Here is a clip from some research.

Insights From Changing Contact Times

What then dictated the lengths of the steps and contact times that were naturally selected at any running speed? Again, the answer was provided by human experiments in which the naturally chosen frequencies during running and hopping were altered (Farley and Gonzalez, 1996; Farely et al., 1991). During both running and hopping , the body behaved like a spring, that is force had the same relationship to displacement during both the yield and rebound stages of the support phase. When the stride or frequency was decreased and the ground contact period increased, the body no longer behaved like a spring. The higher the forces during the rebound and the increased metabloic rate suggested that additional mechanical work from the muscles had to be supplied to replace the work not being performed by the body's springs. Slowing the rate of force generation disrupted the body's springs and made muscles do more work.

I am not debating the spring mass model; I believe that it is a very good theory. What I am debating is the conclusions of the study based on the data.

There are many different options and implications thatcan be drawn from the data that they presented, not just that things should not be coached.
I just tried to outline some problems with the research,and another possible implication of the study.

Is repositioning time constant at maximal velocity in most people? I think it is similar, or very close.

Does this affect the way we coach? Yes, if you coach training hip flexors, it should. But no one does(or should).

Implications for training for good athletes? None.

Implications for those who want to understand locomotion? Lots.

Why is it so hard to believe that as you increase force into the ground, you increase the velocity of the repositioning leg, therefore keeping swing time essentially the same?

If this happens, you can reposition the leg to a more optimal position to apply force, so it can be coached somewhat.

Maybe the difference between someone who is really strong with a high leg turnover and someone equal to them, VMax wise, is purely the position they put themselves into when running - ie their ability to provide force.

Charlie and the other guys use the cue "stepping over" to good effect, helping the athlete reposition the leg to a better position, thus increasing force into the ground, while maintaining turnover, and increasing concurrent hip height and speed?

There are a few points here.
points out that accel of the swing leg at various points and repositioning time are not the same thing.
Cues are used only when and if needed.
Attempts to influence ground forces during ground contact will have a negative impact on force production and prolong ground contact.
Ground forces CAN be favorably influenced by proper technique BEFORE GC.

Exactly.

So instead of telling people to apply more force to the ground, just tell them to step over, a cue that facilitates higher force production, and faster speeds. It might happen that they apply more force, and that swing times stay the same, but who cares, that isn't how you learn speed. Right?

The other stuff is just a locomotion thing, nothing to do with the feeling of sprinting, but might make a few scientists happy.

So how about no more "faster repositioning times do not influence speed, and increased force improves speed", because the mechanics and doing are completely different things.

Charlie, on one post I think you made mention about how many females lack good knee lift after recovering the leg. Since I primarily work with females, I have noticed that they indeed display this lack of lift. It's almost as if when they are closing the heel and swinging through, the knee does not recover all the way through. What variables would you contribute this to?

My best sprinter, though, has improved, but yet is not consistent with this action (at max velocity) all of the time. I was told last year (first year here) that she had poor knee lift. The improvements came when we began emphasizing relaxation (so crucial) as well as the extension component of her arm swing. Early on, her hand would stop right at the hip, and not open up at all. Would it be accurate to say that the arm extension helps in optimally opening up the stride, therefore, aiding in knee lift?

Female athletes reach top speed earlier in the 100m and must carry speed further and have more opportunity for a breakdown of form. Also lower power levels tend to lead to prolonged ground contact times relative to males and more opportunity for falling into the trap of over-pushing, leading to more backside mechanics nd even longer GC times.

I notice you mentioned consistency. I think one of the key areas here is that women have a smaller window of maximal force production and are more easily fatigued by intensive speed work and recover more slowly.

I think that they tolerate longer stuff well, but the time for speed work must be carefully chosen.

If they aren't fully recovered, you won't get the quality and you will re-inforce bad patterns.

I put a tremendous emphasis on full recovery. This is probably one of the biggest areas that initially my athletes have had problems with accepting. They are so used to short rest intervals from high school that they feel that they have not been through a demanding workout. One of my athletes felt that a great workout had to produce tremendous muscle fatigue and soreness.

As the weeks have gone by, they are better realizing the demands that our type of training places on the body, as well as, its benefits.

Now that my athletes are understanding the whys (I always encourage them to ask why) training is so much better. We talk so much about us coaching the athletes, there's nothing better than an athlete who believes in you and wants to compete for you.

Let’s have everybody read this so we can all talk of the same things here.

Reply spring mass model

A more important question is how much of the body acts like a spring or involves active muscle power?

Currently science cannot tell how much the body acts as a spring during sprinting, so the problem with Peter Weylands research is that it is based on premises that swing leg is 100% elastic.

This is a rather blind assumption.

Implications of Coaches

According to Weyland the swing leg is 100% elastic and so coaches are trying to change unchangeable entities by cueing such as stepping over.

Clearly this is not the case!!

What I want to make sure the forum understands that a 1% difference in a 100m is significant. This small margin is the difference between gold and last. Harvard has done us a great service by pointing us to the right direction. One problem is that the one percent is where coaches make their money.(shells of peanuts FLY30!)

Dan please share with the forum the ***materials*** that little "Debbie" used for measuring the NBC tape. Surely she was using the finest biomechanics software on the market. Perhaps they will have the radians of Ato and Donovan ready to share to the coaches here.

Reply swing time/ acceleration

Elite sprinters and marathoners have similar swing times, they spend similar time airborne. (52 % and 50%)

Do they have similar acceleration of the swing leg?

Obviously no, using swing time alone ignores the variable of acceleration.

But that is like simply saying faster runners run faster. We know this. The reason that they run faster is because they have greater ground support forces, not faster swing times.

You've missed the point, swing time doesn't tell us anything, and acceleration does.

Elite sprinters reposition the swing leg faster.

Anybody do you feel though that the 2% difference in flight time is significant in the final race time?

Even when I hear of a "strong correlation" or "no statistical significance", between this variable and that variable, I keep telling myself that these actions are happening so fast that 1% can translate into a huge difference in performance.

Really the Harvard study did not focus on Pure elastic response. It basically tells us that the minimal difference in swing times has to be taken into consideration. It might lead to thoughts that this process is purely elastic, but the study focused on what determines maximum velocity sprinting. Hence, the answer not by being able to reposition the leg faster. This study places no % on what might be elastic and what might not be. Instead, it lets you draw your own conclusions because of the similarities in swing times. , i cant argue with the fact that 1-2% difference is not huge in performance, but it does allow us as coaches to be able to pick and choose where we should intervene and where we shouldn't. As for the comments on the equipment used, The methods are clearly described in the paper. High powered equipment should not be confused with high powered information. It all depends who's hands the stuff is in.

Looking at the research, we have to understand just what it was trying to accomplish. we cant just over look it.

Everyone agrees with one point do they not, that if you apply more force into the ground in the correct manner, you will go faster?

So if swing times are essentially the same, within say 1-2%, and stay the same no matter what maximal speed you have, as shown with the Harvard study, does this not mean that cueing stepping over, and training to get a better leg position to apply force should be better, as it would allow more force, and the same swing time.

What is 1 Percent? The difference between Chambers and Montgomery. What Harvard did was estimate radians and this difference is so slight that it proves that most of the action is elastic. So this information is helpful as a reminder that much of running is natural and should not be over coached. But, here is the flaw with using a low resolution video and no real biomechanical analysis to get accurate measurements of what is going on. shows that the entire swing phase is not a constant elastic response by explaining that acceleration is a small player at very high

speeds. This subtle change over can be seen when the pelvis rotates back and forth. All the so called experts will show that Ben had compensation. This is true. But it wasn't weakness compensation but an adaptation and evolutionary response to allow for displacements of forces that would rip most athlete's limbs off. Some of the cues used by many coaches are great if used properly. If the athlete has great therapy and has been sprinting with an good coach for years they might not need to be cued. The body is smart but not perfect.

Here is an excellent article I would suggest:

Eur J Appl Physiol Occup Physiol 1985;54(5):524-32

Activity of mono- and biarticular leg muscles during sprint running.

Simonsen EB, Thomsen L, Klausen K.

A cinematographic recording of the movements of the lower limbs together with simultaneous emg tracings from nine lower limb muscles were obtained from two male track sprinters during three phases of a 100 m sprint run. The extensor muscles of the hip joint were found to be the primary movers by acceleration of the body's center of gravity (C.G.) during the ground phase of the running cycle. The extensors of the knee joint were also important in this, but to a minor extent, while the plantar flexors of the ankle joint showed the least contribution. The biarticular muscles functioned in a way different from the monoarticular muscles in the sense that they perform eccentric work during the flight and recovery phases and concentric work during the whole ground phase (support), whereas the monoarticular muscles are restricted first to eccentric work and then to concentric work during the ground phase. Furthermore, the biarticular muscles show variation (and rate of variation) in muscle length to a larger extent than the monoarticular muscles. Paradoxical muscle actions appear to take place around the knee joint, where the hamstring muscles, m. gastrocnemius, m. vastus laterialis and m. vastus medialis act as synergists by extending the knee joint during the last part of the ground phase.

I will ask you the same question as Shammer.
How does altering leg acceleration without changing swing times going to affect speed?

Here is an excerpt from:

Relative activity of hip and knee extensors in sprinting -- Implications for training
Klaus Wiemann and Gunter Tidow
New Studies in Athletics
10(1): 29-49, 1995

pages 42-43.

6.2 Relaxation training

Even the fastest land animals are very rarely injured. The primary cause of this is the certainly selective pressure and the fact that quadrupeds have much better balance than bipeds even on rough terrain. However, there are two additional factors to be considered: Firstly, animals presumably are not aware of the execution of fluent and exact cyclic sprint movements and, secondly, they do not perform any strength training. Therefore, there is a decisive contrast to most human sprinters. As already mentioned, even human beings should not become too aware of movement details when sprinting. However, frequent over tension of muscles, together with co-activations of muscles not actually participating in forward propulsion, is typical of all-out sprinting, with the following results:

Firstly, a muscle, which is activated at the wrong time reduces the contraction velocity of its antagonist and thereby increases its energy consumption. By contracting continuously, the

agonist prevents its own micro-regeneration, which is urgently needed, for two reasons: On the one hand, the intramuscular compression remains so high that the blood flow is stopped. Therefore, there is neither a sufficient supply of nutrients nor a removal of waste products. On the other hand, the a–motor neurons, which activate the motor units of the agonist, are permanently stressed. However, the type II motor neurons, which are responsible for fast contractions, very soon tire (Grimby & Hannerz.

Flexibility of recruitment order of continuously and intermittently discharging motor units in voluntary contraction. Progress in Neurophysiology. Band 9. Pp. 201-211, 1981). Normally, these motor neurons discharge only for a few milliseconds, with intermittent short bursts. A permanent activation causes them to fatigue very quickly, so that they are no longer able to produce the highest frequency discharges necessary to cause the muscle fibers to contract. This results in considerable reduction of the total impulse of the relevant prime movers. This is all the more true, if the muscle concerned is predominately composed of fast-twitch fibres.

Presumably, these considerations led Wysotschin (Die Muskelentspannung von Sprintern. Die Lehre der Leichtathletik. 19: 593-596) to speak of “the art of muscle relaxation during the sprint” and to develop a corresponding training programme. Considering that sprint races generally require the highest degree of concentration and tension, it is indeed an “art” to activate only those muscles which are needed for locomotion and then, after an optimal contraction, to relax them as quickly as possible. This fast alternation of tension and relaxation determines the athlete’s stride rate, which together with stride length, determines the athlete’s running velocity.

The ability to relax one's muscles can be trained. For example, V. Borsov (URS/Ukraine) used appropriate training for this facility. However, unlike the optimization of intermuscular co-ordination, the capacity for intramuscular relaxation is linked very closely to the existing fibre distribution. Intramuscular relaxation ability, therefore, is mainly a genetically determined indicator of talent. So, ultimately, the dynamics of the re-absorption of calcium ions into the sarcoplasmatic reticulum determines the relaxation time of a previously contracted muscle fibre. This re-uptake capacity is at its highest in type IIb fibres (Alway 1992).

However, strength training leads to a change in the proportional distribution in a fast or a mixed muscle, in such a way that both cross-section methods (CSM) and neuronal activation methods (NAM) leads to a slow fibre transformation. This means that certain strength training methods unintentionally reduce the relaxation ability of the loaded muscle groups. Consequently, incorrect strength training or full-speed sprinting after or during (macro)cycles of a corresponding training emphasis (especially if cross-section methods are applied) can lead to injuries, which occur most frequently at the back of the thigh. There are two interconnected reasons for this: Firstly, the faulty selection of strength training exercises can result in muscular imbalance. It is almost a tradition with many coaches and athletes to place the emphasis on strengthening the knee extensors. This leads to a further increase of the natural asymmetry of the contractile force of the thigh muscles, to the detriment of the ischiocrural muscles. Secondly, there is a contractility decrement in the strength-trained muscles. This does not only lead to an increase of contraction time, but more importantly, also to an increase of relaxation time. If the knee extensors need longer period of relaxation, the possible result will be a brief overloading of the fast but weaker ischiocrural muscles, during the fast alternation between tension and relaxation at the front or, reciprocally, at the back of the thigh.

Of course, this is not to say that faster sprint times cannot be attained through increased strength. The aim is rather to train sprint-relevant muscles as specifically as possible. Following the findings presented in this article, it is essential to shift the emphasis to training of the ischiocrural muscles and the muscles, which are responsible for lifting the knees. Furthermore, it appears to be especially important to consider carefully the specific effect of strength training methods in the overall training plan.

Finally it should be mentioned that so many injuries occur in supramaximal sprint training using 'towing systems' (Viitasalo et al. Trainingswirkungen des Schlepptrainings auf die Laufschnelligkeit die Maximal- und Explosivkraft. Leistungssport. 12(3): 185-189, 1982; Mero et al. Zum Einflub von Kontaktphasenmerkmalen auf die Schrittfrequenz bei Maximalsprint. Leistungssport. 12(4): 308-313; Bosco & Vittori. Biomechanical characteristics of sprint running during maximal and supra-maximal speed. New studies in athletics. 1(1): 39-45; Mero & Komi. Auswirkungen stimulier supramaxiamler Sprints auf die neuromuskulare und anaerobe Leitung. Leistungssport. 20(1): 33-35, 1990) because in such training, the relaxation ability of the sprint-relevant muscles is strained to the limit.

Based on this excerpt, It would seem that specificity training is in high order! Personally, If one were going to strength train, it would seem logical to develop the entire organism. Based on personal experience, I have found that if one focuses too much on specific strength training that a new weak link is manifested in a non-specific area.

Good article:
Additional factors for maximizing muscular inhibition beyond hereditary factors include the maintenance of the activity in the hind brain, which is able to process activities fastest. This requires that sprint processes be automatic. Optimal operation of the muscle fibres for sprinting requires that they be in an optimal recovery state. The implication is that training tasks that can achieve physical prep objectives while sparing the essential fibres for direct sprint actions will lead to higher ultimate performance. What does this say now about strength work as a general vs specific activity?

How does altering leg acceleration without changing swing times going to affect speed?

Power peaks on toe off however this energy is determined by the downward acceleration of the swing leg.

Force=mass x acceleration

Increased acceleration will result in greater forces.

It follows

Increased downward acceleration= increased ground reaction forces=longer stride length= similar swing time= increased velocity

Speed = SF x SL

SF = 1/ (contact + swing time)

Since swing time comprises ~ 3/4 of total stride time, ~ 3/4 of stride freq is set by swing time. Bottom line - stride freq is set largely by swing time and not at all by swing acceleration. None of speed, stride length or stride frequency is set by how rapidly the swing limb is accelerated (in point of fact, the limb acceleration is zero during stance, it then accelerates backward with respect to the body before reaching a turnaround point - at which point it's acceleration is zero again, and it then accelerates forward before pausing before being retracted backward (with respect to the body/torso, (toward the ground)). So, there are three accelerations of the swing limb: backward, forward, backward. None of them compute into their quantitative description of speed whereas swing time computes directly (Weyand). Swing times have a direct effect on speed! They have a direct effect on stride frequency and therefore speed. The Harvard group, measured and analyzed the relevant variable in this respect.

Comments? Remember these guys did not just whip this experiment together w/o thinking. I do not claim to know this research in and out(like they do), but experts in the field just don't miss

things like that. I am glad we are all starting to realize that it starts on the ground. These research are valuable to us. If their were research that proved that pawing, clawing or stepping over influenced ground support forces then do have someone post it.

Can you post what biomechanical software Harvard used to analyze Ato's and Franks hip radians? Please share with the forum what data they used for such calculations. Since you brand this research with such vigor, you should fully be aware of every detail of what Weyand used to calculate such close swing times.

After that information has been established we can go further.

The funny thing is such experts thought the MJ was the fastest man in the world...any coach worth his weight would know that one Dan.

If their were research that proved that pawing, clawing or stepping over influenced ground support forces then do have someone post it.

I am not a claw and paw guy, but the cue of stepping over has been pretty effective to get the right result in elite springing.

Does it really matter what they used(equipment wise)? It's the people who are using it that is important. Like i said, i dont claim to be the expert, but the research has lots of implications for coaches of all athletes. I think the people on this forum are beginning to understand the focal point of the research. Ground support forces are huge!!

They looked at what they needed to look at from the research stand point.

I think we are all in agreement.

None of speed, stride length or stride frequency is set by how rapidly the swing limb is accelerated (in point of fact, the limb acceleration is zero during stance, it then accelerates backward with respect to the body before reaching a turnaround point - at which point it's acceleration is zero again, and it then accelerates forward before pausing before being retracted backward (with respect to the body/torso, (toward the ground)).

There is a huge underlying assumption here, that swing time is not determined by internal forces of the leg during acceleration rather the the forces on the ground which release elastic energy during airtime.

Accelerate the swing leg faster, deform the track more, greater release of elastic energy from the track and also from within the muscle. The faster a muscle is pre-stretched the more power it can generate.

- stride freq is set largely by swing time and not at all by swing acceleration.

Swing acceleration is determined by force. Swing time does not provide propulsion.

F=MA
Force can be increased by increasing acceleration or acceleration can be increased by increasing force.

Really the Harvard study did not focus on Pure elastic response

The underlying premises of the research is that the swing phase is essentially elastic.

" if the mechanical energy to reposition limbs is provided largely passively through elastic recoil of

energy transfer between body segments than actively by power generated within muscles" Weyland et al, page 1991 JAP

" if this is were the case, if muscle speed has little effect on minimum swing time, then training to improve stride frequency..... would be of little value" Ken Jalaski (Harvard researcher)

IN SUMMARY, THE HARVARD HYOTHESIS IS BASED ON A ASSUMPTION THAT THE SWING PHASE IS LARGELY PASSIVELY ELASTIC.

Can swing acceleration affect speed independently of swing time?
Can swing mechanics affect how well muscular force is transmitted to the ground? If so, can we prove it? These things need to be studied to help us all! Again, time-averaged force is set by the runner's body weight - no matter what. We all know that is simple physics. We are so accustomed to thinking that pawing and clawing to slap down force is the way to get high forces, we need to understand that simply blasting impact force will not improve speed.

In the discussion they offer the possibility that the leg swing might be powered largely elastically rather than actively by muscle is common conception. This could potentially explain why swing times do not differ between fast and slow runners at top speed. What else could it mean? Like I said before, there was no % or number placed on what might be elastic and what might not be. Again, we need to not over look the study. We need to see how it can help us in our coaching. If you think stepping over has a direct impact on ground support forces with no effect on impulse etc, then by all means do it! I just am skeptical that people believe they can change this by coaching the heck out of it.

I'm confused...
Do you agree that if you put your leg into a better position for force production, without changing swing time at all, you will go faster (all other things being equal)?

Doesn't this imply that coaching stepping over, is better than letting an athlete who has knees around their ankles at top speed remain the same?

Re-read the paper again. Understand the difference between explanations of results and assumptions. The results do not depend on if the swinging is active or passive. The swing time results are just that, swing results. **Fast and slow runners take virtually the same amount of time to reposition their swing limbs when running at maximum velocity**. No premises, no assumptions, simply direct measurements of time.

The methods are described in the "Methods Section" of the paper (middle). The swing times come directly from the **force plate-no software or radians are involved.**

Shammer, I will post after work about swing acceleration.

How much did they pay Ato to run on the treadmill Dan? Did he get a time bonus? I know what they did with the local "athletes" but what about the 1996 Olympics? How did they get those measurements.....Ask Debbie!

So Dan, how did they measure the elite guys?

With out knowing, (I will ask what they used) what would be the major problem? The data just repeated itself. (Confirmed what they knew from the lab) Are you suggesting that using different equipment would yield different results? I guess I am a bit confused. If one study is done via force plate, and one using cameras, and the results are the same, one would tend to think that they are on to something.

Thoughts?

Yes Dan, but why do you think the study cost them only $500.00? Were they using ANY accurate equipment? NO. Why do you think they never explained what they used to measure Ato and Donovan in the materials section! Facts are tough to swallow.

Take a look at this one. Some ancient cultures used 25/8 as a measurement of PI, this may be close but that is not the same. When you don't use software to calculate something that is less then a second, soon your theories become thrown out the window. This small error (such as the Aztec calendar) will create problems. Take a look a the leap year problem. The earth does not spin at 365 perfect days Dan, it is too easy to round down or up to get clean numbers.

I think you are blowing this way out of proportion. The study used forced plates, like 1,000's of other studies. Like I said I am not sure what she used in measuring the Olympics, but at any rate why would it be different? Swing time is swing time? So, if the equipment costs 1.5 million, you will believe? Force plates are fine with me.

This point is vital for sprint coaches because we are investigating the possible influence of WE the coaches in increasing top speed by means such as cues, therapy, strength, alignment, Dunkin Donuts creatine filled munchkins, etc.

Let us say that the swing phase is elastic and can not be altered buy coaching. Then we should leave it alone because you would be slowing down the athlete if the mechanics were perfect.

Since we know that the Harvard study used Debbie as the biomechanics expert, we know that a undergraduate student with a VCR is somehow getting radians of elite sprinters using plastic wrap and a dry erase marker and a protractor. This rough estimate is very dangerous since the data used is then extrapolated into a theory that has great influence in the sprint community.

Is the top end activity(max speed) spinal and bypasses the brain-therefore eliminating and conscious/subconscious efforts to ensure proper mechanics then we are in a tough situation.

First, I will have to reducing my coaching fees from 8 dollars an hour to 6 dollars an hour since roughly 30% of the race is near reflexive.

Second, the technique is preprogrammed and if it is not perfect, we can not change it! Then, I will have to change the Boston Globe/Tampa Tribune tryout advertisement (Gerard Mach) and screen athletes with great top end speed mechanics.

Do you think slamming the foot and leg down harder on touchdown (via a greater acceleration) is going to increase stride length and speed?

Can anyone post the links to the 2000 US Olympic trials tests with the shoe pressure plates in MJ's shoes? I seem to remember that they showed that he was striking the ground with a much higher force than any of the other athletes. Some one mentioned the same thing about Frankie in an earlier post.

Dan if the foot is traveling backward at a higher speed breaking forces will be lessened and power can be applied earlier to the ground. has gone into detail about this in previous posts. It's quite simple really, even I with my simple and entertaining logic can understand it.

Unfortunately it's not that simple. How can one accelerate the swing leg without affecting swing time? This confuses me? We know from the study (again forget about the elastic component) that swing times do not vary enough for the enormous differences between fast and slow runners.

You are correct; Michael Johnson is putting more force into the ground! That's what we have been saying.

Do you think slamming the foot and leg down harder on touchdown (via a greater acceleration) is going to increase stride length and speed?

So greater force down on the track will not speed.

You are correct; Michael Johnson is putting more force into the ground!

Dan writes again...

This confuses me?

I think you confuse you!

MJ does not run as fast (max velocity) as any finalist in WC or OG. So they are putting more force on the track buddy! Harvard and youself made an obvious mistake. Maybe Bob Costas has been doing the guest lectures in the Walter Room over in Cambridge!

I am not arguing force here Dan, just mechanical differences in technique at high speeds.

Again, you refuse to address the measurements aspects of the study since it PATHETIC how it was measured. Dan please post in critical detail the way they got the swing times from the NBC tape. Do it. We are all waiting. After posting the details, please read it out loud. If you do not laugh, then you don't understand basic science.

Reading the study (again)

These are Quotes by the way

1.The regression equation for our 33 subjects indicated that stride frequency was 1.16 times greater for a runner with a top speed of 11.1 vs 6.2.

2.The Olympic athletes were not included in the statistical results, just for interest!

3.Minimum swing times for our regression relationship were only 8% or three-hundreths of a second shorter for a runner with a top speed of 11.1 vs 6.2m/s

4.As an illustration of the result, our slowest subject was able to reposition her leg for her next step nearly as rapidly as the fastest 100-m sprinter (0.344 vs 0.320)

The problem with the science is not what they found, but what they interpreted. **The difference between 0.344 and 0.320 is a small difference, when you look at the numbers.** Everyone will agree.
But the problem here is that swing time values are always small numbers. Very small numbers. **When comparing numbers that are inherently small (or a skewed dataset of any sort), normalisation is required to have a bias free comparison.** Since they do not give us all of their data, I will take a shot at this to see what happens.

Stick with me here...

For example, if you were looking at the difference between 0.5 and 0.55, you would say (and could prove) that statistically there is not real difference. But, if I were to tell you that the maximum possible value was 1 and the minimum was 0.4, the data would suddenly change.

Through a simple normalisation equation, (value -min)/(max-min), the differences between the values become apparent, and a real result can be seen.

In the example above, a 90% (0.5/0.55) correlation turns into a 66% correlation.

Now, let's do a mind experiment with their data.

In table 2, they give averaged swing times over 5 subjects.
Let us take 0 degrees as the value, inclined as the minimum, and declined as the maximum.
0 = 0.35, inc = 0.33, declined = 0.359
Turns out the the 100 m sprinter has a swing time at 0 degrees of 0.320 from their own data.
So, if we apply the same % change for inclined and declined as the subjects had:
0 degrees = 0.320 inclined = 0.3 declined = 0.33

If we want to combine the two datasets, we must normalize them.

Max = 0.359, min = 0.3.

Now how does our data look?
The average swing time for normal athletes turns into 0.85
The average swing time for the Olympic athletes turns into 0.34.

Go ahead, work it out for yourself. This is the correct way to normalize a dataset.

Again, this is just an estimate, but there is a big difference if you normalize the dataset to take out bias.

Before, the correlation as seen in the study was 92 %, or an 8% difference. Now, with a normalized data set, that value becomes 40%, or a 60% difference. And this is with some crude assumptions. I suspect that this would change even more if real data was collected.

Ok everyone is bored, I know, but you have to remember, that when comparing data from inherently small data populations, normalization must occur to compare the data sets without bias. Go read any statistics book.

And that's on ONE point; if you want I can go on.

Actually,
Why doesn't someone who knows ask for the whole data set. I will give it to my statistics guru who will rigorously analyze it.

It would sure be interesting, but I dont think that will happen, I will be ignored again

You are exactly right.

Actually if you compare the whole situation to the HIT vs Periodisation thing, it seems to be the same. On one hand, you have the most of the world saying one thing, and then you have the HIT guys reaching world beating decisions off one piece of badly designed research.

The comparisons are uncanny actually; I wonder who bryzcki's counterpart is?

Let's not get carried away. The Harvard study at least makes the valid point about the negative impact of trying to influence the action during ground contact. Bryzcki and the HIT crowd have NO redeeming qualities whatever! I will post an article that T-Mag refused to run on this very subject this week.

I agree, they do show some very interesting data, but I think some of they jumped to some of their conclusions based on their data.

Obviously, someone needs to repeat and extend this research, with some changes in the stucture, to finally determine the answers.

I believe myself that the harder you hit the faster you go, as that makes sense. I am not sure if maximal velocity sprinting is completely passive, but I am sure it is somewhat as I have seen the phenomenon in myself.

From all the discussion I have seen, everyone agrees that to go faster you must put yourself into a better position to apply force, and have an RFD potential that is very high, but based on one study, you can't dismiss completely the ideas that have worked for generations.

Maybe 2 well designed studies, but heck, not one.

Another thing, Mel Siff who we all know is a biomechanics expert has problems with the study. He stated that "even if everything that happens on the ground is like a passive spring, what happens before it cannot be, so instead of being a passive spring model, it should be an active spring model".

Wouldn't it make sense that the body would use all available means to go fast, not just one?

Instead of arguing about who is right, those of you that have access to the raw experimental results could do me the favour of getting them, and I will see what I can do from there.

I have no problem with this. This is how we get beter! We do agree on most everything. I will try on my part to get what you asked for.

Do you think slamming the foot and leg down harder on touchdown (via a greater acceleration) is going to increase stride length and speed?

Yes, however increased backward/downward acceleration of the swing leg requires greater eccentric leg strength on touchdown. This prevents the COM from droping verticaly on touchdown.

Longer step length and increased horizontal velocity of the COM is achieved from faster leg acceleration by

1) closer breaking point
2) faster pre-stretch increases power output
3) increased rebound from the track
etc!

How can one accelerate the swing leg without affecting swing time?

Increased stride length.

As well as increased extension. Which raises the matterof wether the un-trained treadmill runners were achieving a full triple extension. If they were darting its no surprise that they were achieving swing times similar to those of elite athletes.

Does anyone else think it matters if techniques were not similar - ie knee height and foot clearance...?

Yes, the distance travelled by the recovery leg could be markedly different.

You are still misinterpreting the study. Swing time is swing time i dont care how you cut it.

Time and distance are the variables that we work with from day to day.

Using your logic, everyone runs 100m, so 100m is 100m, I don't care how you cut it. The differentiator here is time, not distance.

Looking at the swing time, everyone (roughly) takes the same amount of time to swing their leg, so swing time is swing time. However, the path of the swing leg may be markedly different. The differentiator here is distance, not time.

Keeping in mind that speed involves time **and** distance...

What if we analysed swing ***speed*** instead of swing time? What would we see then and how would this affect our interpretation of the study?

Morsels for cognition?

Swing speed would have a far greater relevance that swing time in determining what an athlete is doing at top speed, due to the different angles at the hips achieved by different sprinters. Swing time is interesting but ultimately useless for reasons pointed out earlier, as it provides very misleading data which does not take into many variables which can occur in a sprint stride.

Charlie mentions in his manual, that with every stride, Bens foot would accellerate up to 80kmph to zero and back up to 80kmph. Now if he has the same swing time as an untrained female athlete on a tread mill who's foot is accellerating to 30kmph, tell me which measurement is more important to the coach?

With your last answer Dan all you are showing now is that you've invested too much in your own arguement to accept any body elses logic or findings as a possibility.

My, my, my Daniel F, you do need to relax a little, learn to spell/type correctly and ease off on that fanaticism – it became especially uncool a bit over a year and ago, you know.

Now listen, we are trying to have a constructive discussion about swinging and a lot of us want to learn. And Dan, I think it would help for you to realize the truth in the old saying: “There’s a Harvard guy on the wrong side of every question.” You just can’t believe all the stuff those eggheads write and go around digging your heels in without giving us something more to go on. Really, one more outburst of the swing time obstinacy and I think Charlie is going to be forced to give you a time out. Of course, this would genuinely hurt all of us. We know you’re a good guy, however carried away you sometimes become.

So please, less zeal on that swing stuff gospel according to John Harvard and give us some beef to go on as to why it’s all in swing time and not in the swing acceleration. It’s not inconsequential. I know two guys who have more riding on this than their long shots for the Super Bowl.

 is at least giving us some biomechanics facts to go on. Oh, btw , I’m not sure I understand the whole swing accelerate more, get more ground force and do a longer stride thing? Is that right? Slapping hard as the foot comes down puts more force on the ground and this results in a longer stride? Please clarify and explain how.

Reply Simpleton

RT 0.104
Dist. / Time / interval T / step length / st. frequency
010m - 01.82 1.72 - 1.26 - 4.62
020m - 02.88 1.06 - 1.92 - 4.91
030m - 03.81 0.93 - 2.02 - 5.32
040m - 04.68 0.87 - 2.13 - 5.40
050m - 05.52 0.84 - 2.20 - 5.42
060m - 06.35 0.83 - 2.27 - 5.30
070m - 07.19 0.84 - 2.30 - 5.18
080m - 08.04 0.85 - 2.30 - 5.12
090m - 08.89 0.85 - 2.30 - 5.12
100m - 09.78 0.89 - 2.35 - 4.78
(110m - 10.82 1.04 - 2.41 - 3.99)

From the above data, as speed increases stride length also increases, the reason for this is that the more force you deliever to the ground the further and faster you travel.

, "btw, I'm not sure I understand the whole swing accelerate more, get more ground force and do a longer stride thing? Is that right? Slapping hard as the foot comes down puts more force on the ground and this results in a longer stride? Please clarify and explain how."

By Newton's third law, If an object exerts a force on a body, the body exerts an equal and opposite force back.

Strike the track with more down/backward force and you will rebound further and faster down the track.

Hard to argue that one. "Simple" physics!

Simple for the learned.

I remember being tricked by Newtons third law in the 8th grade when my science teacher asked the class if a boat had a wind propeller with no sail would this result in forward displacement.

All of the class said yes, when the opposite was the case.

Dear CF audience, (and too I think),

Since I'm interested in running, always wanted to be faster, and I do know just a little bit about physics from picking it up here and there, I thought I might contribute a thought or two to the posts on this interesting topic.

I've agreed with you all along that more ground force seems like a logical way to take longer strides and run faster. However, I have had some trouble understanding how swing leg acceleration you propose would result in the greater ground forces you describe. After reading your last post and thinking about it some, it's making less and less sense to me.

If I have understood your thoughts correctly, you have indicated that the leg should be accelerated rapidly and backward against the ground at the very end of the leg swing so that the foot can push downward and backward against the ground at first contact. And, that if a runner does this, ground forces will be increased and strides will be longer as a result.

Well, first I thought about running in sand. If I go as fast as I can, I know that the sand only comes flying out behind me at the very end of the contact phase. This happens as my leg moves behind

my body and as I toe off before going airborne. In contrast, at first touchdown the sand gets pushed forward when my foot first hits the sand (or ground). This would be consistent with my foot pushing forward against the sand, rather than backward, at the beginning of contact as the foot comes down.

As I thought about it a little more, I remembered that Loren Seagrave even says in his speed dynamics video that what happens when the foot first comes down is that the runner slows down a little from the way the foot hits. I think he calls it a “braking” force.

My curiosity moved me to see if there are measurements of how much force comes down and what direction exactly the foot pushes on the ground on touchdown. I did this even though I was pretty sure I believed Loren. Sure enough, a lot of people measure these forces. It seems that a bunch of them do it a lot of the time. On my computer I was able to get papers that show just what these forces are. It turns out that Loren was right. Everybody pushes like a brake when their foot first comes down into the ground.

Every last measurement I could find. And it didn’t matter if they were running fast or slow (I listed the papers that show this below if you or others want to read them too - they all show the same thing). Every time, in the first third of the contact phase, the horizontal force is negative. The scientists say this makes runners slow down at the beginning of contact and that they only speed up again at the end of contact when the leg and foot are behind the torso. In this late contact position, the leg is able to propel the body forward by pushing backward against the ground (aka horizontal force becomes positive, or if you’re on sand, the sand goes flying out behind you. I think Loren calls this a propulsive force or at least the scientists do). And it seems pretty clear to the scientists at least (and I think Loren too) that everyone runs this way.

I think this means that your idea of accelerating the leg really fast into the ground to get lots of propulsive force on touchdown really can’t be quite right. In fact, it seems like slamming the leg down harder on first contact would only increase the braking force and slow the runner down more. And this would make the stride shorter. It also seems like coaches shouldn’t tell athletes to do this if it’s going to make them slower.

Your 100 meter data looks like it is from a good sprinter. The stride lengths are impressive. However, I noticed there are no numbers for force. I'm also having a hard time understanding how you can conclude that ground force is what’s responsible for the longer strides if you don’t know what the ground force is?

Sincerely,

Rocketman

ps just a few of the good ones. There are lots more, all the same pattern.

Munro, C.F., D.I. Miller, and A.J. Fuglevand. Ground reaction forces in running: a reexamination. Journal of Biomechanics. 20: 147-155, 1987.

Chang, Y. and R. Kram. Metabolic cost of generating horizontal force during human running. Journal of Applied Physiology, 86: 1657-1662, 1999.

Cavagna, G.A., F.P. Sabiene, and R. Margaria, Mechanical work in running. Journal of Applied Physiology. 19: 249-256, 1964.

Thank-you for your post. As a sprinter, I fully understand what Charlie, , , and the rest of the Franciscan coaches are talking about when they speak of slamming down upon first contact. They are completely right. The more force applied at first contact, the less braking that there is. What you are saying doens't stand to reason. A good example would be that of a rubber ball.

Decrease the force of the ball upon first contact...and it will **decrease** the height that the ball travels thereafter. **Increase** the force by throwing the ball down or slamming it down and the ball will increase in height.

The more I focus on slamming my foot into the ground the less ground contact time there is and the greater my hip height. So...the important point to make here is that increasing first contact force.....decreases ground contact time and increases hip height. The backwards pawing motion that Seagraves speaks of will cause the hip to sink, and the ground contact time to be prolonged.

I am a mere lay coach/sprinter and have no background even in elementary physics. However, as a sprinter, I can say that this issue alone has increased my perfomance output dramatically. I will have to wait until the outdoor season hits before the rest of the world knows it as well.

Looking at all of the posts in the last few months, it seems that we may be doing more harm then good in technique and coaches. My role as a coach is to allow the athlete to improve by tweaking (small refinements in mechanics)of the athlete. The more change you can create from less talking the more effective you are.

Who is to say that the body is not programmed to run fast? What we need to look at his the highest velocities from sprinters and what type of movements do they do? Are there general qualities that seem to exist at top speeds? What did the coaches do to achieve this by way of cues and instruction? This is where we should start. Who cares if they stumbled upon something from luck, they took the time to experiment and record what worked and what did not.

"If you want to increase your success you better double your failure rate..."

So after we get those near ideal values we then can try to explain why they work in simple physicis. Also, we want to know what methods were used to create such a beautiful motion. I think Jonty Skinner was right when he admitted he became a slave to his lactate analyzer. I am so confused why technique is so complicated. Nature or God spent some time or deep thought making sure that the body had the required mechanisms to do the right things.

The downward movement at full speed is a paradox. Although the emphasis of the athlete is only on stepping down, if he is sufficiently powerful, he will be higher over the ground. From a greater height, the leg has time to begin swinging backwards more, so that footstrike occurs closer to, but still slightly ahead of the CM. Although the emphasis is on a downward movement, and the extremely short ground contact time does not allow for this to be sensed, the actual landing vector becomes more backwards and less downwards as performances rise. This is a fundamental flaw in the Harvard study. They seem to have worked backwards from an assumption that Michael Johnson was the fastest runer of the top people reviewed, such as Mo Greene and Frankie Fredericks. In fact, these athletes showed HIGHER peak velocities in races, and this is precisely why they generated lower vertical forces than Michael into the track (though ALL forces remain terrifically high). This is certainly NOT to suggest that anyone try to generate "negative foot speed" before landing. Anyone generating such a sensation would be landing farther ahead of the CM and would have to have a lower hip position, and therefore lower speed.

I think this means that your idea of accelerating the leg really fast into the ground to get lots of propulsive force on touchdown really can't be quite right. In fact, it seems like slamming the leg down harder on first contact would only increase the braking force and slow the runner down more. And this would make the stride shorter. It also seems like coaches shouldn't tell athletes to do this if it's going to make them slower

Rocketman, faster backward/downward acceleration of the swing leg changes the breaking point, it brings it closer to the COM, which results in earlier propulsive forces and less breaking forces.

The breaking forces you talk about is determined by the acceleration of swing.

As the COM moves horizontaly faster, the swing leg is required to accelerate faster in order minimise breaking forces.

Thank you for your helpful replies. I have found the posts on this topic to be interesting and informative. By my reading, it seems that everyone speaks loudly and with one voice that the single most important mechanical factor for determining how fast a sprinter can go is the force applied to the ground. And this conclusion seems to be pretty clear and correct to me from reading the recent sprinting paper that these posts have referred to many times, as well as some others that showed similar numbers and patterns.

The difficulty seems to be in the proper coaching approach for getting an athlete to those big forces. It seems to me, from what I have read here, that the critical question is: Is the best way to get sprinters to apply big forces through coaching leg swing mechanics or not?

Charlie, your swing leg acceleration comments helped me understand this better. I think I have correctly understood that you all believe that coaching a fast retraction toward the ground helps speed by affecting the ground force; specifically by decreasing the braking forces.

After thinking about this some more, I realized why the answer to this follow-up question on how to get the big ground forces is less clear. I did find lots of studies that showed that runners do run faster with using the swing leg accelerations toward the ground that you all believe are important. The faster people run, the more rapidly they swing their legs backward and down toward the ground. This is very consistent in the different studies, so I have to think that you are all correct in believing that this movement is important for speed. I certainly believe this is true from what I read.

The hard part is linking this movement to the ground force in the way that all three of you have proposed. When I looked at the ground forces, particularly the braking forces when the legs of runners hit the ground at faster speeds, what I found was that the faster runners go, the bigger these braking forces get. So, at the same time swing acceleration increases, the braking forces also increase. This is true whether it's a single runner speeding up (ref 1), one runner running at different constant speeds (ref 2), or different runners running at or near their fastest speeds (ref 1).

Does this mean that braking forces might somehow be important or necessary for running fast? This idea seems pretty wacky, but maybe the braking helps muscles and tendons generate bigger forces at the beginning of the ground contact that can be harnessed or transferred to the push-off later on? Alternatively, maybe big braking forces do hinder speed and they are just unavoidable for the really fast runners? And, if they are unavoidable, you may all be fully correct that the last swing acceleration toward the ground helps speed in just the way you propose. I don't claim to know the right answer. I really couldn't figure it out from the information available.

But, I did find 's comments on this to be insightful and intriguing. If I understood correctly, he has raised the possibility that the leg swing retraction might not need to be coached. Perhaps this happens naturally as sprinters improve and are able to apply the greater ground forces necessary to sprint faster. , perhaps you could let the group know if I interpreted your thoughts correctly, and maybe even elaborate on this? And Charlie, perhaps you could comment on whether coaches should leave the Evelyn Ashford's of the world alone or not (aka if it's not broke don't fix it – do you consider this good guidance for coaches)?

Also, Charlie, your last post hinted that you might have information on ground forces for the world's best sprinters that would help with this question:

"This is a fundamental flaw in the Harvard study. They seem to have worked backwards from an

assumption that Michael Johnson was the fastest runer of the top people reviewed, such as Mo Greene and Frankie Fredericks. In fact, these athletes showed HIGHER peak velocities in races, and this is precisely why they generated lower vertical forces than Michael into the track (though ALL forces remain terrifically high)."

I'm not sure which Harvard study you referred to because there have been a lot of them. But, I am pretty sure it couldn't be the recent one on sprint mechanics (ref 3). That paper could not have assumed anything about Michael Johnson because he was not included in the study. Also, there was no force data measured or assumed for any of the Olympic sprinters that were included - just swing times and speeds for three of them on one graph. So, perhaps you have ground force information on the sprinters you mentioned from a different paper or source? If this information is available and not somehow proprietary (I couldn't find it, either in a science paper or on the internet), perhaps you could share this with the group? In my opinion, this information would potentially be very helpful on the leg swing-ground force question. This accompanied by your thoughts on the implications of the force information based on your experiences with the ultra fast would certainly be welcome by me, and everyone else here I'm sure. Valuable guidance on this important coaching issue could be gained.

ps

1) Cavagna, G.C. Mechanics of sprint running. Journal of Physiology, 217: 709-721, 1971.

2) Kram, R. Muscular force or work: what determines the metabolic cost of running? Exercise ad Sport Science Reviews, 28: 138-143, 2000.

3) Weyand, PG., D.B. Sternlight, M.J. Bellizzi and S. Wright. Faster top running speeds are achieved with greater ground forces not more rapid leg movements. Journal of Applied Physiology, 89: 1991-2000, 2000.

But, I did find comments on this to be insightful and intriguing. If I understood correctly, he has raised the possibility that the leg swing retraction might not need to be coached. Perhaps this happens naturally as sprinters improve and are able to apply the greater ground forces necessary to sprint faster. , perhaps you could let the group know if I interpreted your thoughts correctly, and maybe even elaborate on this?

I am surprised you found it insightful. Since my brain was high on crack I am excited that some of it made sense, or was entertaining! Seriously mechanics are important and *can be improved from coaching by direct means or indirect means.*

The key to coaching technique is to ensure all of the other variables are in place to make sure what you watching is indeed an error and not lack of therapy, fatigue, or strength imbalance.

From that, my philosophy is allow enough flexiblity in style and idiosyncracies but still have set parameters in techinque to make sure that someone doesn't go against Newton and what the elite sprinters are doing.

Investigating all of the physiological mechanisms we should make sure we are not trying to coach a response that nature has provided us. I feel that the body does a fantastic job of going on autopilot, but since we want super fine pricision we should be carefull to make sure that technique is at it's maximum. Trying to do something that the body is allready doing will cause an artifical (read wrong) mechanical change.

Perhaps Charlie could share what errors are actual perception errors of the athlete and not preparation errors.

I think you raise a great point. a lot of coaches today try to change running technique too much. Someone might have an unorthodox style, but if it isn't broke don't fix it. can't this lead to injuries down the road by changing someone's natural running style?

Unorthodox? What are the elements? You would be surprised what general qualities are done similar to others. The key is to take a look at what should be tweaked or refined to help performance. Many times a lazy coach will not want to takle an error because he knows the effort to change something for the better. It is easy enough to leave something minor alone but really it is a path to failure. Like posture, some things sould be let alone, but if the differences in the norm are way off, this could spell injury if not worked on.

Rocketman writes

"So, at the same time swing acceleration increases, the braking forces also increase. This is true whether it's a single runner speeding up (ref 1), one runner running at different constant speeds (ref 2), or different runners running at or near their fastest speeds (ref 1).

Does this mean that braking forces might somehow be important or necessary for running fast? This idea seems pretty wacky, but maybe the braking helps muscles and tendons generate bigger forces at the beginning of the ground contact that can be harnessed or transferred to the push-off later on? Alternatively, maybe big braking forces do hinder speed and they are just unavoidable for the really fast runners"

Rocketman, the increased breaking forces at increased speed is a result of human contraints on the acceleration of the swing leg.

Wild turkeys for instance have no breaking forces on touchdown since the swing leg is able to accelerate fast enough so that touchdown is made directly under and behind the COM. Unfortunately humans at max velocity cannot strike behind or directly underneath the COM, if they could i have no doubt that the World Record would be well below 9.78. Max velocity could be sustained for considerably longer as result of increased efficency.

In terms of allowing tendons and muscles to generate more force due to larger breaking forces. This is true as speed of contraction is reduced the force capacity for muscle tissue increases. However this increased force capacity comes at a cost of reduced speed longer contact time.

The other price of larger breaking forces is the increased risk of injury due to repetitive eccentric loading.

Keep your posts coming to find them rather interesting?

Rocketman, the increased breaking forces at increased speed is a result of human contraints on the acceleration of the swing leg.

Is this the limit? In twenty years will I be able to coach someone with ground contacts directly under or behind their COM? Then the question is are the constraints a result of something lacking in the athlete or program, or a protective mechanism of the body? Or is it the brain knowing that a change of placements (read closer to the COM) will decrease performance from lack of RFD? Perhaps mechancis will be ideal for the available power of each athlete. Carl Lewis runs like Carl Lewis because of limb lengths and specific power....

The Meleagris Pollogavo is a biped able to travel at speeds above 20 miles per hour. While I will not go into biomechanics of the gait cycle, since the key is to see what other animals morphology can help coaches, not prove my manhood by busting out needo information. It is not a good example of mechancis since the weight of the bird makes extrapolating running mechanics very rough because they don not have the same power/weight ratio as humans. I know they put a lot

of hormones into the things after seeing a rather huge one during thanksgiving, but let's be real on comparing apples to apples. Take a look at the morphological differences in the design of the legs, that my friend is the real answer.

Maybe we should have an operation to reverse our knee joints (like the turkey) to improve where our feet land?

Or is it the brain knowing that a change of placements (read closer to the COM) will decrease performance from lack of RFD?

Striking further infront of the COM, increases force capacity but doenst increase rate of force development. Force is increased by a longer contact time & slower shortening velocity of muscle contraction.

There is a trade off between increased contact time & larger force development. This phenomenon is not exculsive to the support phase of sprinting.

Should swimmers bend the knee further on turns allowing for increased force development whilst increasing the time and the distance the COM should travel? Should blocks spacing be elongated allowing for larger force development or bunched allowing for higher initial velocity?

Obviously the tradeoff depends on individual strength levels, however the concept of increasing breaking forces or contact time to increase power on toeoff is contrary to RFD in sprinting.

Wild Turkey Theory,

, name a animal with the same power/weight ratio as a humans, similar morphological characteristics and gait patterns?

name a animal with the same power/weight ratio as a humans, similar morphological characteristics and gait patterns?

Why? Are we doing all of the basics first? When we are analyzing kangaroos on treadmills, we as coaches must be out of ideas of how to get our 9.5 sprinters faster.

The problem is- you can't entice animals onto the lab treadmill with the promise of course credits.

Warm-up and Dynamic Flexibility

Main Points:
Static stretching is harmful to strength levels right before running. The time before the negative effects go away is debateable.
Everybody seemed to like: jogging a little, bodyweight exercises, drills, and dynamic stretching before sprinting.

I went to the Level 2 school in Purdue, Coach Andy from Syracuse Univerisy showed some nice prep work for getting ready to train. Perhaps people could share one or two very specific ideas to get people ready for training. Perhaps Kebba could lead this topic, since he puts the details into his daily workouts.

1) Prepare the knee joint with various stress patterns and ranges.This has helped with preventing overuse injuries.

2) Do many upperbody stretches and movements to get the shoulder loose.

As for dynamic flexibility, hurdle work can be done during tempo days. Don't do too much "under hurdle work" during the comp phase, since it will add too much stress to the body, and passive work should replace it.

Re Warm up
What time frame are you using for the warm-up. What order of exercises/stretches. How long for each stretching componant and when do you use dynamic vs static stretches?

I never have my athletes do a static stretch 20 minutes or less before speed sessions. The research on static stretches has confused many experts in Track (professional speakers who never done anything in coaching but have systems named after them). Yes static work will impair max strength...but this is only for a short time. I prefere to do most of my static work after tempo days, and do static work on trouble spots before and after practice.

Dynamic work is usually blended throughout the warm-up and done on tempo days as well. We decrease,change exercises/order, as we go from the fall-winter-outdoor season. We simply take a hurdle or two every few weeks and decrease the sets.

RE Static
Do you not like static stretches after speed? If so why?

In the regeneration {stretching and massage} thread Charlie writes "**How about post- workout stretching as a recovery enhancer? Nutrient transfer and waste product removal are normalized when the muscles return to their pre-workout length (improved blood flow). Restoring the muscles to their normal length by stretching immediately after a workout can speed up recovery by 4hrs (the time it takes for the muscles to lengthen on their own).**
"

I agree, it would be nice if you start the regeneration process ASAP. But, when I stretch the athletes myself they start going into spasm and start shaking (after speed). Even after a good warm-down (a essential part of the recovery process) they do this. I have had sucess with PNF, but I make Waldemar look huge, so I have to use more yoga like movements and static done later. We also have a fire ant problem, so the track/grass is hard. When I get a table this might change. Anyone else?

In the regeneration {stretching and massage} thread Charlie writes "**How about post- workout stretching as a recovery enhancer? Nutrient transfer and waste product removal are normalized when the muscles return to their pre-workout length (improved blood flow). Restoring the muscles to their normal length by stretching immediately after a workout can speed up recovery by 4hrs (the time it takes for the muscles to lengthen on their own).** "

I agree, it would be nice if you start the regeneration process ASAP. But, when I stretch the athletes myself they start going into spasm and start shaking(after speed). Even after a good warm-down (a essential part of the recovery process) they do this. I have had sucess with PNF, but I make Waldemar look huge, so I have to use more yoga like movements and static done later. We also have a fire ant problem, so the track/grass is hard. When I get a table this might change. Anyone else?

We currently do parts of various dynamic warm-ups which feature quite a few GPP bodyweight strengthening exercises as well as various drills. Do others perform bodyweight strength movements in their warm-ups also?

I wrote "**I never have my athletes do a static stretch 20 minutes or less before speed sessions**."

We do static work before sprints, just after the first part of the warm-up. The tissues are nice and soft and it helps before a sprint session. Then we warm-up some more. The reason we warm-up so long is for weather and my fear of injuries.

There are athletes that run in the golden league that stretch cold, do three strides of 100m, and then sprint! Habits....

Try doing this Joe: Do a lot of leg static stretching (15 minutes or more) then sprint 1 minute after. You have electronic timing, so see if your 30m time is different.

Hey guys what does the forum think about the **isotonic stretching** methods? (hold 2-3 seconds for 10 sets). I do this before races and sprinting workouts etc.

It keeps my muscles loose and limber without over-stretching.

(1) How soon do you sprint after your stretches? **(2)** What other methods have you used? **(3)** What range of motion do you have for your major joints?

You say to do 15 minutes of static stretching before a session, and then 1 minute later do a sprint...

What do you think will happen? I am scared that I will get injured by doing this, I have never been one to stretch before I play any sport... I would be pretty worried..

What do you think?

Your times will get slower. Don't worry about injury since a slower run will decrease the change of a pulled muscle.

This? Does everyone agree?

I thought that this stretching before a workout inhibits the muscles capabilities for power? Also that stretching inhibits muscles?

But, I guess if you look at janda's work, he says that stretching a hypertonic muscle inhibits it...

this probably does not apply to a normal muscle...

What is the mechanism for running faster?

Can you post a series that I can follow? I am not sure what type/amount of stretching you want me to perform?

I personally don't like my athletes to static stretch pre-comp or as a warm-up to train. Some research indicates that it can take up to slightly over an hour before muscles re-gain their slack/tension. Vertical jump study at Ohio State showed a significant decrease in jump results for those who performed warm-up and stretch vs. those who simply warmed up. I really believe that the golgi tendon organ becomes numb sometimes longer than just temporarily preventing or delaying stretch reflex. The delayed stretch reflex can result in timing/coordination problems. This coming from a study at Appalachian State University conducted by Dr. Harold O'Bryant. I personally have felt a decrement in performance from prior-to-training stretching. Though the muscles need to be warm, it seem to me that a certain degree of tension/stiffness is actually helpful to the sprinter.

Let me add that in 9 years of h.s. coaching-many kids-we have never had a ham pull so in terms of injury prevention I feel it(static before comp. or training) contributes nothing. Now, tomorrow at practice, we will probably have three or four severe pulls because I just made that comment

I agree with nonendurance and Pioneer. I have been taught that the "excitability"/or strength of the nerve impulse to the muscle is reduced. There was a reference to this in the "Science of Flexibilty" by Alter I think. To me it makes no sense to stretch out a muscle prior to a dynamic activity when that muscle will never be put in that position for 10 - 30 seconds and will be contracting and lenghtening at high velocities. Maybe I'm wrong. Any input guys? Here's another one to think about. What about those "experts" who state that if you pull a hammy or something, it's many times attributed because you didn't warm up/stretch good enough. If that is so, then why does, for example, the other hamstring not become injured. The athlete warms up the same using both legs...how come just one then?

(1)I was not clear up. A drop in performance is and increase in time. I truncated my sentance, sorry. **(2)** I also was stating that because you run slower, your more likely not to get injured! If you get a hamstring pull running a 12.1, that's lame.

I thought Joe did not agree with static stretches and placement, I was thinking he did it before he sprinted! I misread his post.

Now that I went over that, lets talk about speed and static work.

I told Joe to sprint after intense static stretches. There has been numerous books about loss of power from static stretches. I wanted him to see (through electronic timing) his times get slower.I stil thought he was pro static before sprints so I wanted to *increase* the loss of power.

I never have my athletes do a static stretch 20 minutes or less before speed sessions.

Everyone who does static stretches, does it before sprint work. Ususally from the night before! Get it? How much time is the detail? What does the research say? Don't stretch right before? A few minutes? One hour. HOW MUCH?

This makes a track coach the zenith of coaching. Pure science and artistry. Manipulating the varibles with real details.

I stretch early morning and sometimes at nights as well, so I am not neglecting this work.

Joe, FLY30 will tell you that in the Science of Flexibility by Michael Alter page 152. cites research on Diurnal Rhythm of Flexibilty. Right after sleep you are tight! Just an increase in blood flow from light exercise will lengthen your tissues. Maybe you stretch then because you are at your tightest! You can arge both ways with science. I prefer to stretch at night. Who really knows.

Lets talk about power...

There has been many tests on static work before a vertical jump and other tests of power. Lets look at them. In Medical Science in Sport and Exercise, Kokkonen and Nelson showed that peak 1 RM force decreased from both static and ballistic stretching. Sale one year later (1997) goes on further and gives values with time and force, in relation to streching. In the ASCM Annual meeting in 1998 in Florida, Kinzey and Clark show that stretching didn't effect maximal voluntary contractions. The pissed off Nelson because they presented conflicting research. Whats up? The bulk of the rearch including Rod Corn from California, that static work decreases power...when done right before(less then 10 minutes).

Ok, so how about some protocols for pre-sprint (competition and training would differ?) warm up?

Does anyone here have any, and if not, where could I find any?

Anything "wrong" or sub-optimal about my warm up?

Nothing's better then running and skipping for sprint warm-ups. I like the fact you have some basic strength movements involved with your warm-up. From a practical standpoint, combining many sub-units will make your program more effecient.

Stop by the US and train with us for a bit. I can't go too much into what we do since I am not very articulate, and actions speak louder then words in technique and mechanics.

I suggest more drills and running with various dynamic work. Not only do you get some technique in, you warm-up too.

On speed days we usually have the athletes jog 1 or 2 laps. Next they do general dynamic warm up drills. These drills are not what I consider "sprint specific". They include exercises such as side slides, carioca, hip/shoulder rotations, easy skips, etc.

The athletes then get into more specific/explosive drills such as power skips, squat jumps, straight leg toe touches, power lunges, etc. Finally, A's, B's, single leg B's runs, etc and 3 or 4 accelerations(maybe 70%, 70%, 80%, and 90%.

Though, I have debated with myself about how much is really needed to get the athlete ready to sprint at 95-100% in practice or at the meet? I think so many coaches just take their old coaches or the "experts" wisdom on how to warm up, train, etc. and never question WHY?

I won't repeat what you guys just said/wrote but the warm-up ideas cited by Fly 30, , and Noendurance are very much the type of warm-up activities that I like my athletes to do. Also important to add that in addition to athletes having to wait at big meets for awhile after warm-ups the additional time between warm-ups and the competition allows for the body to "recover" from the slight fatigue incurred from the warm-up. I like a gap between 15-20 minutes depending upon the weather, condition of the athlete, and which event in the day it is. This is true if you believe in the theory of supercompensation that occurs within a single day and not just one day to the next such as in a microcycle-I do. Of course I'm talking specifically about competitions and not training.

"**Though, I have debated with myself about how much is really needed to get the athlete ready to sprint at 95-100% in practice or at the meet**?"

Great question....Did hear that? HOW MUCH. A value question. While I can't say exactly, since quantification of many variables is hard. I think the times in the practice will determine this "optimal" number. I feel that their should be a gradual improvent each run. If it is "jumpy"(were the first run is flat and then the second is significantly faster) then perhaps the warm-up was not intense enough.

As for time, I feel that the actual warm-ups isn't that much work, it's the effects that take longer to reap the benefits of.

Experiment.

Re Rehearsal
How much does the warm-up have to do with rehearsal and how much is simply heating the organism, raising the temp in the brain, triggering the release of a chemical cascade opening additional neural pathways etc.

Well, a warm up would perform certain tasks.
A. Increase BloodFlow
B. Increase Awareness/Arousal
C. Prepare the body for the stress at hand

I think Charlies term - rehearsal - would be the key here, having a reproducible warm up which you KNOW helps you, and repeating it. Since an organism learns by finding patterns in noise, our brain would be able to find a pattern in our warmup - and know that it is going to be racing soon. This is important, as the body will prepare. This is what we want.

How quick should a warm up be?
How many exercises?
Should there be any mild plyometric type exercises included?
How do we measure fatigue during warm up, and does it have a determental effect on performance?
Should there be any weighted work?
How long should we rest before training/competing?
Do drills need to be incldued?

I realize that this is a track thread, but perhaps Chris could give us insight since he is experienced in explosive performance. What do your lifters do? How can that information influence what we do for track work? Why can't we have a side shot of suzy's glute medius? What did you do Charlie?

Re Suzy
Sorry, I was trying to keep you guys concentrated on the discussion. Otherwise you'd have as much trouble as I do. She does illustrate the old engineering addage- Looks right. Flies right! As soon as I get some time I'm going to set up a photo library on the site. She can have a place of honor there.

Trying to find the "ideal" warm-up is like trying to find the ideal training program. As with the rest of the training, I'm worried about making the warm-up too complicated. The purpose is to prepare the body for training, don't overthink it.

Furthermore, the warm-up needs to be tailored to each athlete. For example, some might require more flexibility work, some less, some hardly any. Some athletes respond well to dynamic stretching, others static, and others might do best with a combination. The same applies to drills and warm-up accelerations. Some will require more repetitions to get into the groove, some less.

Expose the athletes to different warm-up methods and as they experiment and become more

experienced they will fall into a routine that works for them. Don't get hung up on the research, let the athletes find out what works. In the end, why something works is less important than the fact that it does work. By the same token there's no reason for athletes to use methods simply because the research says it should work. Do it because you find it effective.

As a general rule, I'm not really impressed with most exercise research. Someone (maybe Poliquin) said that sports scientists are really sports historians. They demonstrate in controlled settings what athletes and coaches knew 20 years earlier. Don't ingore the research, but also keep in mind that most of your practical experience has already put you far ahead of most of the researchers.

Re Sports Scientists
I remember a few years ago some of these guys trying to scientifically prove that warm-ups were useless. Now, they've moved on to more important things like trying to scientifically prove that massage and EMS are useless.

RE: Research
The incentives of academia require people to contantly publish, even if there's nothing new under the sun. Personally, I think the majority (99%) of academic publishing in all fields is worthless.

In addition, to make a name for yourself in research, you have to be original. Therefore, there's an incentive to produce "cutting edge" and controversial research results that fuels debates. That way, you have more opportunities to publish. It's very similar to training gurus hawking "new and improved" training methods in order to stand out in a crowded market.

Notice that most of the discussion on this forum relates to disproving most of the new training fads. We seem to spend a lot of time talking about what NOT to do. Beware of novelty!

RE: Research

Yes research has it's limits. But with science, many solutions have been made. There is good research and bad research. The key is to find it to help you fine tune the art. Notice that I always use science to back up what I believe? When I ask specific questions based on science, look how far we can go. Look at the contrast showers thread. It died after a the right questions were asked. Science has confirmed the effectiveness of warm-ups and other training conceps. Sports science has given us a language and set of terms so we can communicate better as coaches. Let science be a part of your arsenal.

RE Scientists
Scientists never "find" anything. They can only validate what has already been found by the coach. A lot of these guys don't seen to know what their job is. They spend their time trying to tell coaches that what they see isn't so instead of trying to find out why what we see is happening and how to benefit/maximize.

I do not use medballs in the track warm-up. Watching the videos of experts(people who sell videos of them training, but never elite people?) it seemed to make sense to me to do this, but my athletes love women and they say they don't look to cool doing it.

We do tempo in the morning and we never try to sprint before 12:00pm. We will do it once in a while to experience it for meets and travel.

Only for my swimmers since they have very little dryland time and at 6:00 am people are Zombies.

We use medball/core stuff before lifts for my sprinters since we have a time gap beween the track and weightroom. We get the direct benefits of core work with the indirect benefits of warming-up. I

hate bikes and teadmills for warm-up, but what's great is we don't have any of that crap in the weightroom.

How long are the warm-ups posters do(or their athletes)for different training days and competitions?

RE Comp warm up
The speed warm-up and the comp warm-up should be the same. Be consistent and reduce the chances for error.

I've been very busy with our conference championships (MVC) and I'm currently writing from the championships. Anyways, warm up is something I'm always trying to perfect. With my athletes I originally tried:

1) jog
2) dynamic/ballistic movements
3) continuous dynamic movements

I found this worked GREAT for me as an athlete, however, my athletes like to slide in some static stretching somewhere in the warm up. One of my questions is what's wrong with doing maybe a FEW general static stretches before the dynamic/continuous movements. Therefore using the continuous movements as a means of "reorganizing/restoring" stiffness/tension within the system? Some of these athletes live and die by static stretches so when you take it out they become different athletes. Regarding post workout stretching, etc. I found that in some case throwing a light medicine ball or some walking A's or skipping A's (some sort of LIGHT activity) helped a great deal as they seem to reorganize the CNS. Lastly, for those that implement a continuous/dynamic warm up do you use GENERAL exercises or more sprint specific exercises? One more thing, do any of you have warm ups that are specific to the session, i.e. a warm up specifically for speed or SE, etc.

Randy, the regaining of muscle tension/stiffness or muscle slack is much like someone trying to sober up from drinking. No movement will restore the tension, only TIME after the static holds will bring back the stiffness. In some cases, up to just slightly over an hour will return the stretch reflex to original values. This from studies regarding static stretching and strength/power outputs. One of the reviews on this subject was written by Dr. Michael Stone.

My competition warm-up and speed day warm-up are basically the same, about 45 minutes.
Jog 3-4 laps on grass
2x60m backwards running
2x50m jog and reach for the ground
2x50m turnarounds
10 pushups,10 situps
light dynamic flexibility(leg swings, arm swings etc.)
sprint drills
4x60m accels
It's hard to time it perfectly for competitions, but I will add in a 90% run if it seems like I will have to wait another 20 mins before I run.

My "training" warm up and "competition" warm up are very similar.

I just want to be ready for the task at hand (whatever that is) and will vary the warm-up very slightly accordingly.

I have a sequence that prepares "me" and I just try to make it progressive.

1. Jog/walk - 2x(jog 300, walk 100) or 3x(jog 200, walk 100) with each jog faster than the one

before.
2. Static stretches 10mins (is a break from jog)
3. Drills (on grass) 2xsets of 10-20m (for 2-3 exercises) followed by some stride outs in "flats". Finish with 2x40m A-run's.
4. 3x120m run throughs in spikes:
1st easy tempo, walk back
2nd faster, rest 5-6mins
3rd fast (sub-max)
5. I will then rest 20-30mins before session or race with some walking or short run-throughs every 5mins or so (might depend on weather also).

When racing I will do some starts/accel over 20m after the 3rd 120m run through.
I sometimes do a "race simulation" over 50-100m (for 400m).

I really feel that the rest periods during the warm-up are beneficial for me (?super compensation).

How much ?
Didn't Meyer have some of his athletes do a significant effort longer rep prior to 400m races ? (I think I read about Maybank doing a fast 300m and being shocked but also opening up with a 44s 400 after a comeback when Perec worked with him pre 2000) Did Koch do this prior to WR in 85 ?

Re Fast Pre-race Run
I saw Koch do a max speed 50m 30minutes prior to a World Cup 200m final, but I didn't see the WU for the 400m WR. I doubt she ran anything longer pre-race. Did you see the Warm up Kit Kat?

Hi everyone, this is my first post, so please be patient with me (I am also, a just starting out in sprint training, despite my age). I have not joined any 'Athletics Club' and do most of my training on my own. So my question, is how does the group rate the 'stretchrite' product, especially, as I do, if you stretch alone??

I'm new to this forum and I am currently looking through it. Have some thoughts on warm up and static stretching.

I have two warm up structures.
One is my "dynamic" warm up, which I use for speed, plyometric and hammer training (hammer thrower)
Which is around 15 minutes long uses 50m jog interspersed with exercises and Runthroughs (these built up to max). I only perform some static stretching on lower back (due to back injury)

The other warm up is more for conditioning which basically involves double the distance and not as dynamic.

In regard to static stretching I do very little prior to training - but have found athletes in squad like to them more for mental preparation then anything else

Apart from the obvious (quads, hamstrings, glutes and hips) what are the other major muscle groups sprinters should be flexible in?

The shoulder complex requires a great deal of flexibility. I really enjoy doing dips and close grip rev. pull ups to help develop ROM.

Re Flex
Make sure the traps are relaxed so the shoulders can stay down at speed. Make sure you

stretch the pecs/arms etc after your bench-happy crew leave the weight room. This aids is proper sprint posture (shoulders back in line with the ears). Ever seen relay practices after bench sessions? The receiving arm goes out to the side instead of back!

Charlie,
As you have started to do so, could you identify upper body posture in running.
You mentioned
1. Shoulders down
2. Shoulders back in line with the ears
what else

Makes sense that the overhead squat and all the upper body suppleness it creates is a great exercise!!

I guess I would say proper sprint posture is the same as proper standing posture. This is not always taught, as many coaches believe that the shoulders should be rolled slightly forward with the hips tucked under. I disagree as this limits extension and prevents the rotation of the hips towards the centerline.

Start with the head and work down. I find if the head isn't in the right position, the shoulders won't be either.

Charlie,
Last night I received the video tapes of your seminar with Ian King in April. I only watched the first two tapes, but they were incredible and reinforced much of what you have written about on this forum.

One thing in particular caught my attention. In one of the Q&A sessions, you mentioned briefly that sprinters tend to gain flexibility and ROM as they become faster because the muscle fibers learn to contract and relax together. Could you explain this a little more? You seemed to be implying that speed development leads flexibility development, just as speed leads strength.

I'm just bumping this thread up because I really want Charlie to address the issue of speed development leading flexibility. I think it has important practical consequences.

Fantastic observation supported by tons of research. The best seminar I have ever attended.

It's a possibility, but what you can say for sure is that better tone is influenced by higher speeds. As more fibers within the muscles contract together (recruitment), more fibers subsequently relax together.

Hypertrophy for later strength gains

Main points:
Everybody needs to find their own rep range for hypertrophy because everyone is made up differently.

Conversion from IIb muscle fibers to IIa is important to consider in training, but for sprinters tapers, not staying in max strength phases for large amounts of time, and taking unload weeks will take care of conversion back to IIb. And no matter how much IIb fiber you have, if it's "dead" it won't help you. My question to the forum is: what are ways to reactivate "dead" fibers besides massage? Can increasing circulation do this?

I found this interesting:

I hope I don't get on the slippery slope of offering rules and routines for lifting. Everything must be predicated on the primary goal- MORE SPEED. As far as cross-sectional lifting goes- we often lifted in the 10rep range (based on the strength endurance qualities the athletes already posessed) though there was much less cross section work as the years went by as the desired cross section was already in place. As for lifting highs, Ben squated to parallel 2x6x600, Desai and Mark both did 2x6x525.

Mark was also a proficient cleaner, with a best of over 335 later in his career. In the bench, Mark did 365, Desai did 385, but Ben did 4x5x405, with a double at approx 450 just before Seoul (this was due to a miscalculation of the Olympic plates- intended, 6 plates at 20kg+ 2 plates at 10kg- actual 6 plates at 25kg + 2 plates at 12.5 kg + end clips). PLEASE remember that the weight programs progressed upwards over many years and the weight program never interfered with the speed work. If it came to a choice, speed work always won out.

Proper periodization has more and more of an important role. Right now, since I'm just a youngin and not running all that fast its not as important to me as someone more advanced.

I am doing a hypertrophy phase next fall, I am doing tempo work with a lot of volume. When the fiber is larger, I will then skip the basic strength phase so I can get back to the numbers I was getting in the summer. Is this smart, or should I do more 5x5 work to get a "foundation"? Does the new fiber have type one and type two characteristics? Many Bodybuilders have similar mass to throwers, but strength levels are not even close. This could be genetic as well. Any ideas?

Most people consider 5 reps as strength work, but for some athletes it's hypertrophy training. Personally, I consider 6 reps to be a marathon. Furthermore, when I went to Poliquin's speed seminar two years ago, he stated that after about two years of general training anything over 6 reps is a waste for building hypertrophy for speed purposes. The reason is that for most advanced athletes, reps greater than 6 tend to develop the IIa fibers, rather than the IIb fibers. In addition, if an athlete is very IIb dominant, they will actually hypertrophy more during low rep lifting, provided the volume is sufficient. I personally tend to gain mass when I lift in the 1-3 rep range, not the 6-8 range.

From all of the research I have read, (hypertrophy) that the mechanism of change is hormonal response via the satilite cells. large muscle groups with high loads result in increases in testosterone and GH and IGF-1. Another variable was time under tension, or tempo. Volume is what can cause hypertrophy. As for fiber activation, I would love to have Mr. Poliquin show me the data and research. Not that I don't believe him, it's just I've seen so many methods that work. Should I do 6x3 reps to get volume? Since what I am doing now is not increasing crossectional area but improving strength, I need a mechanism to increase hypertophy. My gut feelings is I will plateu soon since cross section is a factor in strength. A good example are shotput athletes. I don't need to have him be huge, just balanced more. I feel that the extra mass will be worth more then its weight in strenth later on.

I'd take my cue on the weights from the speed and speed endurance results you're getting now. If those componants are advancing then you may be able to advance your demands in other areas. But if you havn't got everything in place on the running front, stay with a maintenance phase and leave the strength advances till after this competition period is over.

What rep range have you been using with this athlete so far? It sounds like you have been using a rep range that normally produces hypertrophy but is not working in this case. Is that correct? If your athlete has a high fast twitch makeup then increasing the reps per set or slowing the tempo might not produce the hypertrophy you're looking for. As you stated, volume is the key, so you might have to simply increase the number of sets to get the requisite volume, which of course will eat into your speed training. But since you're talking about the fall, cutting back the speed work won't be such a problem.
As far as the comparison between bodybuilders and throwers, I think this goes back to my earlier post about low reps and lots of sets to get the require volume. I think Hartmann and Tunneman recommend something like 8-15 sets for low rep hypertophy training. But such a protocol is probably better suited for a thrower than a sprinter. And as Charlie pointed out in a T-mag Q&A, sprinting requires considerable strength endurance. But everyone is different. Some people grow on 12 reps, others grow on 4.

Also, could the athlete's diet be a factor? Is he eating enough calorie and protein to support the hypertophy?

Charlie,
While we're on this topic, I'm curious as to the rep ranges you used with you athletes. Not just Ben, but also Desai and Mark.
What rep ranges did you use to build hypertrophy earlier in their careers? We all know Ben squated 2x6x600 in his maximum phases late in his career. Did he use lower reps during max phase's ealier in his career? How (and how much) did Desai and Mark lift during their max phases c. 1988?

Although there are no doubt many ways to hypertrophy, I favor much of the work done by Stone and O'Bryant indicated that hypertrophy is best developed at appropriate resistances that one can handle between 8 to 12 reps. By appropriate I mean resistances that can be increased or varied from between 2 to 6 weeks depending upon the experience of the athlete. In terms of absolute intensity the heaviest set of 8 that could be performed in say a back squat would be around 78-80% of the 1 rep max. For multiple "work-sets" at the same top weight the number would have to be adjusted lower. The duration of the hypertrophy phase would generally be shorter for a more advanced athlete and longer for a beginner or novice. The program calls for between 3 to 5 worksets for between 8 to 12 reps. Very few warm-up sets, in my opinion, should be performed in this phase(1 to 2)prior to the work-sets. I have seen too many athletes in this phase compromise their top sets(at least their final work-sets) because of too heavy or too many warm-up sets. For a younger athlete I would not be too concerned about that, though, as they

would probably require fairly low intensity work and volume to simultaneously improve connective tissue strength and work capacity at a relatively gradual rate.

I have let him stay within the 2-3 sets of 3-4 reps for the last two microcycles. I am cool with this because he has gone from 315 to 380 in his squat. I am very happy he has stuck at the weight for the last three weeks since his electronic 60m has improved every week now. I think I might have stressed him more then I thought because he came down with the common cold last week and ran slow. He in my opinion was 10.1 shape. His speed endurance will not be there for a month or so for two reasons. He tightens up his shoulders after 70m, and he has not done any real special endurance yet. He went a 8.38 in the 80 before he left, but ran in the high 10.30's this past weekend. I will do a more work in rep range as pioneer stated in his post since I have seen this work with football players. Not only did they "put on the mass" but there max numbers increased nicely. (I was an intern at the university so I recorded the max numbers, not prescribed them). As for Poliquin, I just went on his website and looked at some of his strongman stuff, and I am no longer comfortable with a guy flexing his biceps to sell books.-"Winning the arms race"- for elite sprinters? Who has he produced? I do not wish to be negative, but every photo of him he is in t-shirt looking like Mr.Clean. But, Flash, he has made some nice comments at the ASCA world clinic 20 years ago that I find practical and use every day.

On a related note, how does one decide when it would be advantageous to add more muscle mass? I'm a "big" sprinter 6'1" @ 210 pounds, (but a moderately-sized football player!) Since I am mostly interested in _short_ sprints...the 40 for football and 60m for track perhaps stretching to 100m, what is the best strategy?

I would guess that extra weight (even if it is muscle) won't likely help my top speed or speed maintenance much, but should help my start and accleration. I spent much of the winter nursing a hamstring injury (and missed the indoor season but was able to continue with my Olympic lifting. I actually lost about five pounds, but got stronger in the snatch, C&J, etc. I followed a pretty standard routine for the Olympic lifts - low reps with a bunch of sets and did some minimal tempo work at the track.

I would have thought that this would have helped at least my starts and short sprints. Greater power with the same body weight should be a winner, right? Unfortunately, now that I have been back on the track for a couple of months, I have been disappointed that my times have gotten marginally worse.

The training elements that I was missing over the winter were the track work, heavy squats and deadlifts. I was hoping that the Olympic lifts would make up for the lack of squats, but perhaps not?

Has anyone had any experience with optimal training strategies for pure acceleration? Any thoughts or ideas would be appreciated!

Sorry, I misinterpreted your post. I thought you you were currently trying to get a hypertrophy response. I think you're right that the higher reps will increase max strength and muscle mass, particularly if the reps are closer to the 6-8 range. But how big is the athlete now, and what is your goal? Are you targeting specific lagging muscle groups or the whole body?
Ben was able to increase his strength to rather freakish levels at a modest body weight, so I'm not entirely convinced about your concern of hitting a ceiling with current levels of muscle mass. I would love to get Charlie's opinion, since this relates to my ealier question.

RE Poliquin, I agree with you about the usefulness of his bodybuilding methods, which is what he is best known for. The seminar I went to specifically covered speed, which was very different ground than what Poliquin usually writes about. But you're right, he's known mostly for producing fast bobsledders, not sprinters. I would always take Charlie's opinion over Poliquin's. The funny thing is, at the seminar, most of the questions directed at Poliquin were along the lines of "What

do you think Charlie Francis would do?" No other sprint coach was really mentioned. We all knew who the real expert was.

A high volume of strength training with no speed work carried on for several weeks/months can cause a decrease of performance in the sprints (even the short ones) that might last just as long (as the "strength block"). This is especially true if your training experience in the sprint is limited.

I wish to thank everyone for their imput. I graduated college a little more than two years ago and have much to learn in the real world. As for our fall, I am now a little nervous about just plain lifting without any speed work.(thanks Carlo) We do bloodwork and have a fantastic nutritionist. I swear by the Go! Product and I feel that will be a major factor for next fall. I am looking for 6-8 pounds of mass, mainly in legs. I feel that the marathon runs his previous coach made him do caused atrophy,(the photos are rather clear)and just lifting and resting he should be ready.

Flash, I posted information about next year on the Olympic lifts and other movements section. That could explain why I was not clear.

Re Lifts
I hope I don't get on the slippery slope of offering rules and routines for lifting. Everything must be predicated on the primary goal- MORE SPEED. As far as cross-sectional lifting goes- we often lifted in the 10rep range (based on the strength endurance qualities the athletes already posessed) though there was much less cross section work as the years went by as the desired cross section was already in place. As for lifting highs, Ben squated to parallel 2x6x600, Desai and Mark both did 2x6x525. Mark was also a proficient cleaner, with a best of over 335 later in his career. In the bench, Mark did 365, Desai did 385, but Ben did 4x5x405, with a double at approx 450 just before Seoul (this was due to a miscalculation of the Olympic plates- intended, 6 plates at 20kg+ 2 plates at 10kg- actual 6 plates at 25kg + 2 plates at 12.5 kg + end clips). PLEASE remember that the weight programs progressed upwards over many years and the weight program never interfered with the speed work. If it came to a choice, speed work always won out.

I read that Ben's accidental bench max was 407, which is freakish enough. But 450 is unreal for a 173lb athlete who only weight trained supplementally to his sprinting.

The reason why I wanted other examples is because I only see references to Ben's training. It's helpful to see examples of how the same general principles are individualized for each specific athlete. If people only read examples of Ben's training, they'll invariably try to copy it to a certain extent, no matter how hard they try not to, because it's the only example they have. The more examples we have of other athletes, the easier it is to see the possible variations and underlying logic, especially if you use different approaches to solve the same problem with different athletes, e.g., "I did such and such with Desai, but with Ben I had to do this and that".
With all the talk of strength gains, oly ilfts, etc, I thought some might find this somewhat interesting.

nsca.allenpress.com/nscaonline/?request=get-pdf&file=i1064-8011-013-01-0058.pdf

Hi guys. Been awhile since I've been on. Just come across an old issue of Scientific American with an article entitled Muscle, Genes, and Athletic Performance. One section titled Converting Muscle caught my attention. We all have a very good understanding of basic muscle physiology. We discuss fiber recruitment from the various training protocals out there and so on. The authors state generally "when healthy muscles are loaded heavily and repeatedly, as in a weight training program, the number of fast IIx(b) fibers declines as they convert to fast IIa fibers. In those fibers, the nuclei stops expressing the IIx gene and begin expressing the IIa". They go on to say that the fast IIx gene acts as a "default setting". Several studies they say have consistantly found that sedentary people have more IIx fibers than do fit active people.
"What happens when exercise stops? In one of their studies of sedentary men...I know...just bare with me...the IIx composition was reduced from an average of 9% to 2% in the v. lateralis. Over

the next 3 months of no training, the percent of IIx fibers surpassed the original mark of 9% to a pretty amazing 18%...interesting. What does this have to do with sprinters? They say if sprinters want to boost the relative amount of of the fastest fibers, it would be ideal to remove the ones they currently have, slow down(bad choice of words)training...sound familiar...and wait for the fastest fibers to return two fold. Thus sprinters would be well advised to provide in their schedule for a period of reduced training or tapering leading up to a major competition. Now I know we can't stop training for 3 months but the tapering method of 10 days or so that Charlie has recommended may involve some of the re-fiber conversion. Just something to think about guys. One of the authors/researchers is a guy from Denmark (Charlie do you know him)named Jesper Andersen. He's a researcher in the dept of molecular muscle biology and former sprint coach for the Danish national team.

I've read about the IIb to IIa conversion before. The one that comes to mind most easily is Kraemer and Fleck's book on Designing Resistance Training Programs. I also remember reading something a few years ago regarding the re-emergence of IIb fibers after some detraining, and the author suggested a similar method of backing off at specified periods. Maybe that's one of the reasons why transition phases are helpful in periodization plans, they give the IIb population time to rebound for the next round of intense training.

If you read Supertraining by Siff, one of the models they propose for advanced athletes involves doing the majority of strength training over a concentrated two-month period and then dramatically dropping the volume and allowing a long-term rebound in strength qualities to occur over several months of low-volume high-intensity maintenance training. Maybe this is the mechanism underlying the model.

I've read that Tudor Bompa recommends no more than 8 weeks of high intensity strength training, after which the athlete should switch to lighter explosive work.

Sorry, I don't know the gentleman. The best bet for favourable fibre conversion is intensification. This requires timing of the work, selection of tolerable volume,and alternation with low intensity work. This raises another thought. What if the low intensity work that I have strictly adhered to is below some sort of load threshold. Maybe there is an unexpected additional conversion effect. I wouldn't try laying off however, the sedentary conversion effect also hits muscle groups you don't want to hit, such as the abdominals/ stabilizers. This is a well known problem in disease states, such as muscular dystrophy.

Thanks Flash. The Supertraining "Model" you made mention of could be something to look at closer. Nice point. And Charlie interesting point you make there regarding the low intensity work. Just something else to stimulate our brains. Thanks

"I've read that Tudor Bompa recommends no more than 8 weeks of high intensity strength training, after which the athlete should switch to lighter explosive work."

After getting back from swim practice I took a look at the various Tudor Bompa books on periodization. His work *Periodization Training For Sports* has two anatomical adaptation phases lasting an entire month each. (1) max strength, sprinting, plyos do not build conective tissue? The NSCA states that volume builds the collagen matrix, yet the growth hormone from general weight work builds tendons and ligaments as well. So it seems that training over the years will develop those qualities indirectly; why focus on positive side effects of good strength work. It's like buying a car for the sound system. (2) After a few weeks in the begining of the year we should be sprinting. Why would we need to switch to explosive work? Is sprinting and medball throws enough or must we have all components explosive including the weight work? Is this to keep the stimulus excited? Is this a variation element for periodization or a specific adaptation that can impair speed development via neural/fiber pathways that Bompa is trying to prevent from happening?

Designing Resistance Training Programs page 173 mentions detraining and fiber changes. This is interesting since the study was done for astronauts "hence the concentric work". If you read the paragraph training increases the type IIa fibers, not IIb. It seems that a taper might bring back those IIb fibers. I think the changes are for substrate purposes. The contraction force is likely from neuralogical and myosin cross briges, not conduction speed of the fiber. Type II fibers are still fast, no matter if they are A or B types. Also in the earlier chapter (adaptations), Kraemer and Fleck point out that all fiber types may increase from hypertrophy training. Who knows.

Supertraining- I agree with Siff and Verkhoshansky with some sort of rebound effect. The new muscle may convert over when trained for the demands of sprints. I hope so, since my athletes times better improve adding the extra fiber. Even if he is doing sets of 10 with 225 for hypertrophy, it's still heavy resistance to the tissue compared to aerobic running. I am not concerned about type 1 fiber being activated form doing a hypertrophy phase.

Re Fibre
How does this fit with the maintenance phase? It is during this period that explosiveness will peak. I say max strength can go up to 12wks(since we don't use a conversion phase) though you will seldom have this much time in one training cycle. The maintenance phase can go for around eight weeks before gradual strength losses begin to outweigh the freshness benefits. you should find your peak in the final six weeks.

Re Strength with no speed
Training should never stray too far from speed work. This is the definitive test that tells you if your training is on track. If you find out late in the preparation that your speed is not up to expectations- it's too late.

I think there are far more variables to change besides load. As for a 12-week max strength phase, why not? You sprint hard 90% of the year, why not lift hard 90% of the year.

I feel that all of the phases Bompa wants hints to me that he is talking a lot to Seagraves! While I respect Loren greatly, I feel that it shouldn't be that complicated were you are spending sunday mornings thinking of what to name each microcycle.

I was just tossing around a few ideas off the top of my head. I don't really think the possibility of IIb to IIa conversion should be the foundation of periodization. I was trying to link it with some of the ideas I've read about. As far as Bompa's eight week recommendation, I got that from an online summary of a presentation he made at a recent NSCA conference in San Antonio, but I've haven't heard the presentation audio tape yet. Again, I was just brain storming. And I agree that most periodization models have become WAY too complicated.

Also when I referred to explosive work after a concentrated strength block, I think sprinting definitely fits the bill. It doesn't necessarily mean explosive weights.

I agree that a fast twitch fiber is a fast twitch fiber, regardless of subtype. In reality there is a whole continuum of subtypes. In fact I think it was Charlie who stated that, during sprinting, how fast the fibers contract is less important than how fast they relax after contraction. Is that right?

Good point about fiber relaxing after contraction. I guess the next point is making sure that as *many fibers* are contracting. This is why massage is so important getting all of the "dead" fiber going. If it is in spasm, what performances can you expect from it? This is why deep tissue work is needed. When I massage my guys I can not reach the hard tissue that is deep,closer to the bone, like our soft tissue expert Travis can. This lack of feel from inferior therapists can fool them thinking that all of the tissue is ready, since they can only feel the more external muscle.

So if we have Type IIB athltete with fibers that are in spasm, I will put money on the Type IIA or

IIAB athlete who has been treated with a Skaggs/Waldemar level therapist. This could explain why Ben's Squat numbers were so high.

Re Fast Twitch
I think the main diff is strength. The rate diff allows the white fiber to catch up with the red, which initiates contractions before load feedback calls up the white. The relaxation rate is farther up the chain.

Charlie,
What do you mean when you say relaxation is further up the chain? I didn't quite understand that point.

I had the Danish professor send me the original papers of their study.
They used bodybuilding methods three times a week (RMs). That is, in my opinion, the main culprit of such massive IIb->IIa conversion and the rebound, although they found similar changes in the vastus lateralis of sprinters in another study(I would be interested in checking the training protocol of such sprinters; probably they underwent our famous European special endurance phases that would turn a Ferrari into a Trabant). I can be more precise on the studies if someone require me to do so; I am too lazy to dig into my library at the moment.

Re the Supertraining "method" of strength training periodization, it's Verkhoshankij's "block model". You can read about the several studies Prof. Verkhoshansky did with his athletes using this method in his book about the shock method.

Hope this helps.

Charlie, what sort of intensities would be used during the maintenance phase in terms of 1 rep maximums? Should the intensities vary during the maintenance phase from week to week so as to give the CNS some slight, yet not taxing, stimulation?

RE Chain
The hind brain controls the alternations (inhibitions) in the sprint.

Maintenance Lifts
We went pretty high but for very few reps. Ben went (ideally) 2x2 at 365 bench. Squats also were high but numbers were down and he went much less deep since he wanted stimulation only. Ten days before Seoul Ben did 4x600 but only quarter squat. Six days before he went 2x525 for Quarter squat. Closer in he did upper body only. Forget the story you might have heard about Ben squating 600 half a hour before the race. NEVER HAPPENED. Couldn't happen anyway as there are no weights at the warm-up track.

Dan Pfaff said Donovan was cleaning between the rounds in Atlanta, what do you guys think about this? As for lifting, what does type I fiber have to do with explosive movements? Since they are activated first, should they be a concern or factor in the program? Could this mean stabilizing joints has some merits?

Re Warm-up Cleans
I have no idea,but I wouldn't.1 What if you lose control in the excitement and get hurt-that's game,set,and match. 2 What if you prepare this way,then get there and there are no weights? I don't know about Atlanta, but I've never seen weights at the Olympic warm-up facilities.

As crazy as this sounds, I know of two very well known individuals in the world of strength training/periodization and track and field who say that they were both informed by Pfaff himself that Bailey performed 10 singles on back squat at 90% of his 1rm for the lift underneath the

Atlanta stadium hours before the final. I do believe they had weight facilities at the stadium. They obviously could not confirm that it occurred but swear this is what they were told.

I'm not suggesting in any way that this question applies to Pfaff, it probably doesn't. But how often do you guys think coaches and athletes embellish on their training methods either to intimidate the competition or spread bad training advice that might play on others' insecurities, which occur even at the highest levels of sport?

I think that some of the coaches are doing a very basic program. They have the talent, money, and "creatine" to win. I think they make up fantastic stories to make themselves sound brilliant. The reason I repect Charlie, Pfaff, and Bergan is because they make the complex easy and clear. Many coaches realize they just have better talent, so they are the insecure ones. When you go to a conference there is a lot of presure to sound like a rocket scientist. This is why it is hard to get real answers. Some people make huge sums speaking, while they have never done a thing.

Quote

The reason I repect Charlie, Pfaff, and Bergan is because they make the complex easy and clear.

Amen! I once coined a saying that goes something like this:

"Complexity is the language of the simple-minded"

Basically:

1. Someone who truly knows his stuff is able to make complex concepts sound simple

2. Someone who is full of it makes his stuff sounds much more complicated than it really is, eaither to make themselves look important or to hide their lack of knowledge using smokes and mirrors!

RE; Complexity
One of the great physicists of the 20th century (I can't remember which right now) once said that a theory is worthless if you can't explain it to a cocktail waitress on the back of a napkin.

Perhaps, just the opposite is right. The great coaches can look at what may appear simple, and see all of the details and complex variables.

Pfaff has his sprinters lift the day before the meet and the jumpers/throwers do it the same day. In Atlanta Bailey lifted the day before the heats, Pfaff never mentioned (to me) that he lifted in between rounds. Bailey was coming from a 11 days emergency plan because of an hamstring in injury happened in Lille.

Re Baileys return from injury
Notice that the injury was in his last meet 11days away from the Olympics. This is precisely why good planning works. It takes 10 days to rehab a minor strain, so a safety corridor was provided. Had Bailey competed and sustained an injury closer to Atlanta, he would have been out. You can't always prevent an injury but good planning can prevent the consequences from being fatal. As for erroneous stories,they usually come from some third-hand source (remember Ben's alledged squat before the Seoul final?)

Although the information may or may not be true the sources of this story learned of this "warm-up" over dinner with Pfaff actually at the Atlanta games. I believe a "few" beers might have been involved as well. The sources are very legit in my opinion.

Re Sources
I'm sure they are. Carlo outlined what I'd think was a reasonable scenario, but it could be another scenario,

Pfaff told me what they "usually" do and regarding Atlanta I was more interested in what they did in those "emergency days" before the Games, so he described that to me. It sounds strange that they lifted the day before the heats AND the day of the heats.. may be they did something the day of the final.

Charlie, you indicated earlier in this thread that maintenance could be continued up to eight weeks in duration before gradual strength losses begin to outweigh freshness. During that eight week period, would the intensities vary from week to week or would you maintain at a constant intensity? Would you decrease the number of days of lifting sessions and number of exercises that you would perform compared to the max. Strength phase?

Re Maintenance
I'd rather lift on the same number of days with a drop in the number of lifts. As tolerance is highly individual, I'd be careful about giving an exact formula. For example, some athletes in this period might have to drop the stimulus numbers from, say 3x2 to 1x2, for others this kind of drop may not be needed. I do prefer to keep the weight relatively constant.

Charlie, you mentioned in NYC that in maintenance work your athletes would perform around 2-3 reps for an exercise where they could perform between 5-6 reps. Does that mean you would take the athletes' 5 or 6 rep maximum for a given exercise and perform say 2 sets(after warm-up of course) of 2-3 reps and perform these over say a 6-8 week period of maintenance? How heavy is maintenance work? Thanks in advance.

RE: Bailey and Cleans

I've seen video footage of Donovan Bailey doing cleans. Not pretty. His technique could have been much better. Given his raw technique, I would have kept his cleans outside the 10 day taper period, just in case he compressed a disc or reverse curled the bar into his neck.

Charlie, just how heavy is maintenance work? Lift the heaviest weight that the athlete can handle for say 5-6 reps in a given exercise but only perform about 2-3 reps at that weight for 1-3 sets? Thanks for all of the previous help.

Re Maintenance Weights
You might go slightly lower than the 5 to 6 RM and do sets of 2. You may have to drop sets through the maintenance phase to maintain freshness.

I've seen video footage of Donovan Bailey doing cleans. Not pretty. His technique could have been much better. Given his raw technique, I would have kept his cleans outside the 10 day taper period, just in case he compressed a disc or reverse curled the bar into his neck.

After one day of contrast showers, who needs 9 more days!

Seriously, Let all go to the rehab section to learn from each other on injuries from sprinting. I've hurt enough people in my career.

Charlie, I know I am being a pest but I want to make sure I've got it right. By lower than the 5-6RM do you mean like a 4-5RM then do the sets of 2 or lower in absolute intensity like a 7-8RM? Thanks again.

Re Lower
Sorry, I meant lower in weight/intensity.

Charlie, during the seven week max. strength phase in the CFTS(two three week cycles separated by one unload week), are the weights progressing up during each of those weeks 1,2,3 and 5,6,7? Do you try to get a certain percentage jump each week or do you just lift progressively heavier each week?

Back to the basics.

I am doing a mesocycle (4-5 weeks) of a hypertrophy phase for legs. What frequency (workouts per week), rep range, set total, and load (similar to rep range but not totally) do I do? Do I sprint during the time? If so what day(s)? Remember the fiber type debate....

Give it a shot, please post.

I wouldn't work the legs more than twice a week, even if you drop the sprinting during this time. Based on the earlier exchange that started this thread, I think anything in the 5-12 rep range might work (70-85%). The number of total sets is the most individualized parameter, so I won't even attempt a recommendation, and it'll depend on the reps per set.

For exercise selection, you might want to follow Ian King's recommendation of dividing the leg training into two sessions: one day built around the squat and another day built around the deadlift. I don't entirely buy Ian's distinction between quad and hip dominant exercises, but I still think it's a great way to organize the training. It allows for heavy loading of the big muscles using major lifts, while still building variety into the movement patterns and tapping different motor units. I would also drop explosive lifts during this time and devote the limited energy to more bodybuilding type lifts that produce a quicker hypertrophy response; you have the rest of the year for power conversion.

You might want to use a variety of rep patterns during this period to cover the whole 5-12 rep range over such a short time. Since I feel the deadlift does not lend itself to high reps, you might want to use 5-8 reps on a deadlift day, and 8-12 on a squat day. However, if this sprinter has not done much hypertrophy work in the past, he'll probably respond to anything. Don't worry about specificity; the subsequent training will take care of that.

I think it would be okay to take 4-5 weeks off from sprinting while you're trying to increase muscle mass this summer.
In the earlier posts, I also recommended low reps with a high number of sets for hypertrophy, but I think it takes a lot of training experience to handle that kind of loading. Furthermore, I don't think that type of set/rep pattern will produce very good results over such a short time, especially for a sprinter that does not have the training background to handle it.

Charlie, during max strength phases, do you try to increase the weight by a certain percentage each week or by say 10-15lbs during weeks 1,2,3 and 5,6,7?

Re Max Strength
If you accept that speed is your no1 priority then you can't have a set progression with the weights, as they must be adjusted to account for the output on the track. Perhaps counter-intuitively, though, you will find that lifting strength has gone up in a reasonably linear fashion during the phase (when the lifting is tested fresh!) due to the interplay between speed work and weights. You can set reasonable overall objectives, if you consider the starting level of the athlete, the distances over which you will accelerate, and the length of the training phase.

Quote

Most people consider 5 reps as strength work, but for some athletes it's hypertrophy training. Personally, I consider 6 reps to be a marathon. Furthermore, when I went to Poliquin's speed seminar two years ago, he stated that after about two years of general training anything over 6 reps is a waste for building hypertrophy for speed purposes. The reason is that for most advanced athletes, reps greater than 6 tend to develop the IIa fibers, rather than the IIb fibers.
In addition, if an athlete is very IIb dominant, they will actually hypertrophy more during low rep lifting, provided the volume is sufficient. I personally tend to gain mass when I lift in the 1-3 rep range, not the 6-8 range.

In several Soviet training manuals for the Oly lifts higher reps are recomended the heavier the weight class. In fact if i am not mistaken 6-10 reps in isolation type exercices for the Superheavy's. Are not Oly lifters explosive athletes

Please understand that my thinking regarding strength training has undergone dramatic changes since I wrote that a couple of months ago. Also, after participating in this forum over the last several months and watching the King/Francis Seminar tapes, I am much less impressed by Poliquin's speed training advice than I used to be.

I now think Poliquin puts too much emphasis on weight training as a means to improve speed, which is the number one mistake I made for over ten years. But that's understandable considering he has more personal experience with lifting that with sprinting.

Charlie, you are a genious. I think much of the discussion on training adaptations can be summerized in a simple thought process.

(1) Train for speed to be fast, this is neurological.

(2) You can't expect to progress at both on the track sessions and supplementary sessions of weights or other loading at the same time.

Keep in mind that the best athletes are those who incorporate a high nuerological component into training. What I mean, is the best athletes in the world all have one thing in common, they have the capability to fire a large amount of fibers in ratio to the bodyweight. Gymnasts, Olympic Lifters, Strongmen competitors, Jumpers, Sprinters, all have physiques that arent comparable to the drug fed pro bodybuilders in modern time. But, they do have physiques that are comparable to some degree within their own sports. And I would place my money that even if they switched sports, they could hold there own weight in some performance tests. And most definately do better than someone who uses hypertrophy training alone.

I would be hesitant to put hypertrophy as a goal at any point for an athlete that is post- pubescent, this is strictly personal. For a prepubescent athlete I feel it would be a very good method of training because it alomost ensures that very high tension will not be encountered and the growth of bones will not be changed too much.

Oh and by saying I would not make Hypertrophy a goal, I do not mean I would avoid it, every type of training may have it's place at one point or another. I just wouldn't want my sprinters trying to "get big." I'd rather have them "big and strong." Do you guys agree/disagree, and why?

Taking a look at one athlete that I worked with before the Olympic games, I feel that you don't need to look the part. Take a look at Tim, he ran a 9.84 with his frame. I feel that hypertrophy, intentional or a great cosmetic side effect of power training, helps with mainly the accleration phase of sprinting.

I agree with what you to a point, but some bodybuilding methods may be important for athletes

who seem more ectomorphic. This phase might be a couple of meso cycles for one year post college, who knows....

you are correct about not looking the part but playing it. Have you read anything about the Myostatin gene? I did a report on it for My Ex Phys class and interestingly enough...it proves that strength gains might not be coorelated to cross sectional area. Suppossedly, if an athletes satellite cells bind to one another rather than binding to a pre-existing muscle cell, this may result in hyperplasia also.

See I wrote a ten page report on this a year ago and I can't even remmeber what I wrote because my disc got erased. But, anywho, I beleive that certain individuals, if they have undergone hyperplasia, wont show a coorelating muscle size growth, but performance increases will still show. What do you think about this?

Justin Gatlin and Obadele Thompson are also two very fast guys that have little muscular hypertrophy to display, but put some nice times on the board. Oh and the infamous cheetah, not that I would compare...but..you know I have even seen thin male gymnasts bust out an iron cross so, yea, thats one reason why I dont rely on hypertrophy training too much.

I want to make sure that you know about the muscle mass that was gained by Tim. This was effective, since he ran very fast last year....

As for satellite cells and hypertrophy, some of the reasearch from Steven Alway, a writer for muscular development (former USF faculty! Go Bulls)shows that many of the mRNA activations are by hormonal influxes.The protocols have a overlap of both traditional bodybuilding techniques and power training.....Perhaps some hypertrophy will have to happen when neurological pathways hit a ceiling

Do you know Mark Williams? He is a very good friend of mine; we went to undergrad together at the same school in NC. If I think you are the guy he told me about...your name is Carl...is that correct? I saw Tim in person at Raleigh Relays about two years ago and I dwarfed him in size...lol. I probably still do, but one thing I do remember about him was how he ran a 10.51FAT jogging. His frequency is amazing.

Could it possibly be not the direct effect of hyertrophy training that gives the mRNA this property, or just the fact that something different is being imposed on the system? Also, do you believe that Lactic Acid serves as a powerful stimulator to muscle growth, given appropriate rest. I believe I read this in a Muscular Development article. Questions comments?

Mark Williams. Great person. He has a great future if the right things fall into place. I plan to have him down in Tampa with me if he is available.

I think an acid-base disruption has a correlation with HGH and T surges. Bill K at Ball State has some good research on the mechanisms of hormonal response and the effects on muscle. But what is not clear is the acid/base disruption the mechanism or a red herring from something else.

Take a look at special endurance runs. I feel this is what gets athletes lean....very lean.

I agree.It makes me smile when people mention the HIIT (high intensity interval training) as the latest disco very for fat loss. It is what athletes have been doing for decades without the need of a fancy name.

The special endurance runs you are talking about, are they of the shorter kind 150-300m or longer 300-600m, or it does not matter.

