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Strength and Conditioning Guide

SPORTS PERFORMANCE BIBLE



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Chapter 1: **Coaching Leadership**

Welcome to the Sports Performance Bible! Within the covers and binding of this document, coaches and curious athletes will receive a theoretical framework of how to train, guide, and lead trainees under their tutelage to be their best version. Congratulations reader! Engaging with this content is a signal of growth, learning, and seizing power to improve. Well done! Pathways and trails within training will be mapped for navigation through practical advice, edifices of training, and along with the monumental ingredients that go into establishing athlete goals, strength and conditioning programming for greater kinesthetic vocabulary acquisition, and a hive of other ideas to scrupulously sculpt an athlete into an Adonis within their chosen sport.

The practical strength coaching contained within these pages is built on the last decade of experience we have had here at Garage Strength. Experience we have gained with our overall training of world-class athletes in multiple sports, D1 athletes, professional athletes, state champions, national champions, developing youth athletes, and every and any other level of athlete in between. We have done this day in and day out with wonderful results.

Coaches will learn how to achieve desired outcomes from their athletes. The application of the processes of how to get there will be explicitly delivered as well. The whole goal of the Sports Performance Bible is to provide a comprehensive view of training and what we at Garage Strength do with our athletes over the last decade with unparalleled success.



You will learn every single detail behind training and what we do with our athletes. In this way, you can garner athletic success that is unrivaled. You will learn from our tireless experimentation, consistent work, and eyes-open determination, skills, methodologies, and assets that can be immediately and directly applied within your training framework to improve your athletes' performance within their chosen competitive sporting environment. As a coach, you will learn what needs to be done, the responsibilities that need to be shouldered, how to plan everything to maximize proximal control of contributing factors, and, by books end, be able to explain how the physical tools are implemented into the training, along with the physical activities and physical movements that need to be utilized during training to create savages during sports play.

In a broad brush stroke, the book can be broken down as follows: there is the coach, there is the programming, there is the physical exercise selection within the programming, and then at the end, there is a basis behind nutrition and recovery provided. Assembling these broad brush strokes like Voltron leads into an all-encompassing program that you as a coach can take and apply individually based upon the Sports Performance Bible's prescriptions of what is needed and the factors to be considered. In other words, the Sports Performance Bible provides a framework for individual strength coaches to apply their idiosyncrasies from a proven, tested lens of execution.

After reading, a coach can sit down apply the concepts in this book based on their own specific circumstances (equipment, athletes, and every other factor). This means the ranges and outcomes will be phenomenal! The results will be specific to you! You will be able to take the information developed over the last ten-plus years from

all of our time and research at Garage Strength of developing athletes from middle school to national champs, to becoming All-Americans, to becoming top eight in the Olympics.

We will talk about coaching, all the different lifts and movements, and specific parts behind programming, and factor in concepts such as adaptation, recovery, and the nutrition athletes need. By the end, you'll be able to take these concepts and apply them to your own system of training and reap the rewards and benefits.

One of our athletes, Nick Singleton, is a FREAK football player, but he didn't start off as a freak athlete when he started training with Garage Strength in 6th grade. Looking at Nick at that young of an age, there was nothing that physically signaled, "I will be named Gatorade Football Player Of The Year." Or, "I will be the #1 recruit in the country." Not at all. Nick came into the gym and looked like most middle school kids. He was young, learning how to maneuver his ever-growing appendages, and figuring out the complicated technical coordination movements he was being asked to perform.

Fast forward six years and Nick, through a clear plan established at the beginning, had been (and continues to this day) to train four to five days a week without fail, with this only changing when he is in season. Nick to this day shows up and puts in the work. Of course, the weights on the bar have increased, the plyometrics have become more complicated and omnidirectional, but the expectations have remained the same: show up, work hard, and do it again the next day. For years. Nick Singleton is one of many athletes who have successfully been through the methodology espoused within these pages to experience the rewards the journey provides. Our goal is that you will be able to take your own athletes through similar experiences from youthful upstarts with big dreams to professional athletes living their dreams.

■ Role of the Coach

What is the role of the coach?

The initial role of the coach behind strength and conditioning and sports performance development is providing and establishing purpose for the individual. Purpose is achieved through answering a myriad of questions. What does the athlete want to achieve? What is their aim in their selected sport? Do they want to make a varsity team? Do they want to become a professional? Do they want to go to the Olympics? Purpose ends up being, as simple as it may seem, the reason why the athlete wants to show up in the gym, train, grow, and improve.

Immediately, coaches need to establish this purpose in the training they are providing to their athletes. The responsibility of establishing purpose is paramount to take on as a coach from the onset of working with all athletes. After the purpose in training is established, we coaches can use the established purpose over the next three, four, five, six years of training as a true north to navigate towards. The

established purpose is a beacon signaling, "Success this way! Improvement is this way!" An established purpose creates a guide to justifying a periodized program in place to get the athletes upon and through the path of their purposeful journey that leads to achieving goals, breakthrough life events, and creating memories and experiences to draw upon for wise decision making later in life.

Sports performance training is a great teacher and does an excellent job of providing opportunities to fail. Failure is a great teacher and motivator. In the gym, failure brings with it life lessons like the mindset of trying again, not giving up, and sustaining effort to achieve goals. Within the realm of sport, strength and conditioning coaches allow for a safe space of healthy, stressful experiences to be put upon athletes. The barbell will always win because there is always more weight to be put on the bar; gravity will always win because the plyometric jump has to land at some time. With those images in mind, it is important that we realize the destination is just the start of another trail on the purposeful journey.

A purposeful journey is made up of the steps, goals, and path an athlete has established with their coach. The athlete is guided through the purposeful journey with the assistance of their coach. The purposeful journey must have tremendous meaning to the athlete for it to work.

Purposeful Journey: The reason why the athlete is training. The internal motivation that drives the athlete to push themselves towards their goals in an intentional manner.

The purposeful journey is a key concept. We as coaches are creating a purposeful journey based upon the initially established purpose of that athlete. We need to be a guide in this journey. We need to be supportive of the athlete and provide them structure in this overall plan that will lead to long-term development based on the situation they are in.

In Review:

- ▶ Establish purpose
- ▶ Create a long term plan
- ▶ Provide support throughout the journey
- ▶ Lead the athlete to greatness

■ Creation Of The Culture

One of the big key factors behind successful sports performance coaches is that when a culture is created, it becomes infectious. A positive culture is uplifting like a hymn. Everyone feeds upon a culture of success. A culture of achievement. A culture of support. We want more people at the table stuffing their faces with the nutrients of success, achievement, and support. Though be warned, a culture can be negative and sickly, which is unwanted and needs to be avoided, vaccinated against, distanced from, and a mask thrown over to protect the development of athletes. It is imperative that sports performance coaches implement and maintain a positive culture.

The first key concept is recognizing the purpose of the individual or the team in establishing a positive culture. Where is that individual or team heading? How are they working towards that dream? Is the goal they believe in off in the distance or close at hand? As coaches, we have to establish where our teams and individuals are heading because it is incumbent upon us to implant a vision of drifting ever forward towards success. We have to implement belief within our teams and individuals before they can even conceive or fathom where we want to take them; we need to give them a reason to put faith in our guidance because we can take them to the athletic promise land. Such a belief and faith goes along with establishing expectations and accountability.

1.1 Athlete Expectations Inventory

Questions

Determine clear answers to all questions with each athlete

1. What are the primary goals of the athlete and the team?

2. What part will the athlete play in reaching the team goals?

3. What are initial benchmarks the athlete should reach in pursuit of their goals?

4. How many days will the athlete train?

5. How long will training last?

6. What specific rules are in place for training? (Ex. No phones except to video)

7. What reservations might the athlete have against these expectations?

Next, the coach must set clear expectations with how we will hold them accountable. Never explaining what is wanted from the team will lead to lackluster results. We need to sit down with individuals and teams to clearly articulate expectations to strive towards worthwhile results. For instance, wanting an athlete to show up five days a week is a clear expectation for athletes' training—clearly stating, "Show up five days a week," must be said. From there we need to hold athletes accountable to the expectations we have established and they have agreed to. Repercussions for not living up to expectations need to be communicated just as clearly. Holding athletes to high expectations is paramount through the purposeful journey—what may be a great weight lifted relative to athletes at the gym may pale in comparison to the numbers that need to be achieved to reach the goals athletes have set for themselves (goals such as being a professional athlete, making the Olympics, or earning a D1 scholarship, becoming a starting player). Hold athletes to the highest standard not only to where they can be but relative to where you as the coach see where their greatness can lead. Discussions throughout the purposeful journey are necessary as well.

That now brings us to the influence within the weight room. Many sport coaches remove themselves from the weight room, not bothering to understand what the sports performance coach has the athletes doing in the weightroom for strength and conditioning. Sport coaches who divorce themselves from this process are making a poor choice. Sport coaches neglect to recognize that culture can be established very easily in the weight room. Sport coaches need to communicate and work with sports performance coaches in the establishment of a positive, strong culture that often begins in the weight room. Doing lifts, plyometrics, resistance-based training, speed work, or anything that forces a physical or cognitive adaptation allows for the culture to be established in the weight room. The weight room teaches camaraderie, how to grind, and how to achieve: sports coaches need to lean into this, becoming active and present in the sports performance training realm.

In Review:

- ▶ Have a meeting to establish team or individual goals
- ▶ Discuss where they will be going
- ▶ Establish coaching expectations and means of holding athletes accountable
- ▶ Develop the culture inside the weight room to achieve total greatness

■ Communication Skills

Communication can be difficult. However, we have to understand that communication with our athletes is absolutely paramount. We have to be able to progressively communicate with a cognitive ability that values interpersonal and intrapersonal intelligence. We have to understand the situation for the individual

1.2 Coaching Communication Methods

Type of Communication	Frequency
Personal Meeting	Quarterly/Monthly
Phone Call	Quarterly/Monthly
Email	Monthly/New Program
Voice Messaging	Weekly/Daily
In Person	Daily
Text Messaging	Weekly/Daily
Hand Signals	Competition

athlete. Communication can be developed by showing interest in each individual athlete's uniqueness. Talk to the music lovers about the music they love. Talk to the anime lovers about the anime they love. Talk to the athletes about what interests them and what they are into to get a sense of their tastes, interests, and likes outside of the gym. This allows the athlete to be seen as a more well-rounded individual with distinct and unique personality traits demonstrated in a variety of ways.

Conversations centered around athletes' interests is a manner for a coach to invest in the relationships. This investment in an athlete's interests creates a rapport that showcases care, gives an avenue for the athlete to have a voice, and be an expert. A coach is able to model how to inquire about sought-after information. Inquiry is a valuable skill not only in laying the foundation for a technical mindset but for larger skills for success in life.

For example, remember a time an athlete showed up late to training or whined about being fatigued or tired. How did you react? We need to take a step back and overcome this emotion of frustration. We need to empathize. This athlete may be a young adult who is struggling with paying rent, working late hours, or struggling with the stressors of work and/or school. We might have a teenager who is coming from a home where parents are fighting or come from a traumatic background. We need to be caring and recognize the various situations. This does not mean we lower our expectations for showing up on time. It does mean that the manner in which we address the situation needs to be handled with cognitive clarity that evaluates all factors. For instance, any athlete under the age of sixteen or any athlete without their own means of transportation is almost never at fault when arriving late. Obvious, yes, but still necessary to be said.

We also need to be able to flip the switch. We have to be caring to our individual athletes and teams, but we also have to know how to go from being extremely kind and caring guides on this journey to being aggressive, providing motivation, and holding athletes accountable based upon our established expectations. We can then backdoor this in your face style of coaching with more kindness.

Take again the example of a teenage athlete who shows up late, tired and fatigued to practice. After having a nice, long discussion, we talk about the seriousness of what is being dealt with. Help guide their mental outlook to shift to the environment they are now in: the weight room. Encourage them to focus on the task in the weight room and let everything else slip away. This extreme focus can provide a refuge and valuable distraction to ease the mind, relax from a state of purpose, and bring mental clarity through the task at hand. Now maybe, in this hypothetical, the athlete isn't giving much of an effort. As a coach, flip the switch and raise the level of ferocity to provide the intensity for the athlete so they can feed off of you by becoming the conduit of energy the athlete needs. Tell them you understand while building them up, saying, "I believe in you! I know you can accomplish this! I know you had a bad day," and so on. This switch being flipped into a more emotional state can spark athletes to achieve that daily goal. Transference of energy is a vital coaching skill. Once the workout is over, come back and provide empathy, kindness, and support again. It is a constant cycle of being caring, aggressive, and kind so the athlete can understand that as a coach you are there in their corner.

In Review:

- ▶ Empathize
- ▶ Provide energy
- ▶ Care

■ Consistent Approach And Athlete Interaction

We have to understand how each athlete might feed off of us as a coach. We need to understand how each athlete responds to different cues and what we are providing. We need to consider specific instruction and specific attention to various individuals. Some athletes feed off of lots and lots of attention negatively. Athletes like this want to perform their exercises and almost not be seen. They try to hide from the cues and critiques, picking a platform or squat rack where they think the coach is distracted from seeing. They will take their lifts during moments when the coach is focused on another athlete. It is paramount to be aware of athletes who feed off an overabundance of attention negatively.

Some athletes feed off of lots and lots of attention in a positive way; they want to be coached up, given cues, see demos, and are really focused on where the work is taking them. Some athletes are just needy and want a lot of attention. Needy athletes will pry for nuanced responses for some quantum explanation for failures and successes; they will also routinely ask for validation. Whatever attention-seeking or avoidance behavior is habitually demonstrated, be aware of the individual athletes' needs.

In a team setting, we also have to be aware of other coaches, other individuals, and other people in the room who need time and attention. This has the potential to

1.3 Athlete Intervention Meeting Checklist

Answer all questions within the meeting

***Go into the meeting with a clear purpose and topic of discussion**

1. Is this long term or short-term fix?

2. How much daily effort is needed to improve the situation?

3. Is the athlete doing everything they need to do to fix the situation?

4. What SPECIFIC action items will solve the problem?

5. What are the expectations and actions expected in regard to the athlete following the meeting?

6. When are the micro check-ins occurring and when will the follow-up meeting occur?

7. What is the repercussion if the individual decides against the action items?

create jealousy. Jealousy can create a toxic situation not only for the specific athlete displaying jealousy, but for the larger gym environment as well. Again, be aware and take steps to remedy the situation. Jealousy and envy are toxic to a gym's culture and contribute to negativity. It is important to combat jealousy and envy with intolerance to such behaviors while simultaneously modeling, practicing, and demonstrating behaviors that elicit support, encouragement, and happiness for everyone's successes.

In the end, we have to be vigilant about how different athletes respond to different types of coaching.

Consistency is key. Don't be inconsistent with the treatment of athletes, the attention given to athlete's development, and the accountability required from the athletes. Athletes who are new to the training environment need a lot of attention early on. This might change years down the road. The athlete may no longer need as much attention from an instruction point but may need more interaction, support, and attention around where to attend college and how to remain satisfied with this overall journey along the road to their goals.

The coach and athlete relationship matures over time. Elements of training the athlete that once needed guidance will become familiar along the maturation process. The communication becomes less top-down and the athlete is granted more input as a metric for evaluation. It is consequential that the sports performance coach is aware of the maturation of the athlete/coach relationship.

Let's talk about Jacob Horst. He goes by Jake; let's just say, he is built different. Jake is another athlete who began training at Garage Strength as a middle school kid. Jake, who is now in his early 20's and, at this point in his athletic career, has made the senior world team as a 73 kilogram weightlifter and finished 11th, snatching 315lbs at 150lbs bodyweight. Not too shabby when there are only 10 people in the world who lift more weight than you. As a middle school kid, Jake was told what to do. As an adult, Jake coaches younger athletes in the gym and is constantly providing verbal feedback on lifts and how his body feels. Jake is trusted to do this because the athlete/coach relationship has matured to this point.

In addition to being consistent with our approach, giving cues, to paying attention, we also have to be consistent with how we reprimand athletes and hold them accountable. Calling athletes out about being on cell phones while training is an easy one to nip and desist. Do this immediately by reminding the athlete about the goals established at the beginning of the journey. Use the athletes' goals to reprimand. "I thought you wanted to be a champion?" Call them out for behaviors detracting from the culture being established. The key is to hold them accountable and show them behaviors and actions that contribute to that overall goal.

Social media is a tool. Tools are great! Social media is also a distraction. Distractions have their place but not during training. Comprehending this difference is a must. Athletes filming expressions of strength to post after training to help build their personal brand, document their training journey, or create a memory is a legit means of using the tool of social media. On the other hand, looking at images, videos, and reading posts does not allow an athlete to focus. Differentiate between the two: tool good, distraction bad.

The key here is recognizing who needs more attention and which individuals need it to be harped upon. For individuals who do the unwanted behavior sporadically, it probably isn't that big of a deal but instead needs to be brought up in passing. The behavior does need to be addressed. The sooner the better. We don't want unwanted behaviors to fester. Athletes who demonstrate unwanted behaviors constantly need to be reprimanded. This can also be used as a coaching cue to improve upon holding the athlete accountable. It is also a manner to give the athlete attention.

It all goes back to having a consistent approach and having an impressionistic athlete interaction. Know which athletes need more cues, more attention, less attention, and based on their timeline (age, length in sport, complication of movements being learned), understand through constant interaction that awareness and knowledge of our athletes are always growing and being learned about and built upon.

In Review:

- ▶ Stay consistency
- ▶ Different strokes for different folks
- ▶ Be knowledgeable of athletes quirks

■ Athlete Education

Athletes can learn in innumerable ways. Athlete education is an aspect a lot of coaches forget about. We as coaches have the way we want to train our athletes, teach a movement, and provide cues. Often we don't want to change our delivery of the instruction at all. At times, we are not willing to change. It is good to have solid, reliable methods for instruction. Dull knives need to be sharpened. Stripped screws need to be replaced. Instructional models that are not working for an athlete need to be tampered with until the content that needs to be learned is learned. As coaches, we must add teaching skills that work best for the athletes we are teaching, guiding, and mentoring. The more tricks we have at our disposal for teaching, the better.

We can begin by thinking about athletes learning through visual cues (demonstrating a movement so the athlete can see), auditory cues (an athlete hearing the sound upon landing from a jump), or tactile cues (moving the athlete's body into specific positions). In athlete education, it is important to realize how each athlete feeds off of the cue. Some athletes may respond well from visual cues while others feed off of auditory cues; this has no bearing on athlete capability. It just means that we as coaches need to be aware of athletes' best manner to learn.

As a case in point, constantly providing an auditory learner with visual cues will lead to running into a brick wall. This will lead to frustration in both the coach and athlete. This is negative for all. The coach will raise their voice, the athlete will sense the anger and frustration. This will then lead to the athlete disengaging, shutting down, and not wanting to learn. This is a lose-lose situation that needs to be avoided. Give tactile cues. Give verbal cues. Give hybrid cues that combine visual, verbal, and tactile in various arrangements. The point is to make it so the athlete is able to achieve success and add to their kinesthetic vocabulary of movement.

When it comes to athlete education, we need to recognize how the athlete learns: visual, audio, tactile, or some other way. We then need to remember this from day to day to optimize the athlete's learning capability. It is also important as coaches that we recognize that many athletes will learn through a hybridization of cues, though having a bias toward a particular mode of cueing.

In Review:

- ▶ Teach in a manner that is best suited for an athlete's learning style
- ▶ Use visual, auditory, and tactile cues (or whatever else is best for the athlete)

■ Patience Progressing Athletes And Awareness To Injuries

It is extremely hard for many of us to remain patient with athletes' progress. We are all people who see our athletes start to learn positions, movements, or concepts rapidly and we get excited. We want to push weights on absolute strength movements; we want to push weights on technical coordination movements; we want to push more volume. But! And this is a big but! It is important that we take a step back and look at things from a bigger picture. Step back and take a meta approach. Do a long-term analysis of the fine data projections and realize that the much larger picture requires patience.

Instead of just telling athletes to keep putting more weight on the bar, which can lead to a risk of injury, we need to pump the breaks enough to keep an injury from even occurring. And yes, the risk of trauma is always present but the risk of trauma can also be mitigated with a patient mindset to progress (along with many other things).

Think about an athlete who takes cues very easily, is very well-coordinated, very explosive, and checks all those boxes so that we as coaches feel justified in constantly pushing them with heavier and heavier weights. The constant ramping of loads can lead to excess stress on the body and up and out of nowhere enters strains and overuse injuries. Not good. Not desirable. Such undesirable injuries and strains will tamper the athlete's development. The athlete might never develop to the absolute best they could because we were concerned about that immediate effect, a totally unwanted outcome. Even more reason for patience, patience, patience!

What we have learned at Garage Strength is that we want our athletes to mature to be nearly autonomous. We want them in the weight room during a training session to be focused on things that they feel, things they recognize, and things they are able to achieve. We want them to push themselves in an autonomous way, but just to the point where the stress line will be.

As athletes age, they start to understand their limits and their overall feelings. They get a sense of where they can go as an athlete. This allows for greater autonomy. This allows for a democratic means of coaching to develop. Early on, we need to teach them where they are going in various sports, where they are going with various movements (absolute strength, technical coordination, plyometrics, etc.), and we need to be part of that journey educating them intensively. But then as they age, we can start to back off and provide the prescribed training regimen from the day and watch from afar, applying minimal coaching cues because the athlete is becoming more autonomous. The autonomy gained by the athlete, in most cases, leads to less likelihood of the athlete pushing themselves to that injury risk area.

In Review:

- ▶ View the development of athletes from a top-down, big picture perspective
- ▶ Get our athletes to be nearly autonomous to improve their development

■ **Being The Guide To Becoming A Champion**

We talked early on in this chapter about being the guide for the athlete to becoming a champion, the Obi-Wan Kenobi or Yoda of a coach to the Luke Skywalker of an athlete. We want to be the person who takes the athlete from day one to world-class. Think of the image of the ox pulling the cart through the entire journey; that is the coach. This is why we always need to go back to the initial meeting: what are the athlete's goals and purpose and how as a coach can we guide them along that journey?

As coaches, we are older and have more experience. We have seen athletes come through, struggle, and have successes. Based upon those struggles and successes, we can learn the characteristics that lead to success and that lead to perseverance through struggle. With this knowledge, we try to push individuals into the areas where success is found more often. We nudge athletes towards the choices that bring about success.

We have to have empathy towards athletes' emotional existence. We also have to have empathy toward athletes' lack of training experience. With this dual empathy, along with our recognition of our greater wisdom, we are able to become a greater guide. Growing as a coach and maturing as a coach emotionally, interpersonally, and intrapersonally are incredibly important. The gained esteem allows us to keep our cool through recognizing our cognitive capabilities to use our wisdom and experiences to help athletes master specific situations, skills, exercises, and movements, broadening their kinesthetic vocabulary, expressions of strength, and personal, physical achievements. Maybe most importantly, we as coaches need to be 'learn it alls' not 'know it alls'.

Think of an athlete struggling to execute a box jump who we know physically is capable of performing the task. Instead of getting mad, give the athlete skills, respect their mental state of why, and try to develop the capability. Based on previous experience in the coaching world, we can help the athlete develop this ability. This success with the athlete strengthens the bond and leads to greater trust from the athlete in us as coaches, as guides.

In Review:

- ▶ Be a guide
- ▶ Have empathy
- ▶ Recognize our greater experience from more time involved
- ▶ Have cognitive control
- ▶ Build belief by creating successes



Chapter 2:

Athlete And Sport Typing

■ Team vs. Individual

Understanding what type of athlete we are dealing with and what type of sport we are preparing the athlete for is critical to providing high-level coaching. Athletes do play multiple sports, especially at younger ages. Athletes who play multiple sports are a special challenge. Take an athlete who plays football, basketball, and track and field. In this scenario, we have two open-skill sports played on a team and a closed-skill sport that is played as an individual. These are all key factors that need to be considered right away.

Open-skill sports typically function in omnidirectional movement patterns. Sports like football, soccer, wrestling, rugby, lacrosse, and basketball are open-skill sports. The rules of play are defined but the manners in which athleticism is demonstrated in the sport are many. The play is vertical, horizontal, diagonal, and puts many demands on athletes' bodies to be strong in an array of positions, highlighting a need for the body to possess chaotic coordination. There is chaos to be controlled in open-skill sports that are most widely audience through experiencing a fluid athlete in competition.

Close-skill sports operate in a movement pattern loop. Think of close-skill sports as competitions in which the movement pattern is predictable and orderly. A sport like weightlifting is a prime example of a closed skill sport. A wide array of track and field events operate in closed-skill perimeters. Close-skill sports require the pristine execution of a honed skill. There is typically no outside opponent physically making an impact on the movement pattern(s) being executed.



There are also sports that have elements of both open-skill athleticism and closed-skill athleticism. A great example of this is the free throw shot in the sport of basketball. Basketball is thoroughly an open-skill sport. A free throw, an element within the sport of basketball, is distinctly a closed-skill component contained within.

It is always important that sports performance coaches are questioning the plan from diverse vantage points. Taking many vantage points grants greater preparation for all hypothetical scenarios. Know that it is impossible to prepare for the infinite possibilities that may arise but it is necessary to think through scenarios, hypotheticals, and near-guaranteed what-ifs to best support and prepare athletes.

With that mindset, take into account whether the athlete is playing individual or team sports. We then have to understand the athlete's role within the sport or sports. What is their role in the individual sport? What is their role in the team sport? Where does the athlete fit within the team or in the individual sport?

Open-skill: Sporting environments where movements are open and chaotic; movements are non-repetitive, vary from moment to moment in degrees, and require a high level of chaos coordination.

Close-skill: Sporting environments where movements are repetitive, predictable, and are able to be performed in an identical manner instant to instant.

Use these questions to recognize the athlete's niche and pinpoint the physical qualities and traits that are needed to be successful in the specific sport(s) being trained for.

In team sports, all athletes are role players. Some just play larger roles and some play smaller roles. No matter the size of the role, all athletes on the team impact victory, defeat, and the level of execution.

The same goes for individual sports where there are certain primary movements or qualities that drive the athlete to success, and other smaller pieces to the puzzle. Recognizing the physical attributes necessary to succeed and thrive in the developing individual sport or team sport is paramount.

At times it may seem that the difference in training athletes between playing a team sport versus an individual sport is minimal, if even in existence. In the sense that the physical execution of the training comes down to the individual lifting the weights, conditioning, or training power and speed, the people who surround the athletes do matter.

Alex Rose is a two-time Olympic athlete in the discus. He is one of the best in the world at the sport. He trains remotely and in a sport that depends in no way on teammates for his success or failure. The joke at Garage Strength is that Alex made the Olympics twice by training through his phone. As much as this is a joke, it is true. Alex is a remote athlete who comes on-site during major training camps amongst the throwers. He rarely gets to interact with the Garage Strength team of throwers face to face; it is more like a holiday event when he comes on site. To receive a technical analysis of his throws, he has to film his throws and send videos. Delayed feedback is a normal state for his training; he does not receive critiques from the coach in real-time. Alex's purposeful journey in an individual sport has already brought him to the highest levels of competition. He has experienced success with great support, but his mental game requires a headspace of focus, personal pick-me-ups, and the inability to allow someone else to say giddy-up.

On the flip-side, many of our football-playing athletes, like Nick Singleton, train with a cadre of teammates. Where Nick gets many of the deserved accolades for his successes on the field, he comes to the gym with many of his teammates who train as well. Where the weights on the bar vary and the skills that are asked to be performed differ, the team of athletes provides a wealth of mental support, encouragement, and camaraderie. The team also challenges one another to be better and do more to reach ever higher and higher. So where the training for individual sports and team sports are almost identical, the purposeful journey can often be the difference between a band of merry pranksters and the solitary pursuit of traversal in an epic fantasy adventure novel.

In Review:

- ▶ Know the role in an individual sport or team sport
- ▶ Qualities needed to develop athletes in targeted areas

■ Athletes Reactive Analysis

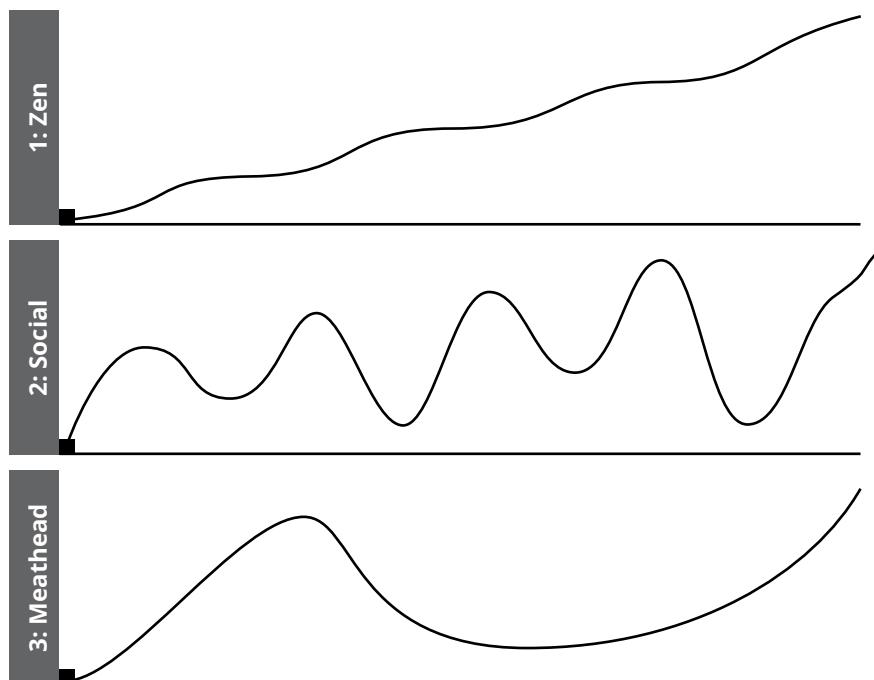
Athlete reactive analysis is a key concept we utilize at Garage Strength. It is something we have learned from training, studying, and analyzing our athletes to gain a deep understanding of them as people. We pay attention to personality traits and personal characteristics as if an attribute sheet for a role-playing character in a table-top game or video game.

Athletes' personality traits and emotional regulation have a direct impact on how athletes adapt, handle different cues, and how they respond to different stimuli.

Athlete Reactive Analysis: The manner in which an athlete responds to training stimuli from a mental and physical aspect.

The Athlete Reactive Analysis is best thought of through a visual curve. There are three curves to help visualize the reactions athletes will have. Typing athletes to fall onto one of the three curves is the heart of the Athlete Reactive Analysis. Type one athletes fall upon an athlete reactive analysis curve that resembles a slow, steady uphill trajectory. It appears as if almost a straight line over the long haul. Type two athletes fall upon a curve that resembles a stock market investment. There are ups and downs on almost a near-daily basis. Type three athletes fall on a curve that rises, falls, and then swells like a tide wave. The use of the curves is then utilized in the athlete reactive analysis tool to assist with programming trajectories, mindset and emotional states, and the outside stressors that come upon athletes.

2.1 Athlete Performance Curves



The first typing, type one, is a Zen-type athlete. The type one athlete is calm and collective. They come in and do their work every single day, hardly ever complaining. In a team environment, they may play a very important role by leading by absolute, total example because they are constantly striving ahead and working hard. They come across as having this machine-like focus on the given task. Type one athletes also tend to be in their own world.

The type two athlete, the Social-type athlete, tends to be more erratic. They are more up and down. Some days they come in and they're completely on fire. Other days

2.2 Athlete Types Summary

	Tendencies	Coaching Cues
Type 1: Zen	<ul style="list-style-type: none"> ▶ Look for specific direction on what to do ▶ Execute exactly how they are asked to execute ▶ Ask minimal questions about training ▶ Offer minimal insight into their personal life ▶ Very internally motivated ▶ Typically very regimented ▶ Allow for minimal disruption to their routine ▶ Goal-oriented ▶ Very easy to peak for precise times 	<ul style="list-style-type: none"> ▶ Focus on this... ▶ Do it this way... ▶ Provide detailed specifics as a coach and they will be executed ▶ Rarely, if ever, respond to a raised voice
Type 2: Social	<ul style="list-style-type: none"> ▶ Need specific direction that is followed up with more specific direction ▶ Will tell you their life existence ▶ Want the coach to know all of their struggles in life ▶ Will get upset quickly if there are social problems in a training environment ▶ Need to be reminded that training is going well and they are heading in the right direction ▶ Need more hands on approach from the coach 	<ul style="list-style-type: none"> ▶ Positive reinforcement ▶ Provide clear cut means of execution ▶ Each rep/set need reminders of proper execution ▶ Plan ahead to have 3-5 minute periods in training where they vent ▶ Remind them that the long term plan is laid out and working, over and over again ▶ Everything is going to be ok...

Type 3: Meathead	<ul style="list-style-type: none"> ▶ Very motivated by external reward (a crowd/social media) ▶ Will provide a massive effort on a daily basis ▶ Will beat themselves down physically ▶ They hold a belief that trying harder is always better ▶ They lack an overall governor to effort ▶ They bring great energy to a training situation <ul style="list-style-type: none"> ▶ Try to provide ranges of weights to hit to manage their intensity ▶ Plan for large group training during the most important sessions of the week ▶ Plan training as “light” for specific days to prevent them from being beaten down ▶ Sometimes they do need louder verbal control ▶ Most likely to injure themselves with high-intensity attempts ▶ Typically excellent competitors but at times they lose their temper
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they are more lethargic. Type two athletes also tend to not handle negative cues very well. As a coach, this athlete type in a team sport can feel unreliable because of the seesaw nature of their training/performance. These are the type of athletes who can ignite in a competitive environment and completely change the trajectory of the competition for the better.

Coaches will learn that type two individuals struggle tremendously with negative criticism. Take the example of a coach who can say to a type two individual, “At the bottom of that squat you collapsed forward. Try to keep the trunk really upright as you drive out of the bottom.” The type two individual interprets the “you collapsed forward” as a personal attack. They interpret that the coach doesn’t like them as a person. They then follow the negative cue with a reply, giving a reason or excuse why they did what they did. Type two individuals expose themselves to coaches through the verbal responses and feedback they give after receiving criticism, critiques, or cues. One incredibly positive attribute of type two athletes is once the coach has demonstrated to them that they are on their side no matter what, the type two athletes become extremely loyal. A second positive attribute of type two, Social athletes, is that they can aid in tying a team together.

Type three athletes, Meathead athletes or, maybe more appropriately, fully charged athletes, are the individuals who are high-wired, putting on a show, and burning that midnight oil when training. They will come in every single day and bring tons of energy. They are the athletes who will always want to go for a max all the time in whatever lift is being performed. They are always trying as hard as possible even when they are fatigued and beat down. They always bring the wood. Type three athletes are really great leaders from an emotional standpoint.

Type three athletes will scream, throw things, and will perform dances and celebrations after athletic successes. Type one athletes on the other hand are calm and collective.

The big key here is to start to understand how each athlete behaves and responds

to cues. Through this analysis, coaches can start to understand how the athletes will adapt throughout a season based upon how much volume they have in training. With a lot of training volume, athletes might feel fatigued. A type two athlete will be down in the dumps; a type three will bring a ton of energy but get frustrated when they don't accomplish what they want at a high level of performance because of the tread on the tires from the high volume; a type one athlete will just mosey on through and keep putting one foot in front of the other.

Understanding the three types of athletes is absolutely paramount to designing a strength program. It also gives a framework for how best to communicate with the individual athletes based upon their athlete reactive analysis.

In Review:

- ▶ Type one athletes are steady as they come and lead by example
- ▶ Type two athletes have ups and downs and reveal themselves through responses to cues
- ▶ Type three athletes are go, go, go
- ▶ Utilize the Athlete Reactive Analysis to provide a scaffold to programming both in season and out of season

■ Playing Surface

Playing surfaces, especially at the amateur level, come in all factors of repair, disarray, and pristine. Some outdoor athletes have the privilege of playing on field turf while other athletes play on grass fields with patches of dirt sprinkled throughout. Some tracks are made of gravel while other tracks are made of the latest technological surface. Indoor sports are played on hard, wooden surfaces that sometimes have great responsiveness and other times contribute to athletes slipping all over the place. Wrestlers compete on a mat. In every and all sporting scenario, the playing surface of the competition is a constant factor in the performance of the athletes.

Having established the sport type and the athlete type, we have to start to comprehend a couple of key factors around the surface of play. Again, is the athlete playing an open-skilled sport or a closed-skill sport? Remember, open-skilled sports are sports like lacrosse, soccer, football, wrestling, basketball, or field hockey. Open-skilled sports are any sport in which athletes are out in a competitive setting and things can happen chaotically within the field of play while adhering to the rules of the game. There is no pre-determined method to how the athletic performance is executed. There is a level of artistry within the play. A closed-skill sport is easier to understand. Meaning that a 100-meter sprint will always be 100 meters long, run inside a lane, and that athlete will stay inside of the lane while running. A shot-putter always has to spin inside a seven-foot circle. A weightlifter will always have to lift the bar on a platform. The setting is always the same thing over and over again with no physical disruption caused by an opponent.

The concept of understanding an open-skill verse a close-skill and how the training is differentiated, namely an open-skill sport requires more reactivity. With demands of more reactivity, we can then go into how the surface of play impacts sports performance. What does grass do to an individual's performance? What does dirt do? What does hardwood do? A track? Rubber?

We need to analyze how the athlete handles the various surfaces and impacts their overall performance. Take this example: athletes will most likely have faster reaction times on turf compared to on grass. Athletes on hardwood probably even have faster reaction time. But the playing surface may also place more stress on the joints—the knees, the hips, the ankles, for example. Think about basketball and volleyball players constantly jumping and needing to land on the hardwood surface. The constant impact of landing requires athletes to be coached up on landing mechanics since they land on a hard surface.

Everything needs to be taken into consideration throughout the training process. For that matter, we want to consider if the sport is contact verse non-contact. Contact sports add a whole other level of physical wear and tear upon the body. Not only do athletes need to prepare for the surfaces that will be competed upon, but they may also need to prepare for the combative nature of contact sports—run blocking in football, boxing out in basketball, or grappling in wrestling. Contact sports coupled with open-skill demands make for a depth of preparation to be done.

In Review:

- ▶ Understand open-skilled versus closed-skill
- ▶ Factor in the impact playing surface has on specific athlete performance

■ Equipment Used

We just covered how ground surfaces for competitive play impact sports performance. We touched on open-skilled sports and closed-skilled sports, noting the fact how closed-skilled sports tend to have more repetitive work while open-skilled sports will demand quick reaction times. That all leads to what type of equipment is utilized in playing the sport forcing us to recognize that the equipment utilized plays a huge role and impacts athletes in substantial ways. The impact of equipment must be prepared for.

With equipment, we need to identify things that impact overall movement. Equipment is rampant within sports, using a stick, a ball, a racket, or protective gear plays a large role in movement and interferes with body movement as well as eye attention and cognitive focus. Not only does equipment impact movement in sport, but it also impacts endurance within the sport. All of this is necessary to be factored into training.

Think about a football player who runs really well without shoulder pads strapped onto their upper body. But this same athlete is really weak; they lack high absolute strength. This athlete gets shoulder pads on and all of a sudden they are extremely slow. Sounds like this hypothetical athlete needs to develop force faster while still under a load. How about if we take an ice hockey or a soccer player as examples. The one athlete is extremely slow when dribbling a soccer ball. The other is just as slow with a stick and puck. We pull out the soccer ball or the puck and stick and the next thing we know these hypothetical athletes are really fast. Eliminating the equipment allows them to show hidden capabilities in one realm and extreme deficiencies in another. Maybe we have them switch sports to track or speed skating? Better yet, we figure out how to increase their speed with the equipment they need to use. More to the point, how does hand-eye coordination slow down their locomotion? We need to take this concept into training so that we can apply it so that athletes' speed work carries over better into the competitive realm.

One manner to increase athletes' abilities with equipment is to actually have athletes perform exercises (when accessible) in their equipment. For example, something as simple as having football players wear their helmets, field hockey and lacrosse players hold their sticks, and basketball players use medballs to simulate the spherical nature of the ball while performing exercises such as plyometrics. Simple, yet creative manners will go a long way.

In Review:

- ▶ Inventory equipment utilized in competitive play
- ▶ Recognize how equipment impacts performance
- ▶ Improve hand-eye coordination in conjunction with locomotive prowess

■ Ranges Of Motion

Range of motion in various joints is an upcoming wave within the realm of sports performance development. What ranges of motion are needed for the sport(s) being trained for and what joints need those ranges is a non-negotiable for sports performance coaches' knowledge base.

Let's think of a football player or wrestler who has tight hips or an immobile lower back. They struggle to lower their hips. Wrestlers will be unable to change levels for offensive attacks effectively and football players will find themselves constantly losing out to the low man. The limited range of motion will lead to a problem area immediately and in the future, if not addressed. We have to start to adapt to range of motion issues in training immediately. We have to improve range of motion issues through mobility.

Mobility is a key concept. By mobility, we see it first as passive flexibility, but more importantly, we see mobility as a passive range of motion with strength and stability. Mobility is an umbrella concept that combines the ideas of the passive range of

motion with strength and stability throughout that range of motion. Simply put, mobility is how much range of motion is in a joint while maintaining the greatest stability. Having just a passive range of motion isn't enough in the world of sports performance. The truly mobile not only will have the passive range of motion but will be strong, solid, and secure through the complete range.

To improve the ranges of motion in specific sports, we have to study the ranges of the joints within specific sports. We have to notice how deep or how shallow those ranges within the joints might be. Analyze positions athletes commonly end up in while playing the sport(s) being trained for. We have to ensure within the training of the targeted mobilized areas that athletes have the requisite mobility through the specific desired ranges to improve overall sports performance. This has got to be part of the inventory for coaches.

Mobility: The ability to get into full ranges of motion while maintaining strength and stability.

In Review:

- ▶ Mobility is how much range of motion in a joint with stability
- ▶ Break down ranges of motion necessary by sport for training

■ Movement and Awareness

We as coaches need to be aware of the movement process. There are essentially two types of models when talking about muscular reaction and activation. There is the top-down model where it is essentially the brain telling the body what to do. It is like immediate feedback in which the belief is the brain is controlling the muscular actions. Another side, more so in relation to open-skilled sports, is the idea that the time frame to make a cut might actually be shorter than the body is capable of doing if the brain must send the message to initiate movement, meaning that it is too fast of a period for the conscious brain to internally trigger the muscular action to have the muscles coordinate in a certain position. In an effort to keep it simple, the idea is that the movements that are occurring are happening faster than consciously can be controlled by the brain. The neurological signals are being sent too fast; it is as if the body is operating almost separately from the brain—the muscles are, theoretically, autonomous in signaling the execution of the athleticism required. Think of this as a bottom-up feedback loop.

The goal is to recognize the bottom-up feedback loop and train it, especially for open-skilled sports. This means skills need to be trained for the body to learn co-contractions in various joints to provide stability in ranges of motion. These skills that develop co-contractions can come about from different movement patterns in the weight room and will help the bottom-up feedback loop to operate more efficiently.

Co-contractions need to be thought of as muscles working in tandem. It is best illustrated through the idea of one muscle trying to complete a task by its lonesome compared to a group of muscles performing a kinesthetic movement as a team. Imagine bench pressing only using the pectoral muscles. Obviously, the weight on the bar is far less than bench pressing using the pecs, triceps, deltoids, lats, and every other muscle that can be engaged to complete the lift. Or imagine running only using the leg muscles and in no way engaging the torso. The trunk would hang over or behind the body, either getting kneed in the head from the quads or kicked in the head from the pull of the hamstrings. Pretty silly image, right? The point of co-contractions is simple: the more muscles working in tandem, the greater the athletic output and kinesthetic capabilities can be displayed. It is why the posterior chain (the backside muscles that comprise the hamstrings, glutes, spinal erectors, lats, and other back muscles) and anterior sequence (the frontside muscles of the pecs, abdominals, quads, and so forth work in concert) firing in co-contractile states can be such lethal power projections for expressions of strength.

Co-contraction: Simultaneous action of agonist and antagonist muscles around a joint.

Once the feedback loop is established, we have proprioception to deal with. Proprioception is our kinesthetic awareness. It is what we see, hear, smell, feel, and all the other stimuli athletes take in during sports play. This is established, but we need to build off of it. We have to acknowledge proprioception in competition and train the skills.

In Review:

- ▶ Feedback loops and the speed of the nervous system reacting (top-down and bottom-up)
- ▶ Building on proprioception and utilizing stimuli to improve performance

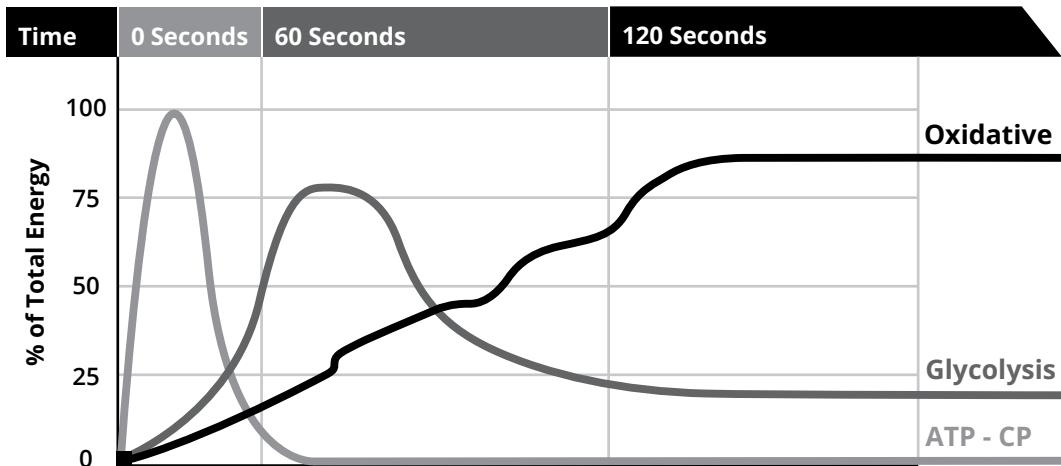
■ Energy Usage

Finally, when finishing up the coach's inventory of the athlete's training program design, we have to understand the energy systems being used. We have to acknowledge if the athlete will be in an aerobic sport, anaerobic sport, or in a sport that operates in a hybrid area. We have to understand how long the competition will last. We need to know what energy system is going to be used by the individual competing in the sport.

Think about an aerobic sport, such as a cross-country race; we will want to train more aerobic capacity specifically because of the demands of the sport. Maybe we are in an interval-type sport, like wrestling or football, so we want to train anaerobic glycolysis but we also do need the aerobic capacity to help with recovery.

Let's take a deeper dive into training for wrestling. At the world-class level, wrestling

2.3 Energy System Usage Over Time



is a sport of two three-minute periods. Between periods, there is a brief rest period and during the competition, there are few breaks in the action. In the muck of the combat, there are also moments of fakes, planning, and readiness; the energy output is on alert but not fully engaged. However, the engagement in a shot or defensive movement is full throttle, maximal effort. Scrambles can be over as soon as they start, go on for a frantic ten seconds, or play out for minutes.

With the above considerations, it is clear that wrestlers need to be able to recover inter-competition. This signals a need for aerobic capacity training to be part of the training regimen. However, the competitive event takes place over the course of two three-minute intervals with moments of extreme intensity and contemplative scheming. Having that information indicates a clear focus toward training anaerobic capacity that allows for optimal operation at near maximal capacity. Takedowns are extremely forceful, powerful movements requiring explosiveness similar to full cleans or unbroken squats. One manner to attack such necessary energy usage for wrestling is by having athletes train using OTM (on the minute) clean doubles. In this manner, the athletes are being asked to perform a highly explosive movement in a repetitive fashion within a mandatory time constraint.

By analyzing these examples, we can start to understand how training can mimic the energy usage needed in a specific sport. We have to realize how long the season and competition of the sport will last. Identifying what energy system impacts the length of time the sport is executed upon will allow us to come back and seek adaptation from our athletes specific to the targeted energy systems.

In Review:

- ▶ Identify the energy system predominantly used within the sport being trained
- ▶ Seek adaptations from athletes that align with the energy system utilized within the sport being trained for



Chapter 3: **Periodization**

■ **Laying Out A Need Based Plan And Structure**

The first key concept behind programming and periodization is laying out a plan and structured program based on the needs of the athlete's individual or team sport. Prior to having done this, we have had our initial meeting with the athlete, discussing their goals, expectations, and how we as the coach can hold them accountable. We have gone through all the things as a coach to discuss what needs to be done to treat the athlete well, hold them accountable, and guide them through their purposeful journey.

The next step we completed as a coach involved identifying what type of athlete we are dealing with: a type 1, a type 2, or a type 3. We looked at what sport the athlete is playing and how the individual reacts to the different aspects within the sport being trained for, looking at such things as the type of equipment that is used within the sport and everything else that is encompassed within the sport being trained for. With this checklist done, we can lay out a plan and structure that is going to be specific for the individual or for a team; no matter what, the plan and structure have to be dynamic.

We use Parabolic Periodization for our athletes to create a programming plan and structure that acts as a dynamic feedback loop. We break this feedback loop into five specific training blocks: the exposure phase, the comprehension phase, the ascension phase, the summit phase, and the realization phase. This five-block loop, or cycle, will be repeated two or three times per year throughout an athlete's career. After each cycle, the coach gains insight on how the athlete responded to different



blocks at different times, gaining feedback on how to structure the next cycle. It is a dynamic system that does not rely on static phases throughout the year, but malleable blocks that can be rearranged and reorganized based on an athlete's needs or a team's schedule. It is a flexible system that caters to the unpredictable reality of athlete, team, and school schedules.

Each phase is unique and has specific applications (which will be discussed in greater detail in the upcoming pages). The uniqueness of each phase serves a valid purpose in the overall training of an athlete. However, as the example below illustrates, an athlete can enter the larger ouroboros cycle of exposure, comprehension, ascension, summit, and realization at various points. Where the athlete is capable of entering is dependent on multiple factors. An athlete's experience level, other sports that they play, or current fitness levels are all factors that influence the significance of this entry.

For instance, with football, we might only be able to get through the phases twice in one year. The system allows us to start at various points inside the phases. We might do the exposure, comprehension, ascension phases and for the next program we write may start at the comprehension phase because we are closer to the season. This is why it is key to have a dynamic system in place.

When a dynamic system is in place, we can figure out where we are in relation to when the season is going to begin and can work backward from the beginning of the season. Even if in-season, we can work all the way back to where training is currently at.

3.1 Summary of Phases

Phase	Focus	Timespan
Exposure	Intro to training, volume focused and challenging to get into decent shape	3-4 weeks exposure to new training
Comprehension	Another higher volume program to stimulate hypertrophic AND technical growth with weightlifting variations	4 weeks
Ascension	Higher intensity program, push weight PR's and create a good environment	4 weeks
Summit	Another higher intensity program focusing on peaking athletes with the lifts that transfer best to their sport	3-5 weeks
Realization	Minimal reps of intensity with very low volume, a hard taper for absolute peaking	1-2 weeks

We are going to cover all five phases and how they play a significant role in the overall athlete development.

In Review:

- ▶ Use Parabolic Periodization to create a dynamic feedback loop for programming plan and structure
- ▶ Work backward from the start of the season or in-season to figure out where to begin
- ▶ There are five phases within the dynamic feedback loop: the Exposure phase, Comprehension phase, Ascension phase, Summit phase, and Realization phase

■ Exposure Phase

The first phase we need to hit is the exposure phase. It is typically sixteen to twenty weeks out from the start of the season. If we think about football or soccer and we start in December, we may be forty weeks out. This allows room for us to go through the exposure phase twice within the dynamic feedback loop. Blocks are typically four weeks long. However, in this case, the exposure phase, if time permits, can last as long as 8 weeks in this situation.

The exposure phase is related exactly to the term. If we think about the purposeful journey, we can say to the athlete that the exposure phase is a lot of volume in the

weight room. Athletes will be doing a lot of technical coordination movements for a lot of reps. Athletes will be doing a lot of reps for absolute strength movements as well. Volume is the name of the game during the exposure phase. We want to try and build the engine, putting a big engine together to make it as large as possible while still being specific to the sport, then we can, as we get closer and closer to the peak period or that in-season period, we can start to focus on specific concepts to the sport being trained for.

We need to look at the exposure phase as more of a general prep period. More so, the exposure phase is where harder lifts that test athletes' mental, physical, and ability to recover are learned, fine-tuned, and developed. Then roughly sixteen weeks from the completion of the exposure phase is when testing will occur before rebooting and going back to the exposure phase and the dynamic feedback loop.

Think of the exposure phase as exactly that: the first exposure to training to stimulate adaptation. The whole goal is that the adaptation being looked for will happen sixteen weeks later or even twenty weeks later. The exposure phase is more like dabbling into what will be created over a long time frame. Like the construction of a building, the exposure phase is the foundation. Without a solid foundation, it is near impossible to build a solid structure that can weather the elements further training.

In Review:

- ▶ The exposure phase contains a lot of training volume and uses high reps relative to the sport being trained for
- ▶ The exposure phase begins to prepare the athlete for success in the future
- ▶ The exposure phase builds the engine

■ Comprehension Phase

The comprehension phase may happen twelve to sixteen weeks out from the test we talked about or from the sport's season starting. The comprehension phase can continue to be utilized to do more higher volume movements and higher volume reps, similar to the exposure phase.

We want athletes to learn and comprehend the specific movements that we are going to try and cultivate down the road during this phase. We might start to put in more advanced, explosive lifts. We might start to do more advanced explosive plyometric work as well. Using the comprehension phase after athletes have been exposed to the struggle and hardship the exposure phase began this journey with, the comprehension phase now allows athletes to comprehend the tools they need along this journey to be successful.

To fully implement the comprehension phase, we need to think more specifically about an athlete's kinesthetic vocabulary—the body's ability to demonstrate an array

3.2 Example Football Season Layout

	Month	Phase	
Off Season	January	Exposure	
	February	Comprehension	
	March	Ascension	
	April	Summit	
	May	Testing/Exposure	
	June	Comprehension	
	July	Ascension	
In Season	August	Summit/Realization	
	September	Comprehension	*Easy training unless opposition is weak
	October	Comprehension	*Easy training unless opposition is weak
	November	Realization Deload	
	December	Realization Deload	*Exposure if season ends early

of expressions of strength, movement patterns, and athleticism. It is one thing to be exposed to a power snatch and a whole other thing to express the power snatch as part of one's kinesthetic vocabulary.

Ever see an athlete perform a power snatch and they end up finishing the movement like a muscle snatch? This is a clear indication that their body has yet to comprehend the full magnitude of the movement for it to properly be considered part of their kinesthetic vocabulary. The comprehension phase is the part of the dynamic feedback loop where issues such as the power snatch being finished as a muscle snatch (or other movement comprehension pitfalls, like the chest diving forward in a back squat) need to be ironed out. In this way, the comprehension phase helps serve as a literal study session of the kinesthetic vocabulary introduced during the voluminous exposure phase.

In Review:

- ▶ Begin twelve to sixteen weeks out
- ▶ Recognize more volume
- ▶ Sprinkle in higher speed movements that are more difficult to learn

■ Ascension Phase

The ascension phase is typically when every athlete gets the strongest. In the ascension phase, an athlete's greatest expression of strength is materialized with absolute strength movements. This is about eight weeks out from the testing period in the off-season or eight weeks out from being in-season. At this time, we drop the volume down and start to raise the intensity.

By this time we have a really good idea of what kind of athletes we are working with; we have a strong sense of whether they are a type 1, type 2, or type 3 athlete. Being eight weeks out from that testing period, we are lifting heavier, we are moving weights more rapidly, and we are doing more complicated jumps. The intensity is going up so the rate of coordination becomes more rapid and more aggressive. During the ascension phase, athletes will start to notice their biggest gains.

Athletes will first notice big gains during the ascension phase to create a bigger buy-in. The exposure phase and comprehension phase put musculature on athletes' bodies, but as they get into the ascension phase it is like, "Oh Wow!" Not only are the athletes getting bigger and more muscular, but during the ascension phase, they are noticing they are getting stronger, more explosive, and more coordinated. There is more weight on the bar. Weights that they struggled to hit for three reps are now being hit for five reps on the way up to top sets. There is a confidence in taking attempts that they were earlier hesitant and fearful. The ascension phase is when we will see a tremendous amount of growth in power output and strength.

In Review:

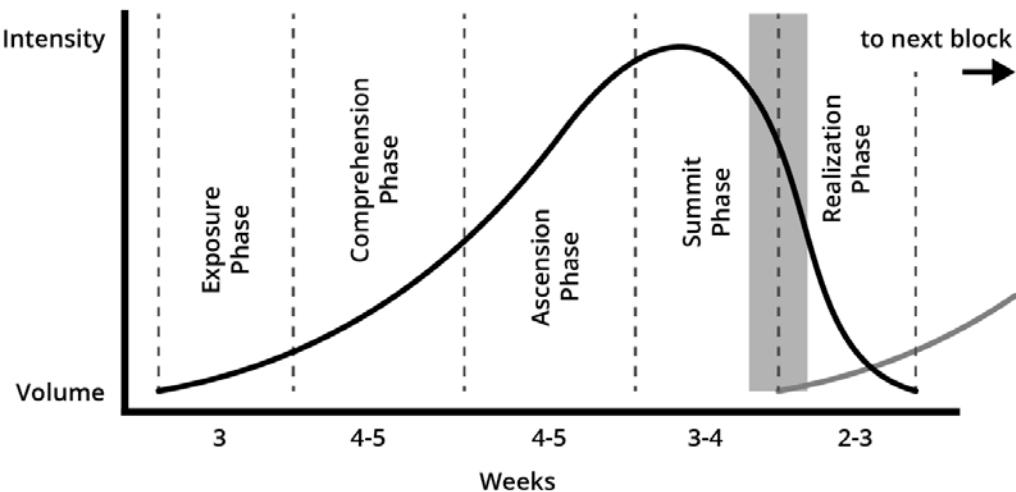
- ▶ About eight weeks out from season
- ▶ Understand athletes overall development
- ▶ Notice how rapidly athletes increase strength and produce force
- ▶ Set up for the next phase in the overall development

■ Summit Phase

The summit phase reaches the pinnacle in the feedback loop. At this point in the purposeful journey, we have traveled quite a distance on the initial foray into the dynamic feedback loop. Our athletes have been exposed to the training, started to comprehend the tools they need to develop to be elite in their own regard, adding to their kinesthetic vocabulary, and, in the ascension phase, they go up the mountain of struggle, realizing how strong and explosive they can be primarily in an absolute manner of expression. The purposeful journey brings them close to the acme of the mountain; the summit phase is part of the purposeful journey that breaches the mountain top.

In the summit phase, the first two weeks there is a little bit more volume again relative to the ascension phase. After two weeks, that volume is cut tremendously

3.3 Intensity vs. Volume Phase Graph



and athletes get even stronger! The volume is cut back down and the athletes will now be similar to where they were during the ascension phase, meaning a shift to greater intensity, weight on the bar, and monster attempts at explosive, powerful movements. What this will do is create a huge rise in intensity during the summit phase.

The huge rise leads to athletes utilizing their muscular strength, their muscular coordination, and their neurological coordination at very high rates. Think of the summit phase literally: the peak of the mountain top is within achievable reach. It will be four weeks or eight weeks out from a major competition, off-season testing period, or starting a season in any sport.

The last two weeks of the summit phase really need to be utilized to focus on higher intensity and cutting the volume pretty substantially to elicit some big-time expressions of strength gains so athletes start to discern they are heading into the realization phase.

In Review:

- ▶ Four to eight weeks out
- ▶ Elicit big-time strength gains by cutting volume during the last two weeks and raising the intensity

■ Realization Phase

The realization phase is the period when heading into a big test. The test could be the start of the competitive season or max testing in the weightroom. Let's say it is the off-season for a soccer team that will be playing in the fall. We start in December with the exposure phase, January with the comprehension phase, February is the ascension phase, March we work through the summit phase, and here we are now in April and we are going to have a test during the realization phase.

The realization phase is typically a two-week period. With this two-week period, volume is almost non-existent. We might have one heavy rep of a power snatch for a technical coordination movement. Maybe one set of explosive hurdle hops for plyometric work. We might cut all the accessory and dynamic trunk control movements. We streamline because we are solely focusing on the test. The tests are developed off the sport's qualities needed for the specific sport being trained for.

Another example might be playing football in the middle of August. If we work backward, the realization phase would occur at the end of July or the beginning of August. Most of July would be the summit phase; June the ascension phase; May the comprehension phase; all of April the exposure phase. Once we set this up, we can

3.4 Example Football Tests

Exercise	Reps	Why?
Bench Press	1 rep max	► Absolute upper body strength
Back Squat	1 rep max	► Absolute lower body strength
Single Leg Squat	3 rep max on each leg	► Absolute unilateral strength
Clean	1 rep max	► Technical coordination, explosiveness, and strength
Snatch	1 rep max	► Technical coordination, explosiveness, and stability
Pull Ups	Max reps	► Back strength and endurance
Vertical Jump	Vertical jump test	► Absolute explosive ability
Double Leg Bound	3 consecutive reps	► Bilateral explosiveness and reactivity
Single Leg Bound	3 consecutive reps on each leg	► Unilateral explosiveness and reactivity

see that the realization phase is just the athlete having the enlightenment that they are a totally different athlete than they were months ago, showcasing their hard-earned gains on the field, during the tests, and executing larger, bigger lifts.

The realization phase is where we see a big peak. Think about someone standing on top of Mount Everest. Think about that feeling! That moment of euphoria! This is what happens during the realization phase! Athletes achieve things they never believed or felt possible. They achieve things mentally and physically. This brings about a belief within us, the coaches, allowing them to buy in even more to the whole training system.

The pinnacle is achieved during this go-round of the dynamic feedback loop.

In Review:

- ▶ Two week period
- ▶ Big peak, euphoric feeling
- ▶ Complete athlete buy-in

■ In-Season Vs. Out Of Season

We gave primarily cursory examples of starting in December or in April as out of season planning. The in-season planning needs to be dynamic. It is important that when in-season, we have to give the athlete time, maybe two weeks, where we are not doing much in the weight room. Athletes are just doing the sport's training and executing the sport's practice as the complete focus.

Now after those two weeks in which the athlete adapts to the sports training and practice, we can start to sprinkle in some exposure and comprehension style training. We can see how athletes adapt to that training–this is what we want to do in-season. While sprinkling in the exposure and comprehension style training, always be cognizant of how the volume is impacting athletes during their sport's practice and in win/loss competition events. The dynamism of the volume athletes are working through in-season is a balancing act. It is imperative to never overwork athletes in-season to sway the outcome of competition negatively against the athletes.

We also need to consider each position specific to the sport being played. Each position may have different things arise. Consider in football, a wide receiver may have foot issues whereas a lineman may have lower back issues–this means that with wide receivers we want to focus on foot strength, and with our linemen focus on trunk stability. This is a paramount point of awareness for coaches with in-season programming versus out-of-season programming.

In-season we will be more focused on positional work or things that might arise. We

also need to have a dynamic week-to-week plan based upon the opponents being competed against. Strong opponents being competed against require a different programming approach than weeks when competing against weak opponents—this needs to always be taken under consideration during in-season programming.

Lastly, as coaches, we need to realize that bodybuilding can be our best friend in-season. Think about a sport like swimming where athletes go through the season and may develop shoulder issues, lower back issues, or lat issues. We can use bodybuilding movements to bring in some blood flow to the targeted area to strengthen it, as well as stability to the specific area. And even in a sport like swimming, backing off of the bodybuilding decreases the volume allowing the athletes to recover a lot quicker and times may drop come the postseason. A little confusing right? In one breath we are lauding the use of bodybuilding movements while in-season to stem off injury and, in the next breath, we are saying to cut the bodybuilding volume to elicit a bodily response that brings about quicker times in the postseason. This is the balancing act of dynamically prescribing volume when in-season. Bodybuilding is a programming tool. That tool can be used to tighten some bolts, but if overdone and overprescribed, that same tool can strip the bolt. The point is, sometimes the bolt is tight enough and is good to go. The use of the tool is no longer required during this point in the season (hopefully postseason).

In Review:

- ▶ Utilize bodybuilding in-season
- ▶ In-season programming will not be as specifically laid out (it will be more specific to the sport, but not laid out and planned perfectly, following the book to a tee)
- ▶ Be dynamic week to week
- ▶ Recognize positional issues from sport to sport, position to position, athlete to athlete



Chapter 4: **Technical Coordination**

Technical coordination movements are key to an athlete's overall development. Technical coordination movements require athleticism and a technique-centered mindset. The snatch, jerk, and clean (and all the variations of the movements) are pivotal linchpins to technical coordination. Because of the high demand for mental and physical execution, technical coordination movements, especially the weightlifting variety, are performed first in a day's workout.

■ **Teaching Movements And Complexity**

The concept behind using technical coordination movements in training is to improve athletes' explosive power capabilities, speed, and ability to initiate co-contractions for greater proficiency with expressions of strength. Latent within all technical coordination movements, whether weightlifting or reflexive, is that technical coordination movements require a level of learning and skill acquisition. Technical coordination movements impact absolute strength and will make athletes faster. More importantly, technical coordination movements will require coordination of musculature through compound movements that require changes in direction, extreme force absorption, and actual sports performance style athleticism in the weight room. We have no argument with the greatness of the squat as a movement that provides great transfer of training, but acknowledge that the kinesthetic vocabulary of essentially sitting on the toilet and standing up is not as neurologically complicated nor athletic appearing as a snatch.

With that said, technical coordination movements are hard. Technical coordination



movements include weightlifting and reflexive movements. Weightlifting movements like a snatch, power snatch, jerk, or behind the neck jerk are a sample of technical coordination movements we can think about. We also have reflexive movements. An example of a reflexive movement is a drop dumbbell snatch into an overhead lunge position. Technical coordination movements are complex. They require cognitive learning and provide a fast way for the coach to understand the athlete, understand how to engage with the athlete, and gain knowledge of how the athlete reacts to different cues, frustrations, and where their movement problems may be.

Technical coordination movements require skill-based comprehension of movement. We want to use technical coordination movements because it requires cognitive learning and is all based upon the comprehension and application of skill. It is a really easy way for coaches to fast-track various ways to engage with athletes. Technical coordination movements greatly improve athleticism, create an

Technical Coordination:

Movements such as the snatch, clean, jerk, variations of olympic lifts, and reflexive movements that require an athlete to perform at maximal power, speed, and strength while executing a difficult task requiring specific technique and coordination of muscles in co-contractive states.

appreciation and understanding for the power of technique, and besides making athletes more reactive and faster, do a superior job of making athletes absorb force, coordinate muscles in co-contractions, ignite high threshold motor units, and greatly improve dynamic trunk control.

In Review:

- ▶ Technical coordination movements are complex movements that provide a gateway to evaluate and engage with athletes
- ▶ Technical coordination movements require skill-based comprehension

4.1 Technical Coordination Exercises

Exercise	Rep Schemes	Why?	
Snatch	5 x 3 6 x 2 8 x 1	<ul style="list-style-type: none"> ▶ Speed ▶ Mobility ▶ Technical awareness ▶ Dynamic trunk control 	
Clean	4 x 2 4 x 3 6 x 2	<ul style="list-style-type: none"> ▶ Power ▶ Force absorption ▶ Dynamic trunk control 	
Jerk	4 x 4 5 x 2 4 x 3	<ul style="list-style-type: none"> ▶ Speed ▶ Overhead stability ▶ Improve neural drive 	
Reflexive Training Ex. Drop DB Snatch to Hip Lock	4 x 3 each side 5 x 4 each side 5 x 2 each side	<ul style="list-style-type: none"> ▶ Transfer to athletics ▶ Coordination ▶ Reactive power output ▶ Decreases stress on body 	

■ Weightlifting Movements

The snatch, the clean, and the jerk are all really complicated movements. But why are we going to use them? We want to use these weightlifting movements because of the cognitive and neural learning that takes place within athletes' bodies; it helps us, the coach, communicate with our athletes better; it allows us to learn what type of athlete we are dealing with (type 1, type 2, or type 3); and, the movements will improve athletes' mobility. Weightlifting movements manage to check a majority of boxes and give a great bang for their buck.

We also have a finite amount of time with the athletes we are training. In this finite amount of time, we want an optimal transfer of training. We want to see what we can do to improve their mobility, their force absorption, their dynamic trunk control, and their maximal strength. All of the weightlifting movements are used to target all of these different areas and provide a large payoff as exercise selection choices. This is a really important concept. When we talk about the transfer of training, we need to focus on key movements (snatches, cleans, jerks) and use them because their transfer to athletic performance is so high. The key weightlifting movements of the snatch, clean, and jerk are the most efficient lifts for improving sports performance.

Such a high transfer means that the movements carry over to multiple lifts and athletic capabilities. Take the clean for example. The clean will carry over to a front squat, deadlifts, force absorption, jumping ability, and the list goes on and on. There really isn't another movement like the clean that will carry over to that many various lifts and athletic capabilities.

Think of how the clean can mimic a takedown in wrestling—change levels (pull under the bar), absorb the force of the opponent (barbell), explode up and through the opponent (squat with absolute strength and co-contractions), and score the takedown. Cleans even improve mobility in various joints: ankles, lower back, shoulders, knees, to name a few, which again, using the wrestling comparison, think of the ankle mobility as the knees travel over the toes when shooting (squatting in the full range of motion of the clean).

By doing these weightlifting movements, we can basically kill seven birds with one stone. From there, we need to understand and consider the weight we use on the bar. We need to be lenient with weight on the bar, realize when we want to increase the weight on the bar, and how proficient an athlete is with all the technical movements.

Teaching lifting techniques can be challenging but is more than doable. Resources on teaching techniques are plentiful and abundant. For brevity purposes within this book, we recommend picking up the book and course Comprehending Parabolic Periodization: Sport Planning And Technical Literacy to engage in greater detail with the topic of teaching and learning weightlifting techniques, as well as the Olympic Weightlifting Technique Course.

In Review:

- ▶ Program the snatch, clean, and jerk.
 - ▶ Transfer of training is high.
 - ▶ Multiple physical aspects of athletic development are targeted in single movements
-

■ Weightlifting Variations For Sport

A lot of sports performance coaches may say that they don't want to use weightlifting movements because they don't want to develop Olympic weightlifters. Coaches want to develop football players, swimmers, and other sport-specific athletes. They think they don't need weightlifting movements. That is bogus. Athletes and sports performance coaches do need weightlifting movements, and here is why.

When we look at the snatch, clean, and jerk, we have to look at them as these huge umbrellas. For instance, we can look at the snatch and start to think of variations that fall under this umbrella that can transfer really well to a sport: muscle snatch, one box snatch, power snatch, high hang snatch, two box snatch, snatch pulls, and a near-infinite list of movements that will fall under the umbrella of the snatch. These variations are not only easier to execute but they can be more sport-specific.

Think about a pause below the knee power snatch. In the movement, there is an isometric muscular action to increase lower back strength and hamstring coordination. Then there is a big explosive pull and finish into the catch making it a great exercise for football players, wrestlers, or swimmers coming off the start.

All of the weightlifting movements have specific variations that can be used. Look at the clean: power clean, high hang power clean, two box power clean, one box power clean, muscle clean, pause below the knee clean, and again, the list goes on. It is an endless amount of exercises that are functional and can be applied to the athlete's body's learning and developing a larger kinesthetic vocabulary and capability.

That is a big key here. The body is learning. The body is adapting. When the body adapts, it learns the exercise, the technique, and expands its kinesthetic vocabulary. And when we have a huge plethora of exercises to adapt to, the body becomes smarter and can move better.

That then takes us into the jerk. We have the push press, behind the neck push press, behind the neck power jerk, behind the neck split jerk, linebacker power jerk, linebacker split jerk, and once again, the list goes on. In this list, we have all these movements that provide shoulder stability and a very rapid rate of force development that is applied to dynamic trunk control because the athlete's body is learning how to apply force through the ground into the trunk and then into the hands holding the bar.

4.2 Olympic Lift Variations

Variation	Olympic Lift	Why?	
Power	Snatch Clean Jerk (No split)	<ul style="list-style-type: none"> ▶ Lower load ▶ High neural drive ▶ Speed 	
No Feet	Snatch Clean	<ul style="list-style-type: none"> ▶ Feel upper body ▶ Slight load decrease ▶ Feel ground forces 	
Hang High (above knee) or Low (below knee)	Snatch Clean	<ul style="list-style-type: none"> ▶ Load lower back ▶ Feel eccentric load ▶ Heavier weight ▶ Improve finish 	
Boxes One box (6") or Two box (12")	Snatch Clean	<ul style="list-style-type: none"> ▶ Easy on lower back ▶ Higher weight ▶ Improve finish 	
Pause at Knee Above knee or Below knee	Snatch Clean	<ul style="list-style-type: none"> ▶ Technical improvement ▶ Feel positions ▶ Knee movement ▶ Load lower back 	
Pause at Catch	Snatch Clean Jerk	<ul style="list-style-type: none"> ▶ Trunk Control ▶ Mobility ▶ Stability 	
Linebacker Bar behind the neck, drive from boxes to catch	Jerk	<ul style="list-style-type: none"> ▶ High Neural drive ▶ Coordination ▶ Rapid force development 	

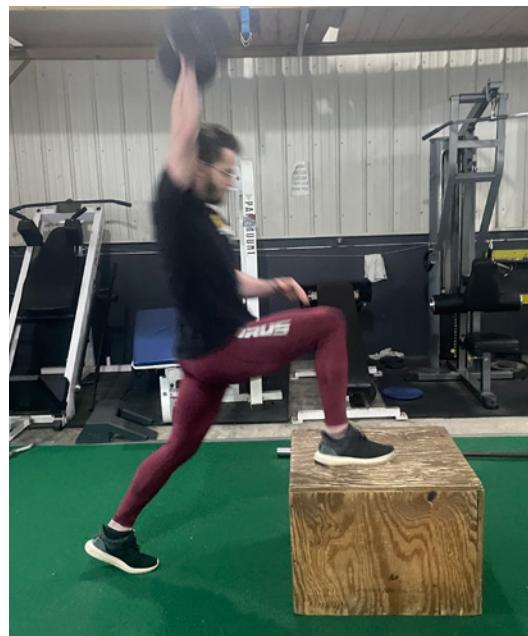
We utilize all of these variations that transfer very well to specific sports. As a coach, we then utilize and test the variations to figure out which movement transfers best to their respective sports as well as which movements their bodies respond to best.

In Review:

- ▶ The snatch, clean, and jerk are large umbrellas for near-infinite exercise movement selection
- ▶ Variations allow for sport specificity to be honed in on
- ▶ Variations educate the body into having a larger kinesthetic vocabulary

■ Reflexive Strength Training

Something we want to talk about inside technical coordination is a term that will become one of the most important concepts in strength and conditioning and sports performance within the next decade. That concept is reflexive strength work. Reflexive strength training is athletic movements that cover the range of the X, Y, and Z-axis. Reflexive strength movements operate within an omnidirectional graphic frame. They are not just compound movements, but they are elastic movements, reactive movements, and require a ton of springiness that lead to movements that may remind people of plyometric movements but loaded. They also come across as abstract and unconventional in regards to the conventional lifts of yesteryear.



Reflexive strength exercises are compound movements on various planes that are loaded. To give an idea, a good example of reflexive work is dropping a dumbbell, catching the dumbbell, immediately performing a snatch while simultaneously stepping forward onto a box. In this exercise, athletes are forced to absorb force while combining unilateral explosive work through a range of positions and areas. Another reflexive movement example involves putting a barbell on an athlete's back. Balancing on one leg, the athlete will bend at the trunk into a single-leg good morning. The athlete will then coordinate the leg serving as a counterweight to the trunk to swing through, simultaneously lifting the trunk, and stepping the swinging leg onto a box. Call this movement a single-leg good morning to box step through. Don't want to step onto a box? Have the athlete step into a lunge. Want to make the athlete coordinate the upper body as well? Have the athlete step and press the barbell. Just remember, do not overload the movement. Reflexive strength movements need to be fast, require balance, and operate over a graphical sphere that is more calculus than arithmetic.

Utilizing reflexive strength training is a key component behind technical coordination. These movements do not showcase absolute strength. However, they do showcase the rate of coordination, kinesthetic awareness, and stability. The other bonus is the movements are easy

to recover from because the load is low. Another plus is the coordination required is off the charts. The body has to coordinate all muscles, move in different directions, and provide stability through dynamic trunk control in different areas. It also becomes fun as a coach from a creative and artistic mindset of application.

As a coach, we can experiment with reflexive strength work and exercises that carry over well. It is also important to use reflexive strength training with younger athletes later on in a program and later on in their training day. Reflexive strength work also needs to be really light. Then as the athletes progress in age and athletic ability (by the time they are 22 or older and possibly professional athletes) then reflexive strength movements can be used as primary movements.

Reflexive Strength: Exercises that cross multiple axis points and require rapid and coordinated movements that force the athlete to react quickly and transfer forces across their body and the load as efficiently as possible.

In Review:

- ▶ Reflexive strength exercises are compound movements on various planes that are loaded
- ▶ Reflexive strength movements do not showcase absolute strength but instead showcase the rate of coordination, kinesthetic awareness, and stability
- ▶ As a coach, experiment with creative movements (but don't overdo it)

■ Analysis Of Movement Using Technical Coordination

One of the best parts behind technical coordination movements is understanding how we as coaches can analyze movement and movement patterns to see where the athlete may be lacking. With any of the movements we choose to use, we will be able to see where the athlete lacks coordination. Imagine, if the athlete presses out a jerk frequently, they might lack coordination in their elbow extensors, coordination in their shoulders with stability, or their rhomboids poorly communicate with their triceps. As coaches, we can see different areas where the body might be lacking. Diagnosing areas in which athletes lack coordination requires the proper exercise prescription.

We as coaches are taught where athletes' bodies may be lacking through our constant viewing. As coaches, we must learn from these lessons presented to us daily by analyzing and watching movements in real-time and on video. It is important that we start to understand the top-down (intentional movement) and bottom-up (reactive movement) feedback loops. The nervous system reacts differently in the bottom-up model than the way the brain is quick enough to respond. This is important to a coach and their development as an instructor in developing athletes' movement vocabulary.

Viewing technical coordination movements also provides a mobility test. As we start to utilize different movements of technical coordination, we can understand where athletes lack mobility. Looking at the sport the athlete is involved in, we can hone in more directly to mobility needs. Take a swimmer as a case study, their mobility coming off the wall has to be very different than a wrestler, football player, or soccer player. A swimmer doing a flip turn is in a very deep position with no stretch-shortening cycle when they hit the wall. A soccer player will rarely if ever, hit that deep of a position. Realizing the different mobility needs between various sports naturally impacts the training prescription. No stretch-shortening cycle in a deep position? The athlete will benefit from pause squats. Never in that deep of a position? We never want to abandon the full range of motion movements, but power style movements have their place.

In Review:

- ▶ Use technical coordination movements to see where the ranges of motion are needed on the field or where athletes lack intramuscular coordination
- ▶ Use specific technical coordination movements to enhance movement patterns over a long period of time

■ Analysis Of Mental Approach Using Technical Coordination

The analysis of the mental approach to training using complex movements (weightlifting movements, reflexive strength training movements) is awesome. The first movement inside of a day of programming when laying out an actual day to be done is going to be a snatch, clean, or jerk variation. This occurs because the movements are so complicated. They are very hard to do.

We as coaches can learn how the individual athletes handle instructions. So if we are teaching a weightlifting variation like a power snatch or a one-box clean, we can also learn how they communicate with us as we give instructions. We can also learn how individual athletes handle stressful learning situations. Maybe as weight is added, instead of dropping under a power snatch, they start to do almost a muscle snatch, indicating the learning situation is becoming stressful. We are thus granted a window to peer through and see how the athlete handles stress when in a learning situation.

To add more mental and physical stress, use these complex movements on a clock to mimic the game clock. We can do drills where athletes have to perform a weightlifting movement on the minute. We can go for fifteen to twenty sets of the weightlifting movement to emulate the game clock. Mimicking the game clock not only trains the energy system, but we are also learning how the athlete handles stress and how well they execute complex movements under physical stress as well. We can provide cues to help athletes stay engaged when under this level of mental and physical fatigue. The great benefit of a drill such as this is it improves competition execution because of what is being done in the weight room.

In Review:

- ▶ Technical movements are complicated and need to be the first movement performed in the day's workout
- ▶ Technical coordination movements provide both physical and mental stress that is to be analyzed by the coach to develop an athlete profile

■ Skill Based Learning For Optimal Performance

The most important concept here is that skill-based learning for optimal sports performance is that all of these movements require skill, cognitive power, and a lot of focus. Because of this, a lot of coaches will shy away from reflexive work and technical coordination movements in general because they are hard to learn, hard to teach, and hard to coach.

Hard doesn't mean impossible. If the movements are not shied away from and we go full steam, coaching the athletes up, and figuring out what makes the athletes tick, things drastically improve with performing and learning such difficult movements. The relationship between coach and athlete improves as well. Athletes respond better and we the coach understand more about how the athlete behaves. The athlete starts to master their skill-based learning. Mastering skill-based learning is key because it opens many doors in the acquisition of a greater kinesthetic vocabulary and grander expressions of strength.

Weightlifting movements and reflexive strength movements develop athletic skills. Skills lead to domination in sports performance. Skills with co-contractions, skills with coordination at really high speeds, power development, or producing a ton of force in a reflexive movement or weightlifting movement in the weight room allow athletes to kinesthetically understand how to transfer these skills learned in the weight room onto the athletic field. In this way, weightlifting movements and reflexive strength movements development of athletic skills to smooth the path for optimal performance.

In Review:

- ▶ Utilize all technical coordination techniques to enhance skill-based learning for sports performance
- ▶ Technical coordination movements require skill, cognitive power, and a lot of focus



Chapter 5: **Absolute Strength**

Absolute strength is the amount of energy or strength that an athlete has or needs to execute a typically slower movement, at least in comparison to the speed needed for technical coordination movements and reflexive strength movements. Think of a back squat or a clean pull when thinking of absolute strength. A back squat is a prime example of an absolute strength movement. It is a little bit slower, not overly specific, much more generalized movement that does not require a ton of skill to execute (it does require skill), and a whole bunch of weight can be loaded on to create a lot more general strength for the athlete when performed.

By creating a lot more generalized strength, we can use multiple modalities of training to make a specific transfer to the sports world. Think of generalized strength as what is often described as farm strength. Generalized strength is the ability to be strong in everyday movements and moving objects with a non-specific structure. Think of the ability to shovel a driveway or maneuver a wheel barrel. Generalized strength is often best expressed and bettered in the weight room through the performance of absolute strength movements. Absolute strength is building a huge engine that we can then use other tools and techniques to make the general strength carryover to the specific strength needed for sports performance.

Absolute Strength: The total amount of weight that an athlete can lift. Maximal force production in a single movement that should be approached with the intent to move as rapidly as possible.



Movements

The staple movements used for absolute strength are full-body strength movements. The back squat, front squat, single-leg squats, deadlifts (to a point), and trap bar deadlifts (to a point) for the lower body. For the upper body, we can use bench presses, dumbbell bench presses, incline presses, dips, pull-ups, rope climbing, and other movements along those lines. Exercises that will increase general strength from the specific movements mentioned prior are elegant in their simplicity. The exercises accomplish much from the standpoint of making athletes traditionally strong, able to move an opposing, static force, and greater at resisting the ever-present villain of lifting and jumping, gravity.

Once the specific movements of absolute strength development are mastered, we can start to provide more load on the movements, use absolute strength movements to increase the weight used for technical coordination exercises, use the absolute strength movements to enhance speed and overall agility, all while constantly remembering there is a point to the absolute strength movements. The point is to make athletes stronger so they don't get bullied in competition when facing opponents directly, are capable of greater expressions of strength, and, maybe most importantly of all, develop the mental confidence built from the absolute strength weights achieved.

In Review:

- ▶ Absolute strength movements are full-body movements that target the lower body and/or the upper body
- ▶ Absolute strength movements contribute greatly to an athlete's general, overall strength
- ▶ Include squats, deadlifts, benches, and pull-ups

■ When To Prioritize Absolute Strength

When training for absolute strength to build the muscle car engine, programming should undulate, going back and forth between higher intensity and lower intensity, like squatting 500 lbs versus squatting 225 lbs. It is important to undulate back and forth like a parabola. The undulation might be over a month-to-month basis. The undulation might be over a year-to-year basis if we are training a complete novice, like a 10, 11, or 12 year old.

Understand that undulating between various intensities (the weight on the bar) does not necessarily make things easier. In the dynamic feedback loop, there are points where volume is prioritized. Volume increases and decreases are prime examples of how intensity undulates in multiple manners. Following that same thread of undulation, the inverse is true as well. The volume can lower and the intensity can increase through adding weight. Instead of performing 5x5 back squats, the athlete is now being asked to perform 7x1 back squats. In this example, the total tonnage of weight moved with the 5x5 is significantly more than the 7x1, but the 7x1 will come with its own intense challenges through the greater weight on the bar.

The undulation needs to occur over various time frames. As discussed with the dynamic feedback loop, the undulation functions primarily under the ideas of volume (sets and reps) and intensity (weight on the bar). Being a slight misnomer,

5.1 Absolute Strength Exercises

	Exercise	Rep Schemes	Why?
Lower Body	▶ Back Squat	4 x 5, 1 x 10	▶ Improve coordination
	▶ Front Squat	3 x 4/2 x 7	▶ Enhance mind-muscle connection
	▶ Single Leg Squat	5 x 5 6 x 4	▶ Improve global and local recruitment
	▶ Clean Pulls (max 4 reps)	7/5/3/5/7 7 x 3	▶ Strengthen posterior chain ▶ Improve technical coordination STRENGTH
Upper Body	▶ Bench Press	4 x 5, 1 x 10 3 x 4/2 x 7	▶ Upper body power
	▶ Incline Bench Press	5 x 5 6 x 4	▶ Upper body coordination ▶ Shoulder stability
	▶ Shoulder Press	7/5/3/5/7 7 x 3	▶ Upper body strength

the weight is always being pushed whether in a volume or intensity portion of the dynamic feedback loop. The true difference in the undulation is always the reps and sets. Asking an athlete to perform a 5 rep max is different than asking an athlete to perform a 1 rep max; this is the essence of the undulation between volume and intensity over selected time frames.

Timeframes function on a micro level and a macro level. Micro levels are on a day-to-day and week-to-week basis. Undulation occurs day to day by alternating between lower and upper body absolute strength movements, and even alternating exercise selection within lower and upper body workouts. Undulation in volume can also occur day to day, focusing on high volume at the beginning of the week, and high intensity at the end of the week. On the week to week basis, undulation can occur by changing the volume globally across all workouts in one week and increasing it in the next week.

The day-to-day runs its course over the span of a week, with four to six days of training in there. The weeks' days are then repeated over the course of four weeks. This brings about the macro level of training with four-week cycles making up the exposure, comprehension, ascension, and summit phases. The realization phase is typically shorter, but in general, the accumulation of the five phases of the dynamic feedback loop lasts for a 20 week period. Throughout this time, absolute strength is steadily growing. The absolute strength engine is being built up and cultivated.

The age of the athlete matters. Having a year of high hypertrophy work, or volume work, we can actually build the size of the engine with basically all age groups, though training level needs to always be considered. Hypertrophy work is increasing the size of a muscle belly. With a young beginner, it is important to develop the size of that muscle belly because over time that size will lead to better muscular and neurological coordination. We can then slowly undulate to a higher intensity to increase more high threshold motor unit recruitment. It is important for younger athletes to build the size of the muscle bellies through hypertrophic work because they are almost always too young and physically immature to realize legit, adult, grown person strength. That doesn't mean they can't be strong, but it does mean young athletes will not at 12-17 years of age demonstrate the strength they will eventually be capable of expressing.

Hypertrophy work plays a very important role in the development of absolute strength. Don't shy away from hypertrophy work because of the association with bodybuilders. Athletes benefit a lot from hypertrophy work. As mentioned, hypertrophy work increases the size of muscle bellies, allowing athletes to push the weight on absolute strength numbers. The pursuit of heavier weight on the bar needs to be appropriately pushed to develop athletes.

In Review:

- ▶ Undulate back and forth between high volume and high intensity
- ▶ It can undulate over months, years, or weeks; age has a very large impact on the rate of undulation

■ Analysis Of Athletic Coordination

One of the most important concepts to understand is realizing how absolute strength transfers to the sports world. We need to use the analysis of athletic coordination, meaning how can we see that athlete A is not as coordinated as athlete B. For a ridiculous analogy, let's say both athletes A and B squat 600 lbs but athlete B has a 40" vertical leap while athlete A only jumps 20". This means that athlete A almost will always need a higher level of absolute strength to reap the reward athlete B gets from absolute strength. In this example, athlete B has greater rates of coordination and scores higher through the analysis of athletic coordination.

Rates of coordination can be tested in a few manners. For instance, athlete A squats 600 lbs and power snatches 100 kilos. Athlete B squats 600 lbs and power snatches 150 kilos. This shows that athlete B has a much greater rate of coordination with high-speed movements. Another example can be done with the bench press. Athlete A and B both bench 400 lbs. Athlete B can do an explosive push up to a 20" inch box while athlete A does an explosive push up to a 12" box. Again, athlete B coordinates faster which signals superior athleticism.

As coaches, we can play the game of comparing absolute strength to the more complicated movements that require a higher rate of coordination.

After using an analysis of athletic coordination test that best relates to the kinesthetic expression we want to further develop, we can use something like contrast training to elicit a better response from athlete A. Contrast training could be something like doing a back squat, rest two minutes, and then do hurdle hops for a set of three or a set of bounds for a set of three. This will improve the coordination speed of athlete A.

The overarching lesson is that absolute strength can be used to analyze athletic coordination very easily, and it can be seen at a very early age. Seeing the disparities between different types of athletes allows coaches to recognize athletic coordination pitfalls and successes from absolute strength. The sooner coordination roadblocks are recognized and manners to improve rates of coordination are implemented into the training, and the longer it is implemented, the faster the gap in absolute strength and rate of athletic coordination can be made up.

In Review:

- ▶ Realize how absolute strength transfers to sports performance
- ▶ Rates of coordination can be tested in a few manners
- ▶ Absolute strength can be used to analyze athletic coordination

■ Establishing Best Movements For Specific Sports And Understanding Benchmarks

In various sports, it is important to establish the best movements for absolute strength for that specific sport. A great example is offensive linemen in football. Offensive linemen block with their hands. Bench press has a tremendous carryover to offensive line work; the same for defensive linemen. For another example, we can think about swimmers. Outside the breaststroke, most of the exercises that have a big benefit for swimmers with the best carryover are going to be rope climbs, chin-ups, monkey bars, and movements of that nature. The comparison of the two sports upper-body exercises showcases that one benefits more from presses while the other benefits from pulls. The absolute strength movement is different but the necessity of using an absolute strength movement still remains.

As coaches, we have to establish the benchmarks for where athletes have to hit relative to their training for sport. That is to say, we can set a benchmark of a weight a swimmer has to hit for a weighted dead hang pull up for a set of five. We then need to create a ratio for a high rep pull-up, say twenty reps not weighted. An established benchmark is important and must be relative to their sport. The linemen in football will be more focused on benching and squatting because those two absolute strength movements provide a greater transfer of training in service of the sport of football.

5.2 Example Benchmark Lifts for Division 1 Football Recruits

Lift	Reps	Line	RB/LB	QB	DB/WR
Snatch	1	225	225	175	185
Clean	1	305	300	225	265
Back Squat (Below parallel)	1	405	350	275	315
Front Squat	3	350	315	250	300
Single Leg Squat	3	275	315	225	275
Bench Press	1	365	315	225	275
Incline Bench	1	275	250	185	225

*All weights are in lbs.

The established benchmark lifts differ from sport to sport. As coaches, we have to establish these specific benchmark lifts for each sport. With these benchmarks created, we can sit down with our athletes, inform them what absolute strength movements to utilize to lead to elite athletic performance in their chosen sport, and then we can create goals based on these target movements to increase the athlete's specific absolute strength lifting.

Continuing with the benchmark movements, we have to have an understanding of the absolute strength movements transfer of training relationship from the gym to the competitive sporting environment. Using the example of an offensive lineman who can bench press 400 lbs as a max and can bench 315 lbs for a set of five at 1.3 meters per second, they have a really good benchmark lift(s) established. Such speed and absolute strength work will be demonstrated in their pass protection, the ability to extend opponents away from their body, and more engagement through the hands and arms run blocking. If we have the swimmer (or wrestler) focused more on a rope climb with a 50 lbs kettlebell or a pull up with a 50 lbs kettlebell and a high volume of achievement for endurance strength by performing a set of twenty pull-ups, we will see the benchmark levels reached demonstrated by stronger collar ties (wrestlers) and a greater power pulling through the water (swimmers). The benchmark movements, as well as milestones in achievements (like performing a 1 rep pull up with 67% of one's bodyweight hanging from their person), indicate clear strides forward in the weight room and will more than likely manifest as improved performance in sporting competition.

It is important that we understand benchmark movements and how to apply them directly to various sports. Benchmark movements are necessary to increase absolute strength, create a direct transfer of training, and showcase performance metrics that often predict capability in sports competition. One unsung novelty of establishing benchmarks is that they provide goals for athletes to achieve and strive towards. Benchmarks function as a valuable tool and need to be in every coach's repertoire.

In Review:

- ▶ Establish benchmark lifts based upon specific sports
- ▶ Use benchmark lifts for goal setting
- ▶ Again, establish benchmark lifts based upon specific sports
- ▶ Again, use benchmark lifts for goal setting
- ▶ This is said twice because it is IMPORTANT

■ Point Of Diminishing Returns

It is well established that absolute strength has a tremendous carryover. With benchmarks in mind, let's talk about establishing the levels of achievement for benchmark lifts. Using the lineman example of benching 405 lbs, 455 lbs, to benching 500 lbs there comes a point of diminishing returns.

Do we really need to have an athlete squat 750 lbs versus squatting 600 lbs? Do we really need a swimmer to do a pull-up with 150 lbs versus 100 lbs? Is there a point of diminishing returns? Or more specifically, are we spending too much time in the weight room instead of enhancing technique out on the field or pool or court? This is where we have to establish where the point of diminishing returns exists for athletes on an elite level.

The point of diminishing returns may be a decade away. It may take ten plus years for an individual to hit that point of diminishing returns. As coaches, we need to be aware that a point of diminishing returns does exist. Once athletes get to that certain level, coaches can back off of absolute strength and work to maintain the absolute strength the athlete has worked a near lifetime to achieve. We can focus on technical coordination, reflexive work, dynamic trunk control, and things of that nature even more often.

The goal is to establish the point of diminishing returns and then try to get athletes' absolute strength and technical coordination movements to that point so that the athlete can focus more on the technical game/sport. This allows the athlete to spend more time outside the weight room to become a better athlete on the plane of competitive play.

With that said, spending more time outside the weight room to become a better athlete on the plane of competitive play must always be a priority throughout sports performance coaching and the development of athletes. So few athletes are able to push and reach the pinnacle of absolute strength numbers that will only bring about diminishing returns. For the majority of athletes who never reach the hulking absolute strength numbers, like squatting 750 lbs, it is still mandatory as ever to train other attributes such as technical coordination, reflexive work, plyometrics, bodybuilding, the trunk, and other accessory exercises to improve sports performance.

In Review:

- ▶ Establish the points of diminishing returns
- ▶ It takes years to get there
- ▶ Primarily impacts elite athletes



Chapter 6: **Plyometrics**

■ Analysis Of Sport Related To Necessary Plyometric Goals And Purpose

We have to be aware of what plyometrics are. Stated simply, plyometrics are the use of explosive movements to generate maximum force in a short period of time. Plyometrics are primarily jumping with the lower body and creating similar expressions of strength with the upper body—clapping push-ups for example. Athletes will do single-leg jumping, bilateral jumping, sprinting (to a point), and agility work, stressing that plyometrics will primarily be based around jumps: depth drops, box jumps, hurdle hops, and things of this nature.

Laying out the training program, on day one we will have a technical coordination slot, an absolute strength slot, accessory work slot, and dynamic trunk control slot; this slotted template may be two days a week as the athlete's training focus. On the third day, we may focus entirely on plyometric work and dynamic trunk control work.

We need to be aware of what type of cutting and what type of acceleration is needed in a sport. Is it bilateral? Is it unilateral? Is it panoramic, joystick-induced zig-zagging? Is it very specific to a type of range of motion? What speed is the movement performed at? We need to know the characteristics of the sport that then need to be brought into the plyometric training session. And last, what are the impacts and results needed to transfer over to the athletic field of competition?

Plyometrics' overarching impact is to create more explosive, rapidly coordinated expressions of strength. Plyometrics, and by association jumping, allow for improved



training of force absorption, balance (particularly with unilateral movements), application throughout vast ranges of motion, unlimited directional movement over three-dimensional planes, and the reapplication of force. Plyometrics combats that ever-present nemesis of sports performance, gravity. Another thing, and what often goes unsaid, plyometrics can be performed with absolutely no equipment with a clever, spatially aware mind.

If we look at the impact different plyometrics have on an individual and how they transfer over to the sport, we can see a lot of good being manifested. Look at a plyometric movement like hurdle hops, which might transfer really well to offensive linemen because hurdle hops develop an explosive first step, require deceleration on the landing, and require absorption of force to be reapplied to leap over the following hurdles. Hurdle hops might also make the linemen more fatigued for two to three days. It is important to understand that hurdle hops, plyometrics in general, will elicit a huge response but in the short term it might create a negative feeling on the athlete's overall feeling.

In Review:

- ▶ Plyometrics are primarily based around jumping
- ▶ Be aware of what type of cutting and what type of acceleration is needed in the athlete's sport being trained for
- ▶ Different plyometric movements have different short term and long term impacts on the athlete

Bilateral Plyometric Work

Bilateral plyometric work is the easiest way to introduce plyometrics to athletes. The easiest way to get athletes to learn how to be reactive and to develop force rapidly is by using bilateral plyometrics. Bilateral movements serve as a great means of introducing young athletes (ten, eleven, or twelve years old) to plyometrics; bilateral movements are great for novice athletes despite their age as well.

Bilateral plyometrics means using two legs to jump onto a box, a step, over a mini hurdle, or a medicine ball. Bilateral movements are less complicated than using unilateral movements. Despite lauding the merits of using bilateral plyometrics

6.1 Weekly Program Template

Group	Exercise Type	Sets
Day 1: Lower Body	1 Technical Coordination 2 Technical Coordination 3 Absolute Strength 4 Dynamic Trunk Control/Accessories	4-6 4-6 4-6 2-4
Day 2: Upper Body	1 Technical Coordination 2 Absolute Strength 3 Hypertrophy	4-6 4-8 3-5
Day 3: Athlete Day	1 Technical Coordination 2 Plyometrics 3 Dynamic Trunk Control	3-4 3-6 3-6
Day 4: Lower Body	1 Technical Coordination 2 Technical Coordination 3 Absolute Strength 4 Dynamic Trunk Control/Accessories	4-6 4-6 4-6 2-4
Day 5: Upper Body	1 Technical Coordination 2 Absolute Strength 3 Hypertrophy	4-6 4-8 3-5

movements with youth and novice athletes, the exercises are not reserved just for beginners. Bilateral plyometrics are great movements regardless of age, experience, or ability level. The point is that bilateral plyometric movements have a low entry fee but like any great and simple expression of strength, the rewards are bountiful.

Bilateral jump work can be executed in other ways than just standing. Seated bilateral work can be used to create variation, alleviate the potential settling in of boredom, and create new neural disruptions upon introduction. Using seated bilateral work elicits a positive response, especially for athletes who struggle with utilizing their hamstrings. In the seated position, the hamstrings will pull the hips forward from one box to jump onto another box. Seated bilateral jumps are the next, easiest way for young athletes to start to learn and execute bilateral movements. Again, seated bilateral jumps are effective for all athletes regardless of age, experience, or ability level.

That then takes us into contrast training with bilateral plyometric work. Contrast training is the paring of absolute strength movements with plyometric movements. Contrast training is using an absolute movement, like a set of three front squats in a bilateral position, followed by a rest of two minutes, and then performing hurdle hops. Contrast training is a way to complicate the training regimen without fabricating more neurally demanding plyometric movements.

Contrast Training: Pairing exercises together in a superset, usually an absolute strength movement paired with a plyometric movement, that improves the neural response from both.

The contrast-based training then takes us into reactive-based training, which include exercises like a depth drop into hurdle hops or simply executing hurdle hops with a fast reaction between jumps. This is much more reactive-based training, but all movements are still done with bilateral execution.

It is important to note that during bilateral plyometric work, we want to look for co-contractions in the knee joint to make sure the quads and hamstrings are firing at the same time to create more stability around the knee. We want to make sure the calves and tibialis area are firing to protect the knee joint. We also want to be aware of the areas around the hips, noticing that the glutes and lower back are co-contracting as well to provide the needed stability. With the stability through the co-contractions, athletes will be able to produce a ton of force from the bilateral plyometric perspective.

To be able to see co-contractions in action, we want to first recognize detriments to movement efficiency. Detriments deter athletes from speed, rapid coordination, and being more explosive, indicating either a neural hiccup in the bottom-up signal or an inability to co-contract. One prime example is athletes who need to take the prep hop before the actual leap. Every sports performance coach has seen an athlete who takes a minor bunny hop before bounding to the box or over a hurdle. Another

example of a detriment to optimized co-contractions is seen in the landing when the hips of the athlete plummet and bottom out. Plummeting upon landing in a jump is a clear sign of not being able to co-contract the muscles to decelerate, absorb force, and reabsorb force to most quickly re-jump. A third example of an inability to co-contract properly can be seen from the lack of extension through the hips and knees occurring in congruence. A final example to point out is the time spent on the ground between jumps; notice the sound of the athlete landing to get an auditory sense of quicker co-contractions transpiring—we want ninja assassins, not elephants trampling through.

In Review:

- ▶ Start young athletes plyometric training with bilateral work
- ▶ Make sure co-contractions are occurring
- ▶ Start with simple movements and build as athletes become capable

■ Unilateral Plyometric Work

With unilateral plyometric work, there are a lot of different facets to be understood. Let's start by saying unilateral plyometric work is a lot more challenging than bilateral plyometric work. It is a lot harder to do contrast training from a unilateral position than from a bilateral position. Think about bilateral contrast training with doing front squats: do the set of front squats, rest, and go jump. The reps are manageable, accounted for, and the movements align up nicely with a one-to-one ratio. Doing single-leg squats we have to do three reps on one leg and three reps on another leg. The squat reps have doubled. Then we go and do our unilateral jumps, three reps on one leg and three jumps on the other leg. Again, we doubled our plyometric work. Contrast training with unilateral work is a recipe to speedily increase volume.

The overall load and fatigue and energy usage is quite a bit higher. Basically, unilateral plyometric work is double and way higher than if we just did bilateral work. Unilateral work is also more challenging because the athletes are in a unilateral position, which demands single-leg stability and a heightened awareness of kinesthetic proprioception. Single-leg movements are harder to do because athletes have to be more coordinated to perform unilateral plyometric movements, placing more demands on balance, coordination, and working against asymmetrical weaknesses (which is a good thing but creates a larger degree of fatigue, both mental and physical).

The higher coordination demanded of unilateral plyometric movements is also its greatest benefit. Unilateral plyometric exercises transfer really well to sports and help athletes become more coordinated, more symmetrical in their power output, and just overall more athletic. Harkening back to our absolute strength example where we had two athletes back squatting 600 lbs, with the less coordinated athlete we will want to use more unilateral plyometric work to increase their rate of coordination but we would not want to do it through contrast training.

We want to use unilateral work because it will help with agility, cutting, co-contractions, and help coaches see the clear dominant to the non-dominant side of the athlete. Typically athletes that aren't as coordinated have a higher level of disparity between their dominant side and non-dominant side. The sooner athletes start to learn and utilize unilateral plyometric work the better they get at it and the more coordinated the athlete will become. This leads to better transfer over to the field or court or arena of sport competition. Most sports are played in a unilateral position. Think of a wrestler, a basketball player, or any field sport where athletes run; they aren't running bilaterally doing double leg bounds. Not at all! They are running and cutting unilaterally.

In Review:

- ▶ Utilize single leg plyometric work in the beginning to understand the dominant and non-dominant side
- ▶ Unilateral exercises have a big impact but can make athletes more fatigued
- ▶ They improve less coordinated athletes
- ▶ They give a drastic advantage on the competitive playing field

■ Implementation Of Plyometrics Into System

It is extremely challenging upfront to implement plyometric work into a system. To begin, we have to take the perspective of looking at lower body plyometrics (hurdle hops, bounds, single leg bounds, etc.) and upper-body plyometrics (clap push-ups, med ball throws, push-ups to boxes, etc.).

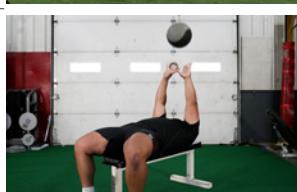
From there, we start by doing plyometrics once a week. We want to make the movements really easy to begin. Start with having athletes jump onto a box, over a hurdle, or do a jump lunge. Making the movements easy to execute allows the athlete to build up to doing plyometrics two days a week.

When programming plyos two days a week, we can start to pair them with absolute strength movements as a contrast method. Do this at the beginning of the week, have the athlete rest four days, and then on the back end have the athlete do easier lower-intensity bilateral plyometric work.

Two days a week of plyometric work is plenty. Just make sure to ease into it. Start with once a week and begin to add more complicated movements into that single day. As the athlete masters the more complicated plyometric movements, then go into two days a week and factor in contrast training movements.

Finally, like technical coordination movements, establish which exercises in the plyometric world transfer very well to the competitive realm of the sport being trained for. A sprinter will benefit greatly from single-leg bounds, increasing their overall sprinting ability. A swimmer performing explosive pull-ups, catching and

6.2 Athlete Day Example

	Variation	Reps and Sets	Why?	
Circuit A	PVC Pipe Walks	5 x 15 meters	► Stability and foot strength	
	Jump Lunges	5 x 3 each side	► Unilateral explosiveness	
	DB Snatch to Box	5 x 3 each side	► Reflexive strength	
	Stair Jumps	5 x 3 jumps	► Explosive reaction	
Circuit B	Hurdle Hops	Snatch Clean	► Reactive power	
	Side Band Jumps	Snatch Clean Jerk	► Lateral explosiveness	
	Medball Bench	Jerk	► Explosive upper body power	

exploding back up, will have a huge carryover to the pool. Understanding that the two movements proposed are entirely different movements, the movements still have a through-line in being the same type of movement when laying out the overall periodization.

In Review:

- ▶ Begin with one day a week
- ▶ Start easy and introduce more complicated movements into the single day
- ▶ Use contrast training a second day of plyos
- ▶ Identify movements that have the greatest carryover

■ Frequency And What To Look For

In the world of plyometrics, when starting with younger kids or novice athletes (regardless of age), once a week is plenty of frequency to teach the young athletes and novice athletes grounding mechanics, how to absorb force, how to cut, and all things of that nature. As they get older and more experienced, we can start to implement things like contrast training. This allows us to begin to do plyometric training twice a week. We will see that doing absolute strength work with some plyometric work will start to bridge that gap between the weight room and the athletic world, especially when coupled with a day reserved specifically for plyometric work (at Garage Strength, we call this plyometric specific day an "Athlete Day").

But what are we looking for as sport performance coaches? We need to be aware of athletes who when grounding do repeated jumps, stutter steps, or unnecessary steps. We also need to notice slow reaction times from grounding to jumping. Notice delays from side to side with the foot grounding (think left foot then right foot pitter-pattering to the ground not quite in unison, like a ghost note on the snare drum), or the feet grounding aren't in line, parallel and equal when landing. In a nutshell, notice how athletes land. We may also see athletes do a stutter step into another jump or land, pause, and then jump. Noticing such disruptions in coordination requires the sports performance coach to coach the athletes up. During the development of ironing out the kinks in landing mechanics and reapplying force, note how long it takes the athlete, whether that is weeks, reps, or months, to flush out the wrinkles.

We are looking for rapid muscular actions, grounding mechanics, and jumping mechanics to generally improve overall so athletes' athletic ability transfers better to the competitive realm so they can dominate in their sport.

In Review:

- ▶ Once a week is plenty for beginners
- ▶ Older athletes who are well trained can handle twice a week
- ▶ As coaches, we need to pay attention to grounding mechanics

■ Absolute Strength And Its Relationship With Plyometric Work

We have been mentioning using contrast methods. Contrast methods are where absolute strength pairs with plyometric work. The example we have been using is having an athlete doing a front squat (or a back squat) for a set of three or five reps, resting two to three minutes, and then athletes go and do their plyometric movement.

We can do this with the upper body as well. We can have an athlete do a bench press at 75% of their max for a set of three to five reps, nothing to be overly fatigued from, but enough that it will prime the nervous system, heightening the body's awareness so that the body is able to recruit a little more than it otherwise would. The athlete then rests two to three minutes to let the fatigue flush out and, now more neurologically primed and aware with the nervous system heightened, we can execute even faster plyometric movements through rapid muscular actions.

That is how we can use absolute strength: in priming, through contrast methods, and by teaching grounding forces and force absorption because athletes will be working through similar planes of execution in expressing strength. Think about it, if we are doing a back squat or front squat with a slower, controlled eccentric or a pause in the bottom, the movements will carry over well to the grounding mechanics and force production positions uncompromisingly demanded in athletic performance and necessary to effectively complete plyometric exercises.

In Review:

- ▶ Use contrast training
- ▶ Absolute strength movements prime the nervous system and heighten the body's awareness
- ▶ Working through the same planes helps with grounding forces and force absorption

■ Mobility And The Relationship Toward Plyometric Work

Think about the ankle joint, the knee joint, the hip joint and their relationships with plyometric work and power output (and even speed). Say we have an ankle that doesn't dorsiflex well so the knee doesn't travel forward. The limited dorsiflexion can have a negative impact on power output. Say we have an athlete with a very tight Achilles tendon that doesn't enable the knee to travel forward past the toe. In this manner, the knee being unable to travel over the toe is negative in the same way as the ankle that doesn't dorsiflex well. On the flipside, if the knee goes past the toe and the athlete is mobile in the dorsiflex position it will help with acceleration. It will help with the drive phase in sprinting, too. If the ankle is not mobile it impedes the athlete's ability to produce an abundance of force to accelerate.

When we talk about mobility (passive flexibility with stability through specific ranges of motion), we have to look at how mobile athletes' hips, ankles, and knees travel and stabilize in the lower body. With the upper body, we have to do the same assessment of how the limbs travel and stabilize through the joints' ranges of motion. All this means is that more mobile joints and more stable joints transfer better to the field, mat, court, or competition setting. A more stable and more mobile knee creates better co-contractions to allow an athlete to cut quicker and accelerate quickly from a range of angular perspectives.

Realize that lower limb mobility is paramount for executing really high-speed plyometric work. Be aware of how ankle, knee, hip, and lower back mobility can transfer to plyometric work and in turn lead to greater sports performance.

In Review:

- ▶ Mobility is incredibly important with plyometric work
- ▶ Mobility is paramount to executing really high-speed plyometric work



Chapter 7:

Accessories And Trunk Control

■ Analyzing Weak Points

When discussing accessory and trunk control we have to recognize what will be consistent problem areas for specific sports. It seems without question, in almost every single sport we will have possible knee issues, lower back issues, or shoulder issues. So when we lay out the programming plan and see the characteristics necessary for the athlete to be successful in their sport, we want to prescribe accessories that address specific problem areas. We need to have the foresight to make sure we are programming for mobility and stability in the shoulders, knees, and hips to avoid problems down the road.

Knowing the importance of mobility and the skillset to express strength and stability across a diverse range of motion, it is important that we begin with a strong base when addressing weak points, so we start from the ground up. The ankle may very well be the most important joint to protect, train, and stabilize to prevent injuries. The ankle is the joint closest to the ground and even in low impact movements like walking, the ankle is constantly active and being engaged. The ankle is the contact point in the chain of joints that cascade up the leg. An ineffective ankle joint can create a chain reaction for more problem areas to develop.

The knee is next in line. The knee is not an area where a range of motion is necessarily limited. However, the tendons around the knee often experience traumatic injury in open-skill sports. Open-skill sports ask for athletes to demonstrate chaotic coordination. Open-skill sports with the expressions of strength through chaotic coordination put joints, particularly the knee, in precarious



positions. Strengthening the tendons around the joints is imperative to plug leaks in the system. Stronger tendons decrease the likelihood of injury; it is impossible to eliminate trauma but it is possible to resist the likelihood. The larger the range of motion the knee travels and is strengthened through, the more stability that can be created in the joint. Besides full range of motion movements, bodybuilding movements help as well.

The hip is our next joint that needs addressing. The hip works closely with the lower back. Tight hips are indicative of a tightly wound, twitchy athlete. Strong, rigid hips are able to resist and push back against opposing forces. Still, mobility through a full range of motion is always the goal. With the hips, we want to address the joints through full range of motion movements, as well as utilizing abduction and adduction movements. Unilateral movements like lunges, Cossack squats, curtsy squats, lateral box step-ups, single-leg squats, and a few others all do an excellent job of loosening up the hips, creating more stability, and addressing the hip girdle in propriety (always remember the groin, connecting abdominal muscles, lower back muscles, glutes, and other surrounding muscles).

With the lower body we want to address the major joint closest to the ground, the ankles, immediately and with priority. Believe it or not, lack of mobility in the ankles

Chaos Coordination: The ability to rapidly coordinate various muscles and joints to stabilize and develop force during situations where unexpected, unstable, or extremely complicated movement is prevalent.

can negatively impact the shoulders (think of the chain reaction performing a snatch or overhead squat). The upper body is quite the opposite of the lower body, in that we start with the joint furthest from the ground with the shoulders. The shoulders take a pounding in contact sports. The shoulders go through extremely diverse ranges of motion. The shoulders are asked to contort, stabilize, and operate through incredibly fast movements of action. The shoulders are like an action film from the '80s. Because of this large task, it is important that the shoulder girdle is addressed thoroughly. There are many exercises that do just this, but the go-to accessory movement is dumbbell external rotations.

Traveling down the arms leads to the wrists and elbows. In the larger scheme, these two joint areas seem pretty inconsequential to big, burly expressions of strength. Not at all. Ever try to hit a heavy load front squatting with a bum wrist? Swing a golf club or tennis racket with a nagging elbow? How about bench pressing with either joint acting a fool? From a bodybuilding perspective, curls and curl variations become one of our best friends when protecting the elbows and wrists. Strengthening the surrounding musculature, both pulling and pushing prioritizers, is necessary.

Lastly, if athletes are in a contact sport, such as soccer, football, wrestling, or lacrosse, we have to train the neck. We have to train the neck in an explosive manner. We also need to train the neck in a slower, long-duration fashion as well. Both manners the neck to resist sudden blows help in protecting the brain to decrease the probability of receiving concussions.

In Review:

- ▶ Analyze weak points, see the problem areas, and program accessory movements to strengthen the joint
- ▶ Typically shoulders, lower back, and knees as the problem areas
- ▶ **ALWAYS TRAIN THE NECK** when dealing with contact sports

■ Hypertrophy Work

Some strength and conditioning coaches are completely against training athletes like bodybuilders. However, when we start to realize that joint health, even for power-based sports, is a really important factor we realize the benefits of bodybuilding exercises. The importance of joint health creates the ability to train longer, harder, and with more volume. Joint health is also paramount to decreasing injury, both from overuse and trauma. Hypertrophy work allows specific targeting of the musculature supporting and around joints to not only elongate an athlete's career but to allow them greater ability to train, prepare, and stay on the competitive field during play.

If we use hypertrophic training with higher reps, think in the range of five sets of twelve to fifteen reps, we may see some size increase in a specific muscle belly based around a joint. For example in order to stabilize the knee we decide to increase the

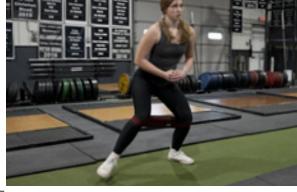
size of the quads and the hamstrings. Maybe we do Nordic hamstring curls for three to six reps and front squats for six to eight reps. This leads to larger muscles through hypertrophy in the quads and hamstrings. It also leads to more joint stability. It brings more blood flow to the joint. It will help with overall recovery. It will even help with in-season work.

Hypertrophy-based work, especially at the ages of ten years old all the way to twenty years old, is extremely impactful for developing athletes. Then from the ages of twenty to thirty-five years of age, use bodybuilding style movements as active recovery, as an easy training session or as in-season training sessions, all in an effort to bring in more blood flow, feel better and more stable in problem areas, flushing out some of the scar tissue in the process.

In Review:

- ▶ Hypertrophy work is important for athletes
- ▶ Hypertrophy work helps to improve joint stability, bring more blood flow to the joint, and overall recovery

7.1 Lower Body Hypertrophy Exercises

Variation	Reps and Sets	Problem Area Worked	
Walking Lunge	4 x 7/7 3 x 11/11	▶ Glutes ▶ Hamstrings	
Glute Ham	4 x 11	▶ Hamstrings ▶ Lower back	
Nordic Hamstring Pull	4 x 7	▶ Hamstrings	
Side Band Walks	4 x 7/7 3 x 11/11	▶ Glutes ▶ Hips	

■ Dumbbell Accessory Work Upper Body/Lower Body

It is really important to recognize that when we train with dumbbells we can train unilaterally or bilaterally. We can also train in a deeper range of motion using dumbbells. Without a barbell restricting movement past the chest, by bench pressing with dumbbells we can easily achieve a deeper range of motion; our hands and pecs stretch into a deeper range.

Almost all athletes will have one side of their body that they drastically favor over the other, one area that is drastically weaker than the other, or a lagging muscle part that stems from a traumatic injury or overuse injury. This is where dumbbells are irreplaceable. We can use dumbbell accessory work to target unilateral positions, deeper ranges of motion, and even try to wake up areas that may have suffered some type of trauma in the past so the athlete can come back, recover, and return to competing at a higher level in their respective sport.

7.2 Upper Body Hypertrophy Exercises

Variation	Reps and Sets	Problem Area Worked	
Miracle Gro	3 x 17 3 x 20 4 x 9	► Triceps ► Lats ► Shoulder Mobility	
Bicep Curls	3 x 17 3 x 20 4 x 9	► Biceps ► Elbow Health	
Lat Pulldown	3 x 17 3 x 20 4 x 9	► Lats ► Shoulder Stability	
Dumbbell Row	3 x 17 3 x 20 4 x 9	► Traps ► Upper/Middle Back	

In Review:

- ▶ Dumbbell training allows for unilateral and bilateral training
 - ▶ Training with dumbbells allows for a deeper range of motion
 - ▶ Dumbbell accessory work can be used to wake up areas that may have suffered past trauma
-

■ Trunk Control

The keys to dynamic trunk control are many. But why is it so important to accessory work? First off, the most important aspect behind dynamic trunk control is being able to absorb energy. In the weight room, when we do technical coordination movements, absorbing energy is demonstrated when receiving a clean, holding a back squat, or jumping and landing in a specific position. We want athletes to be stable and able to absorb the energy. We want the gut work of the athletes to lead to co-contractions with the back so the body can absorb everything, providing stability and foundation for the entire body. And this all must be done in a dynamic manner.

Doing things in a dynamic manner can appear in various athletic feats and expressions of strength. One example we can visualize is picturing an athlete running full speed. As the athlete goes to cut, the upper body does not keep going forward but instead is rigid through the co-contractions in the back, erectors, spine, and gut allowing the athlete to cut fluidly because they are absorbing the energy at a very high speed. Without the co-contractions and proper deceleration mechanics and musculature, the athlete will tumble forward like a barrel down a gangplank.

Training dynamic trunk control is unique in that we want to train dynamic trunk control from a bodybuilding-style at times, doing traditional ab exercises like an ab-roller, a reverse hyper, or hanging leg raises. We also want to train it dynamically by implementing various jumps and jumps with pauses. We also want to train it with weights: power clean with a pause in the catch or back squats with a slow eccentric.

In Review:

- ▶ Dynamic trunk control provides stability
- ▶ DTC helps absorb energy
- ▶ DTC improves athlete's cutting capability

■ Lumbar Flexion Exercises

Middle school and high school athletes almost always spend a lot of their time slouched forward. This will create lumbar flexion. The problem is that they have lumbar flexion with minimal muscular action. They are just passively sitting there hunched forward.

The next reason lumbar flexion exercises are important is that really good athletes, elite athletes, or athletes who have been developed over a long period of time might develop a slight anterior pelvic tilt because they are always in lumbar extension from years of training. They are always extending as they pull a clean, a snatch, or even if extending as a linebacker or lineman in sporting play.

We have two concepts here. Some kids in high school are in lumbar flexion but the lumbar flexion is passive and they lack the coordination to improve. The other side of the coin is that once they improve the constant lumbar flexion, the inverse becomes true and they are in lumbar extension quite a bit. We need to train the gut to operate in lumbar flexion to improve the coordination of all surrounding musculature to contribute more fully to dynamic trunk control.

Think of an athlete laying on the ground on their back and pushing their belly button down into the ground, flexing their lower back as well. We will see their abs start to quiver because they are learning how to coordinate their trunk. Hollow body holds or rocks are a great exercise to utilize to develop and train such abdominal ability. Or think of someone bringing their legs down, flexing their back and pushing the belly button down, and then they raise their legs back up while still pushing the belly button into the floor (we call this exercise Ironklad Abs). The Ironklad Abs movement forces the body into ranges of motion that address both lumbar flexion and lumbar extension.

We want to train lumbar flexion movements to push the anterior pelvic tilt, as well as to train better coordination between the gut and back when doing these movements so the coordination leads to better proprioception, better rigidness, and in turn, enhances dynamic trunk control which allows athletes to be faster and more agile in their athletic realm. Lumbar flexion occurs during sport as well, so it is important to solidify the position(s) for the chaotic coordination sport demands, particularly open-skill sports.

In Review:

- ▶ Passive lumbar flexion is unwanted
- ▶ Training lumbar flexion counters anterior pelvic tilt that may develop in well-developed athletes who are in lumbar extension routinely
- ▶ Lumbar flexion training creates better coordination between the gut and back for improved dynamic trunk control

■ Implementing Dynamic Trunk Control

Do we use dynamic trunk control movements specifically in the accessory realm of programming? Yes. However, trunk control will be trained throughout the entire program because all compound movement musculature energy production flows through the trunk. Absolute strength movements, technical coordination movements, reflexive strength movements, and plyometric movements all train dynamic trunk control directly in some fashion.

We will train dynamic trunk control even in the accessory portion of the workout, especially if we have younger athletes who need more volume with trunk control or if we have problem areas within specific sports that need to be addressed or when in-season. One reason for training dynamic trunk control during the accessory position of the workout is that we want to train the gut to rapidly absorb force. To do this, we might have athletes do movements where they rapidly bring a plate down to their stomach while perched on a decline bench or rotating and throwing a med ball.

7.3. Dynamic Trunk Control Exercises

Variation	Reps and Sets	Problem Area Worked	
Side KB Jumps	4 x 5/5	► Stable in the hip and trunk at higher speed	 
V Up Press	4 x 11	► Stable in trunk while putting out upper body force	
KB Press in Hip Lock	4 x 5/5	► Stable in hip and trunk while pressing in unilateral position	 
Walrus	4 x 15m	► Dynamic plank that forces dynamic trunk control	

We want to train rapid coordination to improve trunk control and the way the body absorbs energy. If an athlete can't receive the energy they can't reuse it. It's basic physics.

Leading into the utilization of isometric actions during the accessory portion of the workout, we might do exercises such as pausing in a V-up position or holding the legs horizontally while hanging from a pull-up bar to enhance athletes' overall trunk control.

The point being is that we want to use isometrics, rapid movements, and slower, more calculated movements to improve trunk control. Put this holistic approach to dynamic trunk control into accessory programming, particularly in-season. And with younger athletes who need more volume for greater exposure to dynamic trunk control, accessory movements need to be utilized over and over again.

In Review:

- ▶ Dynamic trunk control is trained throughout the programming
- ▶ Use accessory movements that are isometric, rapid, and slower, more calculated in nature
- ▶ Young athletes need maximum exposure to DTC accessory exercises (this doesn't mean overdue it)

■ Structural Integrity

This last portion of this chapter deals with structural integrity behind accessories and trunk control movements, which brings us to mobility work, yoga, and even passive stretching while executing meditation.

With the program layout of technical coordination, absolute strength, plyometrics, and then some accessory and trunk control work, we can ideally finish the workout with some mobility, passive stretching, or meditation to finalize and finish off the training session.

We might also prescribe for our athletes to go home and spend twenty to thirty minutes doing yoga an hour before bed. Realize that meditation and yoga, even doing things like mobility work, will lead to better structural integrity. Better structural integrity will lead to better joint stability, fewer injuries, and greater cognitive awareness. With greater cognitive awareness, athletes will be less likely to injure themselves when in a precarious position in the weight room or in the athletic realm. They'll also be able to control their emotions more through meditative practice.

So utilize mobility, yoga, meditation, and passive stretching inside a workout, but also encourage athletes, particularly young kids, to implement these elements later

on in the day. The encouragement of doing mobility, yoga, and mediation later will teach young kids how to take advantage of the time they have to further their athletic development. Also, go ahead and use phone apps to track progress and to help with accountability.

In Review:

- ▶ Program mobility, yoga, and passive stretching
- ▶ Encourage athletes to do mobility, yoga, meditation, and passive stretching at home



Chapter 8: **Speed Work**

■ Starting Speed

Picture a sprinter exploding off of the starting line or a lineman rising out of a three-point stance. This is the drive position. The drive position is the position accelerating out of a dead stop. It is the zero-step in trying to go fast. It is the moment of take-off when the rocket fuel is initially applied. It is important that the zero-step is deliberate, twitchy, and explosive. The sole goal is to get to accelerate to top speed as quickly as possible through effective mechanical coordination.

To make speed easy to think about, let's look at speed from the point of view of running a 100-meter sprint event on the track, the fastest running event in the sport of track and field. First look at the drive position with a clear focus on athletes' shin angles. We want the shins way past the toes. We want a steep shin angle to project the athlete forward and help the torso continue to project the body forward to drive down the track in the initial acceleration from the zero-step. A steep shin angle helps the locomotion of athletes accelerate as quickly as possible, potentially getting the human body from 0 miles per hour all the way up to 21+ miles per hour.

With the steep shin angle sending the body down the track, athletes have to have rapid recruitment, co-contracting muscles throughout the legs, trunk, and torso. To best develop rapid recruitment through co-contracting muscles, the use of plyometric work, technical coordination work, and the use of absolute strength are all necessary to build the capability known as overcoming strength.



Overcoming strength is the ability to eclipse the baseline of zero energy movement; overcoming strength is a part of the puzzle contributing to the body's ability to accelerate its sprinting locomotion from zero to twenty plus miles per hour as quickly as possible.

Starting speed is the understanding that athletes need to have rapid recruitment, absolute strength, and positive shin angles to have a positive trajectory down the track to lead to rapid acceleration and speed.

In Review:

- ▶ Steep shin angle
- ▶ Rapid recruitment trained with plyometric work, technical coordination work, and absolute strength work
- ▶ Overcoming strength is the ability to eclipse the baseline of zero energy movement

8.1 Speed Work Example Warm Up

Variation	Reps and Sets	Problem Area Worked	
Toe Walks	2 x 20m	<ul style="list-style-type: none"> ▶ Ankle mobility ▶ Plantar flexion 	
Heel Walks	2 x 20m	<ul style="list-style-type: none"> ▶ Ankle mobility ▶ Dorsiflexion 	
Heel to Toe Roll	2 x 20m	<ul style="list-style-type: none"> ▶ Dynamic ankle mobility 	
A Skips	2 x 20m	<ul style="list-style-type: none"> ▶ Hip Mobility ▶ Sprint technique work 	
B Skips	2 x 20m	<ul style="list-style-type: none"> ▶ Hip Mobility ▶ Sprint technique work 	
PVC Walks	2 x 10m	<ul style="list-style-type: none"> ▶ Foot proprioception ▶ Ankle stability 	
Hip Roll and Extend	2 x 10	<ul style="list-style-type: none"> ▶ Hip Mobility 	

■ Drive Phase And Acceleration

The most important aspect of speed training transferring over to the world of sports performance is understanding the drive phase. Understanding the drive phase is the most important concept to comprehend in all of athletics. Comprehension of the drive phase means being able to recognize, analyze, evaluate, and instruct the mechanics of the drive phase and acceleration, as well as the muscles that will be utilized during the drive phase and acceleration, to improve athletes' speed for sports performance.

When accelerating, athletes will utilize their quads, hamstrings, and glutes (the glute max is the biggest muscle in the entire body). Their feet, calves, and ankles will also be extremely active. The kinesthetic coordination and ability to co-contract these muscles effectively in the process of accelerating are incredible. The goal is to get athletes to maximize the use of their glutes and quads to rocket their bodies through the drive/acceleration phase. Essentially, how quickly athletes can go from the zero-step to their first step, the second step, the third step, the fourth step, to the eighth step as fast as possible with peak power production is tantamount to being fast.

Understanding the drive phase and acceleration from track and field sprinting gives a baseline knowledge of how the sprinting mechanics and theories will best transfer to the athletic world of open-skill sports and other closed-skill sports. Field athletes in open-skill sports have to cut. Athletes in a cut have to decelerate and then use that energy to accelerate out of a cut-pass patterns in football, crossovers in basketball, moving to different positions in volleyball. Sports demand the use of the mechanics of the drive phase and acceleration to get to specific spots because athletes need to move quickly. The faster athletes can get to specific spots the better they will be.

The main difference between sprinting and open-skill sports' drive phase and acceleration is the zero-step in open-skill sports requires a zero-step to be done from a place of chaos coordination. The angles out of a cut, lateral movements, or changing levels require chaos coordination in the application of overcoming strength to burst from the zero-step. The essence of the drive phase and acceleration from sprinting provides a viable launchpad to apply concepts in the broader domains of sports performance.

Athletes have to recruit rapidly, coordinate rapidly, understand and see things quickly, and be perceptive in a movement to best understand the technique of drive phase and acceleration running mechanics to have a direct impact on the overall movement in sports performance.

In Review:

- ▶ Understand the drive phase is a non-negotiable regarding sports performance training
- ▶ Focus on muscles utilized in the drive phase like the quads and glutes
- ▶ The concepts of the drive phase in track provide a technical launchpad to transfer tutelage to the open sport world

■ Taking The Drive Phase Off The Track Into The Sports World

In the track world, people have studied the 100-meter sprinting event incredibly well. We know the start, the drive phase/acceleration, and maximal mechanics breakdowns. We know the phases of sprinting. We can take these specific concepts from the phases of sprinting and implement them into the sports performance world to implement them into the elements most used in the sport being trained for. With that said, probably 80-85% of speed-based work for sports performance needs to be focused on acceleration.

So, how does the focus on acceleration transfer over to other sports?

We know to enter a cut, to decelerate, and then to accelerate out of that cut will be kinesthetically, particularly shin angles, related to the drive phase/acceleration phase in track and field. Having that base, we can go back knowing that athletes will enter the drive phase from precarious positions, further cementing the need for chaos coordination to transpire for optimal speed production. Entering the drive phase from precarious positions demands athletes have dynamic trunk control.

Athletes cutting left, right, diagonally, and all which ways use the mechanics of acceleration. The mechanics of acceleration means using the quads, using the glutes, and using a steep shin angle to propel the body forward at a fast rate. Having an understanding of how the track world can have a direct impact on sports performance and where that impact will be is vital. Athletes will not always be in maximal mechanics running but will more often than not be in the realm of the acceleration/drive phase.

In Review:

- ▶ The mechanics of the drive phase/acceleration phase as taught in track is a base for sports performance training
- ▶ Bias training for speed in sports performance towards the drive phase/acceleration phase
- ▶ Dynamic trunk control is the solution to running and accelerating when in precarious positions, particularly when cutting

■ Maximal Mechanics

It is important to understand that maximal mechanics do occur in sports. Athletes do reach top speed in competitive play. It is also important to recognize in the discussion of speed, particularly maximal mechanics, what equipment is used during play because the equipment has an impact on speed, acceleration, and running at max speed with proper mechanics.

It is rare for athletes to hit true maximal speed during competition because of a

multitude of factors. Picture a soccer player dribbling a soccer ball in the open field or a football player in complete gear with the ball in hand achieving max velocity. Not only is the object of the ball disrupting the soccer player's maximal mechanics of speed or the football player needing to change the pursuit angle of the defender with football in hand, but it illustrates how hard it is for athletes in either scenario to consistently achieve maximal velocity to best execute maximal mechanics. It needs to be said again and again: most sports are always in acceleration. To further hammer this point home, think of sports that never allow for running at top-end speed simply because the court or field isn't long enough. The transfer of understanding maximal mechanics does not initiate the largest transfer of training.

However, maximal mechanics does transfer. Athletes need to learn that while running at top-end speed they need to increase vertical ground force. To increase vertical ground force, athletes want to be upright with their posture and have their feet placed directly under their torso. Athletes also need to know that when they are running at top-end speed they should not be leaning forward like they do when accelerating.

With all that being said, the transfer of maximal mechanics over to the athletic realm is rare. Maximal mechanics and max speed will happen in punt returns in football after breaking past the coverage, chasing someone down in field hockey, or the occasional breakaway in rugby, but rarely does the maximal mechanics and maximal speed transfer to the sports world on a consistent, play by play basis. Maximal mechanics is a novelty worth exploring in sports performance but never should be the focus of training speed outside sports, like sprinting, that it is paramount for success.

Simply put, it is difficult to achieve maximal mechanics and max speed off of the track.

In Review:

- ▶ Maximal mechanics and max speed is not often achieved in the sports world
- ▶ Understand that maximal mechanics demands an increase in vertical ground force
- ▶ Increase vertical ground force is heightened through an upright posture and foot placement directly under their torso

■ Slowing Down The Slowest

Reaching top speed fast is tantamount to athletic success. Staying at top speed for as long as possible is one thing that makes an athlete great. The concept of slowing down the slowest highlights this training mindset. Forces are always acting upon the body to decrease speed. When at top-end speed, friction, opponents, and speed are all working to slow athletes down. As sports performance coaches, we want to develop the engine in a way that athletes have reserves of power to maintain their speed.

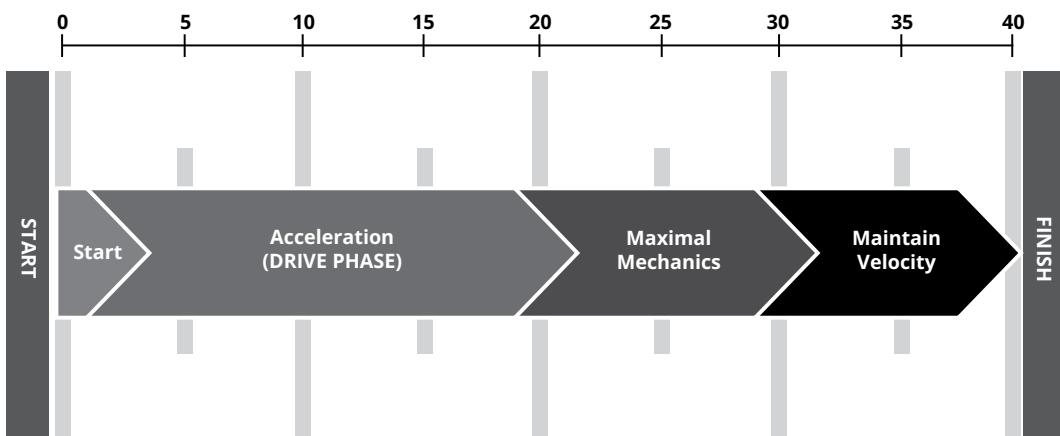
It is a given that any fuel tank will run out. The concept of slowing down the slowest is the idea that athletes will be able to continue to generate the power needed for the requisite amount of time demanded to stay fast. Not only will athletes need to generate the power to move fast and keep the fuel jets firing, but athletes will need to resist energy leakage through proper form and technique.

Proper form and technique are the not-so-hidden components in maintaining speed to slow down the slowest. The athlete who stays fast the longest tends to win. All things equal, the best mechanics win.

In Review:

- ▶ Power and fuel to stay fast
- ▶ Technique, technique, technique
- ▶ Best mechanics win

8.2 Sprint Phases



■ Application To Non-Locomotive Sports

Locomotion is running in a cyclical manner. Non-locomotive sports are sports such as wrestling, volleyball, and throwing events in track and field. In non-locomotive sports, there is no true running. The big question with non-locomotive sports to be answered is: how can we take speed-based training and apply it to specific non-locomotive sports?

This is where the importance of ankle mobility comes into play. Ankle mobility allows for a steep shin angle and the ability to project the body forward at a faster rate and higher speed. Think of a freestyle wrestler changing levels and dropping, their knee traveling forward through great mobility in the ankle to allow for a super-fast shot to get in a position to dominate an opponent. This is not running speed being expressed as strength, but the example is without argument a demonstration of being fast and having speed. In this way, it all ties back to understanding grounding mechanics and how ankle mobility impacts speed.

Grounding mechanics help non-locomotive athletes be aware of the need to improve force absorption. Athletes grounding in plyometrics is typically seen as transferring over to the locomotive-based sports, but it also has a really high transfer rate over to other, non-locomotive sports—volleyball is essentially a showcase of plyometric expression of strength with technical attributes coordinated from the jumping approach and upper body kinesthetics utilized to strike the ball. Athletes must learn how to absorb energy effectively and be able to use this kinesthetic vocabulary acquisition to elastically reuse the grounding energy to project themselves rapidly in whatever directions the sport asks. Athletes who can project themselves rapidly will be faster, whether that is going to kill a volleyball, engage in a double-leg takedown, or laterally propel the body to defend a shot on goal.

In Review:

- ▶ Realizing that it is important to have good ankle mobility and understanding grounding mechanics transfer very well
- ▶ Plyometrics and speed based work should be used in non-locomotive based sports

Frequency And Implementation

How do we train for running speed in various sports? We can look at speed in a plethora of ways: 10-meter sprints, 20-meter sprints, 20-meter hill sprints, 30-meter hill sprints, skips (this gets into the plyometric realm), and more.

We can start with training running speed once or twice a week by working on the mechanics. We can teach ankle dribbling, skips, single-leg bounds, and all types of movements that are synonymous. We can then get into doing sprints. We can do 10-meter sprints, 15-meter sprints, or cluster sets with a sled. The point is to start to engage with speed-based work around running once or twice a week.

8.3 Speed Work Example Workout

	Variation	Reps and Sets	Why?	
Circuit A	Banded Jump from Seat	5 x 4	► Stability and foot strength	 
	Gwiz Jumps into Bounds	5 x 1/3 each side	► Unilateral explosiveness	 
B	10 Yard Sprints	6 Sets	► Reactive power	
C	40 Yard Sprints	4-6 Sets	► Lateral explosiveness	
D	Sled Pull	6 sets 20 yards 1/4 bodyweight on the sled	► Explosive lower body power	

Once or twice a week of speed-based training around running will allow the coach to notice issues athletes have with running properly. The time of speed-based training around running provides the opportunity to teach proper running mechanics. It is important to teach the running mechanics with the sport's equipment being used.

Speed training can go up to three days a week, but should not exceed that frequency ever. Three days is the max. Remember, there are other aspects of the sport that need to be targeted. Speed-work does need to be done once or twice a week with the sport's equipment in play (which is ideal) or without the sport's equipment in play. It is important to balance the use of equipment with the non-use of the equipment. The third day of training should only be used if the athlete struggles tremendously with the technique needed for the desired speed application. If the third day of speed training is utilized, the focus is specifically on technique.

Finally, recognize how the training impacts the competitive sport. As a coach, if speed is a huge factor in the sport being trained for it probably needs to be trained twice a week. If speed is not a huge factor though important, the training can be done once a week with a day of thirty minutes of training with very simple mechanic work.

In Review:

- ▶ Recognize the impact speed has on the sport being trained for to help determine the frequency
- ▶ Teach the necessary speed mechanics demanded of the sport
- ▶ Train both with and without the equipment of the sport



Chapter 9: **Nutrition And Recovery**

With nutrition and recovery, we have to think about the overall big picture. Eliciting adaptations is the whole purpose of training. We want our training, designations, programming, and periodization to create long-term adaptations; however, athletes need to be able to recover from the stimuli prescribed through their nutrition and recovery.

■ **TDEE (Total Daily Energy Expenditure)**

The first place we have to start with athletes is TDEE. Sitting down with our athletes, after going through a first full block, we will have a second formalized meeting. During this second meeting, we go back over the expectations and the means of holding athletes accountable. At this second meeting, we want to bring up nutrition. Nutrition is one thing that will allow athletes to be more autonomous. Nutrition is an area we can really get athletes to control themselves and take ownership within their training. Of course, as athletes begin with their nutritional journey in an effort to optimize sports performance, we want to provide oversight.

TDEE, total daily energy expenditure, is straightforward; it is how much energy the athletes are using throughout the day. How much energy is used while sleeping? Moving their hands? Walking? Comparing the TDEE to how much physical activity (training) is causing them to burn calories is a necessity. Understanding the calories burned with TDEE and the calories burned in training is imperative to begin to properly fuel the body to maintain, bulk, or cut. Once the athlete, with the coach's help, can figure out their TDEE they can get a better grasp on any issues they are



having or any problem areas nutritionally within a sport.

If we think an athlete's TDEE is 2500 calories, but really it is 3000 calories and the athlete is consuming only 2500 calories and they are tired, beat down, and fatigued all the time. Well, no wonder! The hypothetical athlete is 500 calories in a deficit. They are super lean and they can't recover. This illustrates how knowledge of the TDEE needs to be used as an initial step in understanding and optimizing athletes' overall adaptations to the stimuli being provided. A fully charged battery lasts longer and exhibits better performance. Keep the battery charged.

In Review:

- ▶ Total daily energy expenditure must be calculated
- ▶ Nutrition is the first level of autonomy for athletes
- ▶ Training in a TDEE caloric deficit will be shown through body composition, fatigue, and inability to recover from session to session

■ Nutritional Needs Of A Sport

The first thought when it comes to the nutritional needs of sports circles around the idea of mass. Bodyweight sports provide very straightforward examples of the line of thought surrounding mass. Positional body sizes in football also invite the same gaze. A heavyweight wrestler or an offensive lineman in football needs to be bigger. They need a specific mass that benefits their positional or bodyweight needs.

We do not want large, super-obese individuals walking around. We want large, musculature individuals hulking around! Yes, football linemen need to be big and throwers need to be large. However, we want to aim for larger, heavier athletes that are male athletes having 18-20% body fat or 25-30% if they are females. We also might not want that—it strongly depends upon the sport being trained for. Whatever sport is being trained for, we need to establish how much weight the athlete needs to carry upon their frame.

With weight class sports (boxer, wrestler, weightlifter, MMA fighter, etc.), we know there are masses athletes have to be with minimal strength loss. The first concept is big athletes need to be bigger. Other weight classes or other positions need to be lighter. Athletes may have to lose some mass to be faster or lose some mass to make a weight class. The goal when decreasing mass is to have that decrease result in a minimal amount of strength loss. It is thus important that we identify how much mass is needed for the individual in the specific sport for the specific position or weight class.

With all of this in mind, recognize that carbohydrates are key. Carbohydrates are key around the timing of being consumed. Having carbs in the neighborhood of an hour or two hours before training will allow athletes to have better training sessions. The proper timing of the carbohydrates will give the athlete a lot more energy. Their muscles will be more full of fueling nutrients and athletes will recover better on the backend of the training.

In Review:

- ▶ Understand the nutritional needs of sports, recognizing the mass point an athlete needs (with a minimal amount of strength loss if cutting weight)
- ▶ Factor in the utilization of carbohydrates around training sessions

■ Endurance Vs. Strength Based

Endurance athlete coaches will say they don't want their runners to train like the throwers or say they don't want their swimmers to eat like a powerlifter. And they're right, you don't! But we also have to realize endurance athletes will be burning a ton of calories in comparison to throwers and powerlifters when they are out running multiple miles or swimming multiple kilometers.

Start understanding the nutritional needs by beginning with the macronutrient, protein. A lot of endurance-based athletes do not get enough protein. Lack of protein causes athletes to struggle to recover and adapt to the stimuli being provided by the sports performance coach. Struggling to recover and adapt happens because athletes are unable to replenish their muscles with the necessary amino acids.

Starting with protein as a key macro, we can then work backward. To illustrate working backward, let's use the example of a female swimmer. The female athlete weighs 150 lbs and we prescribe 150-170 grams of protein. Stepping back further, we realize she is burning 3000 calories a day for her TDEE. Being at 150 grams of protein per day, we multiply the 150 grams of protein by 4, and we end up at 600 calories in a day. This female athlete still needs to consume 2400 calories just to maintain her body's weight. Here is when we start to factor in carbohydrates. We decide to put in 400 grams of carbs, which totals out at 1600 calories (again, we multiplied the grams of carbs by 4 to arrive at 1600 calories). We are now up to 2200 calories combined between protein and carbohydrates. The hypothetical athlete still needs another 800 calories to get to the target number of the TDEE. We finish off the entire equation for the swimmer with fat macronutrients. Working with the TDEE in mind, beginning with protein, then loaded up on carbs, and finishing with fats is a really simple manner to calculate the macronutrient needs. It is also the easiest way for us as coaches to optimize recovery from different stimuli.

We can utilize this same formula with a strength-based athlete. However, a strength-based athlete will be burning fewer calories but their ratios will be different because they are bigger and will need more protein consumption. Because of the higher need for protein consumption, they will get a larger, relative amount of their calories from protein to fulfill their TDEE needs.

In Review:

- ▶ Start with protein as the first key macro by looking at the bodyweight of the individual (1 gram of protein per pound of body weight)
- ▶ Carbohydrates and glycogen for more calories
- ▶ Fill up the remaining TDEE needed calories with fats

■ Key Macros To Target

With a male athlete, one easy step coaches can do is that we can easily target the athlete's macros of protein, carbs, and fats into a breakdown. The easy breakdown for male athletes requires having 40% of their caloric intake from protein, 40% from carbohydrates, and 20% from fat. With confidence, 90% of male athletes will succeed with the 40/40/20 macronutrient breakdown.

With women, we want a breakdown of 35% protein, 35% carbohydrates, and 30% fat, a 35/35/30 split. Typically, women will feel better with higher amounts of fat macros due to their menstrual cycle. In the follicular phase or luteal phase, depending on the individual woman, some will feel really good when they have higher fat consumption during the follicular phase while others will feel better during the luteal phase. It is up to the person, an instance of the athlete being more autonomous, to come to the

9.1 Athlete Calorie and Macro Nutrient Examples

Athlete	Calories	% Protein	% Carbs	% Fat
Football Player 240 lb Male	3750	39%	37%	24%
Strength Athlete 105 lb Female	1950	38%	34%	28%

*The nutritional needs of different athletes can vary depending many factors. Use these examples of a rough estimate for calculating macros.

better timing based around the specific follicular or luteal phase for the increase in fat macro consumption. The female athlete and coach can talk to try and figure out the best time to have more fat during the different parts of the menstrual cycle.

Note that when broaching menstrual cycle discussions, make sure the female athlete consents to the conversation and is completely comfortable in discussing the topic. Parents of underage athletes need to be spoken to and have given permission to the coach before ever dialoguing about the topic.

In Review:

- ▶ 40/40/20 split for males
- ▶ 35/35/30 split for females
- ▶ Athletes take more responsibility and accountability with their nutritional intake to demonstrate autonomy

■ **Supplementation**

Using the old example of being on a deserted island and only able to take three supplements, we would take a protein supplementation, creatine (which benefits force production, force development, cognitive health, and protects the brain for those in contact sports), and then we would end with a sleep supplementation like ZMA (which has zinc, magnesium, vitamin B6). These are the three supplements that everyone needs to take: protein, creatine, and a sleep formula.

Once we have those three, we can start to look at having a multivitamin. We want to look for a multivitamin that has things like alpha-lipoic acid and other anti-inflammatory agents but is also high in vitamin D and B vitamins. Next, we can look for supplements that help with joint and heart health. Here we can look towards fish oil and collagen with vitamin C to scratch that itch.

At the end of the list comes a pre-workout. Typically, athletes do not need to have a pre-workout. Pre-workout is a glamor supplement. The problem is, especially with high school kids, they just want to take protein and creatine (which is great), but then they are marketed to so well they want to take pre-workout. We are not saying pre-workout is bad, just not in any way, shape, or form on the most necessary list of supplements to improve athletic performance during sports performance training.

As coaches, we need to understand that creatine is extremely healthy. Creatine is not an anabolic agent; it is an amino acid. Creatine is not banned by USADA, WADA, or the NCAA. We need to educate parents and athletes that creatine is okay. Actually, creatine is better than okay. Creatine is a great supplement.

Remember, when beginning to recommend the use of supplementation to athletes and athletes' parents, protein is the best place to start because it is not only affordable but easier to mentally digest for parents and athletes. After selling athletes and their parents the benefits of protein supplementation, we can move into recommending sleep supplements to help improve the athlete's sleeping for improved recovery.

Sleep is the anabolic agent nobody brings up. Optimizing our athletes' sleep will bring about better recovery for improved performance. That then takes us into the multivitamin and the joint health and heart health supplementation recommendations to close it out.

Wait with recommending the pre-workouts. Tell athletes to have a cup of coffee or some other drink with caffeine in it as a viable substitute.

In Review:

- ▶ Protein first
- ▶ Creatine is an amino acid
- ▶ Sleep supplements help improve sleep for better recovery
- ▶ Wait to introduce pre-workouts

9.2 Supplement Recommendations

Athlete	Benefit
Whey Protein	Protein synthesis and recovery
Casein Protein	Protein synthesis and recovery, slow release before bed
Collagen	Joint health and recovery
Pre workout	Caffeine energy boost, not necessary for all athletes, especially younger athletes
Zinc and Magnesium (ZMA)	Sleep quality and recovery
Multi-Vitamin (D, C, E, K)	Overall health and recovery
Greens	Reduced Inflammation and health

■ Sleep And Sauna

Any athlete who has access to a sauna needs to use it. The sauna can help athletes increase their heart health, endurance (without any physical activity because of heat shock proteins), and it will help with overall mobility and cognitive awareness as well. The sauna is a great time for athletes to be by themselves, have their phones away, and use that time to enjoy their own thoughts. The sauna can be used as a means of meditation. In addition to improving endurance, cardio, and heart health, the sauna also helps with recovery.

Optimizing the sauna factor is good for athletes. Prescribing the sauna function in conjunction with plentiful sleep is great for recovery. Using the sauna in the morning will help athletes sleep better at night.

Ideally, we want athletes to get 8 to 10 hours of sleep to maximize their overall recovery. As stated earlier, sleep is a hidden anabolic agent. Getting 8 to 10 hours of sleep is of the utmost importance. Focusing on ample amounts of sleep to recover well is paramount to bouncing back from all of the stress of training and life.

Sleeping 5 to 6 hours creates brain fog, crabiness, and the inability to recover from all the cumulative stress that life and training bring.

Athletes need to understand that meditating before sleep will help as well. Athletes also need to be aware of how much sleep impacts overall recovery, in turn impacting sports performance. Let it be known that some women need more sleep during specific phases of their menstrual cycle. As a coach, female athletes need to be aware of this factor; it is the job of the coach to educate the athlete. During the luteal phase, women will most likely need an extra hour of sleep to help with recovery.

In Review:

- ▶ Recovery is the key component to adapting to stimuli
- ▶ Sleep 8-10 hours to optimize overall recovery
- ▶ If access to a sauna is available, use it

Conclusion

The overall takeaway from the Sports Performance Bible is that we want to focus on what coaches can look for, take out, and implement in training athletes to create adaptations over and over again. As we all know, it isn't as simple as just the adaptations. We will also have to go through roller coasters of emotions. We will have to have expectations and enforce accountability. There will be injuries and a slew of other things we have to plan for.

We have to realize that as the coach, we play a huge role. From the beginning, sit down with the athletes, tell them the expectations, ask them their purpose, where they want to go, and layout that plan for the journey. After that all goes well, the coach needs to sit down and reflect on who they are dealing with, what type of athlete, what type of sport, open or closed skill, what type of surface, what type of equipment, and everything else that goes into sports performance training and preparation. And then, after all that, we have to communicate how many days a week we expect the athlete to be training. We have to communicate what type of work we will be doing: technical coordination movements, absolute strength movements, plyometrics and speed work, various accessories and trunk work, and all of these various things. We also need to communicate expectations in regards to nutrition, recovery, and autonomy as an athlete.

If everything goes well, athletes will advance to postseason play and get to perform at the highest levels of competition in their sport at their current ability level. During the postseason, meetings around expectations for training need to transpire as well. Be open with the athlete(s) about the plan going forward and the imperative for the athletes to communicate with the coach. At the end of any season, whether that includes post-season play or not, coaches need to sit down with athletes and

offer valid critiques surrounding athletes' training throughout the year, both in-season and out-of-season. Positives and negatives need to be breached. During this time, athletes also need to be pushed to give feedback to help the coach reflect. More input gives more information to consider. The largesse of information allows for more informed decisions moving forward. Throughout these discussions, it is not only important to discuss where the athletes succeeded and where they have opportunities to improve, but it is important to be aware of how they felt the training impacted their competitive play in sports performance. It is also good to use the end of the year fuel and optimism to kickstart the training for the next year.

Challenge yourself as a coach. Challenge yourself to dig deep into who the athlete is and what they need from you. Then the workout can be laid out. Structure provides a stable platform for athletes to succeed. Training structure manifests from having and communicating clear expectations. Structure with clear expectation communicated is then allowed to blossom into an elegant flower from meticulous program planning. Communicate directly and plan accordingly and the recipe for structure can be baked.

Ultimately, for all of this to be successful, it comes back to constant communication from the coach and recognizing the role as the guide with empathy to provide a positive light to achieving greatness in the athlete's respective sport.



Bonus: **Coaching Dives**

The Coaching Dive's are our example of B-Sides and Rarities. These are notes specific from the earliest meetings and discussions between Earl and Dane. Earl would leave his discussions and rearrange the notes into written thoughts, in essence, a more coherent comprehension of Dane's brain. These are thoughts spewed from Dane while Earl was interrogating and interviewing Dane during various training sessions. Some of the Dive's have context, others do not, nonetheless they are sound bites of information that can lead to an even deeper understanding behind important sports topics. Enjoy.

■ Dive 1 - Specialization

The first takeaway is that the initial three years of training need to be generalized to develop all around athletic ability dynamically, isometrically, in different energy systems, and with a wide array of applications. The goal is to create the maximal force development in as many angles, positions with various movement patterns, both fixed and dynamic, or open and closed.

Now after this initial window of generalized athletic/sports performance development within an initial three-year window (which can extend longer if training starts incredibly young) the scope narrows down to 2-3 sports, typically decided upon by seasonal shifts. This occurs between the ages of 13-15, but can extend until 18, or through grade school. After this window of athletic development, specialization into a singular sport, entering into the professional mindset occurs within the sport's performance preparation.

The training into specialization brings upon a greater focus to specific sport qualities in training. Priorities are set, rate of development takes on a more tuned/dialed in focus, and the goal of movement qualities, through repetition, constant reps, and constant focus translating into specialized strength qualities. Assisting the development of these qualities can be augmented by actively gazing/watching/studying superior performances of sport (watch the world records and masters compete and execute movement). Finally, in the gym of sports performance qualities, realize when enough is enough, avoiding diminishing returns.

There are traditionally three broad energy domains in sports performance: alactic/phosphagen (ATP & creatine phosphate), anaerobic/lactic (glucose/glycolytic), and aerobic/oxidative (fatty acids & glycolytic). All three domains impact one another within training and performance. And as will be looked at later, interact in a much more connected way than traditionally thought.

■ Dive 2 - Energy Systems

The aerobic/oxidative system has a great quality in assisting recovery, ability to work day in and day out, as well as allowing an athlete to handle volume. In the first three years of sports performance development, and up to and prior to the age of 11, it needs to be indirectly trained through sport (generalize and multiple--swimming is excellent), daily play (for HOURS), and labor (chores, farm work/strong). As specialization occurs, the low intensity versus high-intensity levels within the aerobic energy zone needs to be moderated, with one true "intense" aerobic capacity workout every 5-10 days.

Anaerobic/lactic and alactic/phosphogenic can be pushed (within controlled intensity/volume levels) daily. The athlete's actual sport training/practice must always be weighed within the programming when addressing the anaerobic threshold parameter. This goes for aerobic as well.

Typically, phosphagen (associated with strength training) is the energy system trained first, followed by the anaerobic system (OTM, cluster sets, rep maxes, intervals) and training concludes with aerobic/oxidative work. However, the weakest component of the energy system used within the sport being trained for allows biasing to occur. In addition, changing the order in which the system is trained when in a session allows for targeting/biasing to improve fatigue coordination (the idea of being strong consistently throughout a competitive endeavor in sport). Coaches want to train adaptable athletes capable of constant adaptation for progression.

With all that said, new means of evaluating energy systems are emerging from places like Training Think Tank. First, all systems are aerobic/oxidative. Oxygen depletes and replenishes in direct correlation to ATP creatine phosphate and all actions have lactate present in the muscle--it can be said that there is no such thing as alactic.

Instead, the new means, the paradigm shift, looks at respiratory (lungs, the body's ability to bring in Oxygen and expel CO₂), delivery (cardiovascular, the body's ability to deliver oxygen to the working muscles), and utilization (muscles using the oxygen for energy) to

train endurance, thresholds, fatigue coordination, and tension manipulation. Any one of the three (intake, delivery, utilization) can be a limiter to an athlete's performance in sport. If the limiter isn't trained for improvement, the body defaults to training where the hold up occurs, never improving the system as a whole or the system that triggers the hold up. For instance, low intensity, long duration training can improve the respiratory hang ups and improve oxygen intake, allowing the delivery (cardiovascular) to be in an oxygen surplus more consistently. However, if low intensity, long duration training is ignored, or is not blended into the endurance training, the body never learns to improve oxygen intake and CO₂ expelling.

The system, incredibly simplified, can be thought of in this way: O+ (oxygen surplus, O > use), O= (equal use of that being delivered, O = use), O- (oxygen deficit, over utilized, O < use).

■ Dive 3 - Training Energy Systems

The overarching theme of training energy systems is to target/bias the sports performance training towards the sport. For instance, rest periods within training should closely mimic the recovery periods within the sport being prepared for. It will also benefit the athlete to commit actions in the training realm that simulate the intensity periods within the sport. As an example, a five rep back squat can have a better transfer to sport than a one rep max because of the time under tension and the asking for repeated energy expenditure simulates the sport better. The inverse of this can be true as well. This then leads to why and how to bias energy system training. If the energy system is not used in the sport, it should be of low priority, if trained at all. Examples being, putting too much muscle on distance runners, or having throwers running long distances--both examples could negatively impact training recovery relative to the athletes' sports or the adaptations being sought.

Finally, the more oxygen the lungs can take in and the better the circulatory/cardiovascular system can deliver the oxygen to the muscle to be utilized, more efficiency through fatigue coordination can transpire; then, the more likely the athlete will be able to reproduce optimal (to near maximal, or maximal) force production repeatedly. The longer this utilization can be maintained before passing into an oxidative state can create better performances in sport.

■ Dive 4 - Elements of Athleticism

A generalized approach always has a place in Sports Performance training. Use the easiest movement patterns for the most gains, particularly initially. Through learning simple tasks like the squat, hinge, cleans, jumps, landing in an effort to absorb force and, more importantly, increase an athlete's rate of force production. As these generalized movements become more ingrained, specialized movements enter the training protocol as well. Specialized movements, reactive strength with perception qualities, contribute to

unleashing the athlete's primal reflexes used within the various demands of angles within the sport.

Efficient movement starts from a generalized athleticism built through universal movements. From basic, rapid movement patterns of coordination, control in positions and joint angles can start with a base of isometric strengthening, followed by a build up into dynamic (force production) out of the held positions. Moving up the hierarchy of force production dynamism, reactive movements (responding to barriers and distracting elements used to compliment perceptive neurological development) enter into the training. Again, all is done to maximize efficiency in movement patterns and maximize force production in all relative sporting movements.

Building up all the various elements of acceleration/deceleration qualities, elastic qualities, absolute strength qualities, endurance qualities, mobility qualities, and agility qualities enhance the ability to get into a tactically advantageous position within sport to implement superior strategic execution. As these qualities improve, the ability to see possibilities in sport becomes greater and more pronounced opportunities to the athlete.

Dive 5 - Strength Training

Strength training allows an athlete to develop absolute strength, dynamic strength, reflexive strength and the ability to create and absorb greater rates of force. Relative strength does matter and is shaped through the sport.

Strength training, the general/basic application of squats, pulls, hinges, presses, and carries transfer to sport. However, the application of these movements needs to be utilized through the sport being transferred. Joint angles and positions within the trained sport need to dictate the strength focus for the trainee.

O-lifts are the holy grail of sports performance movements. The high skill of coordination, coupled with the dynamic nature of the movements leaves them great for strength development within sports performance. However, sports dictate the use of the o-lifts through variations that place the athlete in joint angles and positions that simulate the sport being trained for. For instance, a basketball player power snatching from three blocks is more applicable to their sport compared to snatching from the floor.

Finally, four things. One, direct and influence an athlete towards sports they are best equipped for success. Push the athlete towards their physical performance strengths that can be demonstrated upon the competitive arenas within sport. Two, aim for targeted points of performance that are enough to enhance and exceptional in their aim. Three, going past those targeted points of performance can have diminishing returns. Four, use bodybuilding and hypertrophic work to gain lean muscle mass, prevent injury and create a higher degree of joint stability and health.

■ Dive 6 - Speed Training

Speed comes in a multifacet of forms and is demonstrated through omni-directional movement patterns. Explosive acceleration, maximal speed capacity, deceleration into a restart are all elements of speed. In these domains, the ideas of burst, explosive maneuvers that are quick and immediate in duration, and throttle, shifting of movement speeds based on perceptually reactive instances over the course of competitive endeavors in sport, enhance and demonstrate speed attributes. Optimizing mechanics of speed in congruence with the training for sport's movement patterns, joint angles, endurance repeatability requirements, and competitive needs are paramount.

Speed training relative to sport needs to be biased towards the elements most commonly used, the directions performed, and the repeatability/endurance work to rest time domains. For instance, a sport with various positions and body types (such as football) requires an amalgam of speed training that is highly dependent upon position. Look at the linemen. Rarely ever will that position ever reach maximal capacity running speed, however, that position will routinely require burst reactions and proper acceleration mechanics and force production, thus making it important to bias speed training towards such elements. IN the same manner, speed in the sport of wrestling is burst and acceleration driven, but with a very strong control placed on the throttle. Soccer on the other hand asks for nearly all the elements of speed to be trained in nearly equal measure. The umbrella picture requires the trainer to always begin with the sport/position being trained for to properly bias training.

■ Dive 7 - Range of Motion

The greater an athlete's range of motion, the less likely injury will manifest. However, mobility without stability is a recipe for poor sports performance. Ideally, the athlete can demonstrate strength and joint integrity (stability) in the greatest range of motion in all joints. This is excellent from a general perspective of sports performance, but not quite necessary depending on the trained for sport.

As an athlete advances and narrows their scope into specialization of sport, stability becomes more unique. Additionally, this sport specific stability limits the scope of range of motion focus. This isn't to discount stretching or the utilization of full range of motion movements, they need to be done, but rather to begin to bias, especially in season or in peaking, movements that deal in and mimic the ranges of motion the sport of specialization is played in.

Acquiring strength within various positions requires time under load via isometric, eccentric, concentric, and altering tempos creatively within every plane of movement; of course, biasing movement to mimic the planes/directions played in specific to the sport being trained for. Think of the planes of movement like a joystick, capable omni-directional movements. Coordinating these positions from one to the next is a neurological process that through training needs to iron out wrinkles and the kinks in

the myelin sheathing for more fluid positional coordination. As ludicrous as this may sound, having athletes perform with purposeful, bad technique to disturb the competitive movement can force the ideal technical model to emerge and be more precise (DO NOT OVERUSE THIS METHOD--it is meant to be short and disruptive in training). Variation in movements, which can be used more routinely and reinforce technical gains, disturb the competitive movements, forcing learning and neurological adaptations.

■ Dive 8 - Automating Movement

Creating an automatic connection between repetitive, practiced technical movement and the dynamic application of that movement takes time. Coupling the movement's dynamism with perceptive qualities plays up the open circuits of field sports. Through this daily, seasonal mental grind and fatigue, a monastic engagement needs to set in to illuminate the benefits of the training process's repetitive nature. This repetitive nature creates technical proficiency. Additionally, the replicability of the movement transfers from a thought of performance to an automatized action of performance, meaning the body no longer needs to "think" to execute but just executes. The automatization of movement creates a more fluid, powerful athlete.

Throughout this training process, a coach will notice compromised/weak joint angles and asymmetries within the athlete. Through the use of unilateral work (lifts and plyos), dumbbell work, bodybuilding, and timed eccentric patterns, these compromised/weak positions will improve in stability, strength, and performance metrics. Injured athletes can't perform. The protocols of addressing compromised/weak joint angles and asymmetries are incredibly important for sports performance. Make sure to target the joints (shoulders, knees, hips, ankles, wrists/fingers, elbows) most used in the sport, but not neglecting any, and teach manners to protect the spine and neck (bracing, slow twitch movements with large sets/time under tension).

Once again, stressing the importance of the olympic lifts, these movements thoroughly prepare the whole body to generate force, absorb force and react/counter that force. In many open sport qualities, the ability to respond to an opponent's force, the ground's force and/or an athlete's own bodily force is tantamount to athletic performance.

■ Dive 9 - Level of Performance

Competitive displays are sport dependent. In season and out of season training protocols are sport dependent. The frequency, volume, and intensity used in training an athlete is not sport dependent, but dependent upon the competitive level engaged in by the athlete plays a role as well, in that a HS athlete, college athlete, and post collegiate/professional athlete all differ in needed frequency, volume and intensity, as well as exercise selection. Where strength may be a much larger focus for a HS athlete, reflexive strength might have a larger place in training for a professional athlete. Also, the volume, frequency, intensity, and exercise selection are dependent on in season and out of season competitive domains. For instance, exercises such as reflexive strength movements that operate at a

low volume and low external intensity allow for quicker recovery from an effort, making their use more appropriate for an exercise selection for in season training.

A key aspect involved in competitive displays is training towards benchmarks and metrics to give indicators of potential levels of performance, being that all athletic displays result as well within the dynamic movement system patterns (mainly attractors and fluctuators activity is highly demonstrable). Depending on the athlete's sport of specialization, there are demarcated strength numbers, mobility and stability indicators, and performance metrics that indicate levels of potential in sport through the transfer of training. These benchmarks and metrics are scaled within levels. Meaning, the metrics to be met to start in a HS program are lower than the metrics to be met to go D1 and so on, up the competitive ladder. As a sports performance strength and conditioning coach, the goal is to get to the highest level of benchmark & metrics as soon as able. Doing this as fast as possible allows the athlete to then spend more time ironing out the technical demands of the specialized sport to increase competitive performance. Of course this depends on the athlete's drive, goals, emotional state, and purpose. Now once benchmarks are established and hit, aligned to the athlete's goals, maintenance does need to concur to hold these metrics for reproducibility; or, the athlete pushes into a higher level of performance.

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Dive 10 - Off Season Training

Off season training finds the most success through the implementation of greater frequency. The more often the athlete turns up to perform, the faster their growth and skill capability will grow. In turn, the volume of work will add up and progress like drops in the bucket. So, as frequency becomes a daily mindset and the volume accumulation naturally builds up, a complimentary mindset and emotional maturity need to have a corresponding growth to maintain successful growth.

One thing that helps tremendously with this career-like grind towards athletic growth is an expressive, creative hobby or, at the very least, a passionate distraction as an outlet. Hobbies and passions outside the drive for sport success help with the mental struggle/

grind. Such creative hobbies/passions allow the athlete to broaden their identity and sense of self. This greater diversity in self awareness and intrapersonal understanding makes for a more informed identity. This is a subject that needs to be explored in greater depth, studied, and explained in greater detail.

Now besides the mental components, the off season training protocols need to advance stability strengthening, focusing on common injury areas with the sport(s), advancing the athlete's skill level and potential by working towards benchmarks/metrics. The off season is also a time to intelligently manipulate body mass and composition. Ideally, the goal is to gain lean muscle mass that will improve the performance in competitive play. This may also mean needing to remove excess/unhealthy weight through proper nutritional protocols to improve performance in competitive sport.

■ Dive 11 - Mental Approach

To start, the mental approach needs to be prepared for a marathon of sustained effort. And not just any marathon, but the ultra variety over rough, unforgiving terrain. Depending on goals, the mental stick-to-it-ness demands vary.

The path to success needs to work backward from the end goal. Depending on the duration until attainment of the goal informs the navigation to the goal. For instance, an athlete who snatches 90 kilos who is expressing the desire/goal of wanting to snatch 150 kilos has ways to go to reach that number. So the immediate goal needs to be an obtainable step towards that long term goal. In our example, let's say hitting a 100 kilo snatch. Being that you are a good coach, you get the athlete to that first step of snatching a 100 kilos on their way to a 150 kilo snatch. As the coach, you now have information to work from to assess how to continue moving forward. How long did it take to reach this first step towards the larger goal? What volume did the athlete lift? Frequency of training? How did the other lifts' numbers grow in congruence? This composite creates an information profile of how the athlete grows and has grown. This information gives the coach a blueprint to continue growing the athlete.

Of course, the athlete's maturity and training mentality all contribute to the growth and improvement. The athlete has to manage stress, avoid unhealthy relationships and need to socialize and surround themselves with people who make a positive impact upon their growth potential. With visualization feeding the athlete's purpose, the maintenance of motivation stays nourished, sustained with creative outlets and hobbies to help lessen the stress and solidify the athlete's identity. A healthy mind greatly assists a capable body.

■ Dive 12 - Coordination

Coordination is a dense and infinite dive, but you know it when you see it. Coordination develops out of a loop within the internal structures of the body. This loop is integral to athletic performance within the competitive display of sport.

The coordination between internal features and external (environmental inputs) creates the coordinated output of athleticism. It must be noted environmental factors are numerous and any list would only be illustrative. Coordinated loops that can cancel out these uncontrollable factors, ignore them if you will, have fewer exterior roadblocks for the body's interior coordination loop to function in through rehearsed instincts.

Training the coordination loop develops faster over frequency of exposure. To maximize frequency of training stems immediately from a scheduling commitment with a follow up of doing the work while present. The body's capabilities grow and achievement is garnered sooner for a deeper dive into the technical movement requirements of the selected sport being trained. This frequency of training can then take on a ritualistic endeavor as a lifestyle. As the athlete eliminates outside distractions that do not benefit their growth, a monastic engagement emerges.

Through such a commitment, benchmarks of training performance are reached. Hitting such benchmarks in training signal sport potential for success through competitive display; however, they do not guarantee it, only better prepare the athlete to.

■ Dive 13 - Co-contractions

The coordination loop can not begin utilization internally until a task is defined for execution. This task can be pre-determined within perimeters of potential means of execution possibilities and then may be executed through multiple manners of athletic display. Ideally, the most effective form of movement execution is utilized to complete the athletic task. This will not necessarily be the case though. There is too much outside noise/glitches that occur in sport, especially in open sport skills.

Performing the athletic task requires intramuscular coordination. Maximal intramuscular coordination is always submaximal of individual muscle capability in an individual muscle's usage through co-contractions. If this is not the case, overuse/imbalance of intermuscular coordination will manifest from one muscle within the coordination and co-contractions taking too far of a lead in execution of movement. Such imbalances will lead to a quicker fatigue state during performance, increase the likelihood of injury, and will make the general potential of athletic performance less.

The athlete wants to achieve a submaximal intramuscular balance to enhance performance. This allows for athletes to train in a submaximal state of effort with a frequency, volume and intensity, better preparing the body for maximal states of effort when necessary. This ability to eliminate "grinding" when training is exemplary. In addition, perfect balance through intermuscular coordination typically results in a healthy body state nearly devoid of injury, muscles holding off fatigue states through superior coordination, and best of all, better performance during competitive displays of sport.

■ Dive 14 - Metametrics

Metametrics are a peripheral, psychological/neurological state linked to an athlete's goals, wants, and other "intangible" factors that connect mental/philosophical drives to the physical development of the athlete through training and within competitive display of sport. Metametrics are outside traditional states of objective measurements; they carry with them subjective states of mind. Metametrics do influence and contribute to athletic performance and training. They are an X factor. To a degree, metametrics fall within arousal states for the athlete and have some dependence on, and contribution to, the arousal. In this way, metametrics become a direct move of motivation. An easy measurement and expression of an athlete's motivation occur through frequency of training; meaning, just by showing up on a consistent, nearly daily basis, the athlete's behaviors make the motivation objective. As cliche as it may sound, it's one thing to say you want it and a whole other thing to put in the work towards what you want. Such frequency of training translates into motivation manifested allowing for the preparation to take on a script for progression. This script for progression becomes planned preparations. These planned preparations then lead to planned results. The planned results are accordingly projected based on benchmarks and metrics related to athletic progression and capability stretched within reach.

■ Dive 15 - State of Intention

All things within the coordination loop for directed, athletic movement starts from the state of intention. The state of intention is informed by the task to be performed with an ability to dictate how and at what speed the task will be accomplished. Within sport, intentions of movement are shaped by rules and perimeters of competitive boundaries and restraints. These boundaries act as intention prompts: score a touchdown, score a goal, achieve a first down, don't foul, stay in bounds, don't use this appendage, and so on and so on. These external factors, which include rules of sport, opponents, implements and equipment, fields of play, and other factors outside the organism all impact the coordination loop and the displays of athleticism.

From intention and external factors, the internal functioning of the coordination loop is multi-directional networking of information for performance. The signals are chunked/zipped together to hasten coordination-communication for performance. Not all movements require full use of the coordination loop, but instead process necessary information in the manner that best allows for the organism to recruit the most intra and inter musculature across landscapes for dynamic results. The faster and more fibers coordinated, the greater the potential for superior performance.



Dane Miller

@ghostfacedmillah

Six Olympians, 18 Olympic trial qualifiers, 30 National champions, and countless All-American and All-State athletes covering a multitude sports. The numbers don't lie, and the numbers don't stop. As the owner and master coach behind Garage Strength, Dane Miller is one of the United States' most well-known and recognizable names in sports performance and strength coaching expertise. In addition to the undeniable heights his athletes have reached, Dane is the recipient of the USA Weightlifting (USAW) Larry Barnholth Award for Coaching Excellence, has been appointed to assist at USAW training camps at the Olympic Training Center in Colorado Springs, CO, and was named team leader and team coach to 6 Team USA squads. He has had the honor of training under and with athletic luminaries including Anatoly Bondarchuk, Zygmunt Smalcerz, and Charles Poliquin.

Dane's own success is grounded in the same value + focus + work methodology he employs with his athletes. From humble beginnings in his parent's garage, Garage Strength is now Pennsylvania's premiere training center for elite athletes and healthy humans alike, filling not only strength and sport-specific training needs but also mobility, lifestyle, and nutrition. Dane's unique, intensive training programs are the heart of Garage Strength, and are based not only on tested and proven methods of optimal athletic development but each athlete's specific skill and need.



Earl Kunkel

@earnest_knuckle

Besides being the strongest non-meat eater at Garage Strength, Earl makes it a point to pick his banjo daily in the Scruggs style, is an avid artist, currently exploring the interaction of color through pixel art, and makes it a point to read and write daily. He makes money working as an educator at a school in the third-largest city in Pennsylvania.

When not working, he is taking walks with his wife, Julie, playing video games with his daughter, Belle, discussing the lore of some Internet deep-dive with his son, Rhys, or texting his daughter Teegan, who is attending college to become a PA about her cat, Ginger, attacking his sockless feet. He also enjoys spending time with his dogs, Otis and Alma, in the morning when everyone else in the household is still sleeping. In addition to having weekends worth of certificates under his belt, he has trained, studied, and apprenticed under his mentor, Dane, for multiple years, investigating programming, technique, and transference of training to sport in both closed and opened competitive environments. In 2019 he set the American Masters 35-39, 96k, snatch record. It's been broken since, but he has a paper certificate and a PDF to accompany the video evidence for documentation. He loves punny people.

"The Sports Performance Bible is an awesome resource any strength coach or sport coach can use to organize training and improve results!"

- Nick Gwiazdowski, 2x World Bronze Medalist

"What more could a strength coach ask for? The Sports Performance Bible is a blueprint for training based on incredible success!"

- Alex Rose, 2x Olympian

There is no greater reward than developing an athlete from recruit to all-star. Whether you train high schoolers, collegiates, or professionals as a strength coach, sport coach, or personal trainer, it is critical to understand what the most important aspects of training are.

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Stop adding unnecessary fluff to workouts, but understand what is absolutely necessary to prepare athletes for their specific sport. By reading this book, you will not only learn how to structure strength workouts, but how to train any athlete to overcome any physical stress their sport throws at them in their quest to become a champion.

