Hangboard Repeaters Strength Endurance Protocol

Jędrzej April 8, 2019 11 Comments

"After 8 weeks of training, my finger strength increased by 17%! Thanks again for your wonderful site and your help selecting a plan! I can't wait to go crush!"

Carson (V8/7B)
Boulderer (US)

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Quick summary

TOP

- Finger strength gains of 21.5% reported after just four weeks of training.
- Finger strength gains of 32.0% reported after multiple 4-week cycles.
- Redpoint: 1st season: +1.44 YDS letter-grade, multiple seasons: +2.5 YDS letter-grade
- Onsight: 1st season: +1.51 YDS letter-grade, multiple seasons: +2.03 YDS letter-grade

Hangboard Repeaters strength endurance protocol

The knowledge as to who exactly invented the Hangboard Repeaters strength endurance protocol is lost in the darkness of history, but it's probably the first structured hangboard protocol ever developed [1]. It's designed to mimic the grip and relax sequence that is characteristic of climbing. The loads applied are generally low, compared to Eva López's MaxHangs protocol, or to the Eric Hörst's "7-53" protocol, which makes it safer for intermediate climbers [2][3]. The rest times between hangs are on the other hand very short, typically just 3 seconds. This means that your body will have to tap into both the alactic energy system, burning the creatine phosphate (PCr) stored in the muscles, but also to the lactic energy system, where anaerobic glycolysis is contributing to adenosine triphosphate (ATP) production. Enhanced blood flow will be induced to enable lactate and hydrogen ions removal, which will in turn inevitably lead to muscle pump. While Eric Hörst doesn't consider fingerboard Repeaters to be the best strength endurance protocol, he still thinks it can be useful as a pre-season preparation for lead climbers [1].

The 7/3 Hangboard Repeaters strength endurance protocol details

1. Choose three to seven different grip positions. Consider including:
    - An open crimp
    - A full crimp
    - A three-finger pocket
    - Two-finger pockets: index-middle (IM), middle-ring (MR) and ring-pinkie (RP) – advanced
    - A sloper
2. For each grip position determine your MVC and the respective hangboard training load.
3. For each grip position:
    - Hang for 7 seconds, rest for 3 seconds.
    - Complete a total of 6 hangs.
4. Rest 2 TOP tes and switch to the next grip position.

7. Complete a total of 1 – 3 sets.

Table 1: The 7/3 Hangboard Repeaters summary table.

7/3 Repeaters	
MVC hang test time [s]	5 - 10
MVC-7 load (beginner)	40 - 50%
MVC-7 load (advanced)	60 - 80%
Sets	1 - 3
Positions/set	3 - 7
Hangs/position	6
Hang time [s]	7
Rest betw. hangs [s]	3
Rest betw. pos. [min]	2 - 3
Rest betw. sets [min]	12 - 15
TUT [s]	126 - 882
Total time [min]	7 - 105

Fingerboard Repeaters climbing workout remarks

- For the maximum voluntary contraction (MVC) determination use 5 – 10-second test hangs.
- The load for Hangboard Repeaters strength endurance protocol should be equivalent to 60 – 80% of your MVC.
- Beginners should start with 40 – 50% of their MVC and do no more than two sets.
- The last hangs are supposed to feel hard, and you should get pumped.
- You should be able to complete all the hangs – use a pulley system to adjust the load.
  - If y omplete all the hangs, reduce weight.

- If you want to experiment with the hang times and the rest times, you can try:
  - 6 seconds hang, 4 seconds rest
  - 5 seconds hang, 5 seconds rest
  - 5 seconds hang, 2 seconds rest

You will need to devote one or two fingerboard training sessions to determine the optimum loads for particular hang positions. It is impossible to give one general rule, as the loads will depend on the number of sets you choose to execute, the rest times between sets and hangs, and even the sequence in which you order the grip positions in a set. The time for the MVC measurement is not strictly defined, but it is normally assumed between 5 – 10 seconds [4][5]. Throughout this blog, the 7-second MVC measurement is generally used for consistency (MVC-7).

The exact determination of the hang loads for Hangboard Repeaters climbing strength endurance protocol, or “intermittent isometric contractions” is a science in itself, and touches on the subjects of “critical force” (CF) and the “energy store component” (W’) [4]. But you don’t have to be that precise – as long as you get pumped and you’re able to complete all the hangs, you’re probably on the right track. If you want to shift the balance of the exercise more towards strength or simply adjust the intensity, you may choose a different version of Fingerboard Repeaters, such as the 6/4, 5/5, or 5/2. Another concept you may explore is doing Hangboard Repeaters till failure (Endurance Repeaters), as it was suggested by Tom Randall in the TBP interview [5][6].

> *The exact load determination for each grip position may be tricky, but as long as you get pumped in the end and still manage to complete all the hangs, you're on the right track.*

In Figure 1 below, my example exercise logs for the 7/3 Hangboard Repeaters strength endurance protocol are shown. The routines were done on the Moon Fingerboard for six different hang positions: 3-finger sloper, 3-finger pocket, two 2-finger pockets (index-middle, middle-ring), full crimp, and half crimp [7]. First, a 30-second hang test was done for each grip position, corresponding to roughly 80% MVC-7 intensity [8]. For each position, the added/subtracted weight was recorded and subsequently adjusted. However, because of the large variety of holds used, which lead to a relatively high exercise volume, it was impossible for me to complete the routine. I recalculated the hang intensity and reduced i TOP based on the MVC-7 measured for each hold position. Yet, for the 3-finger pocket

was struck.

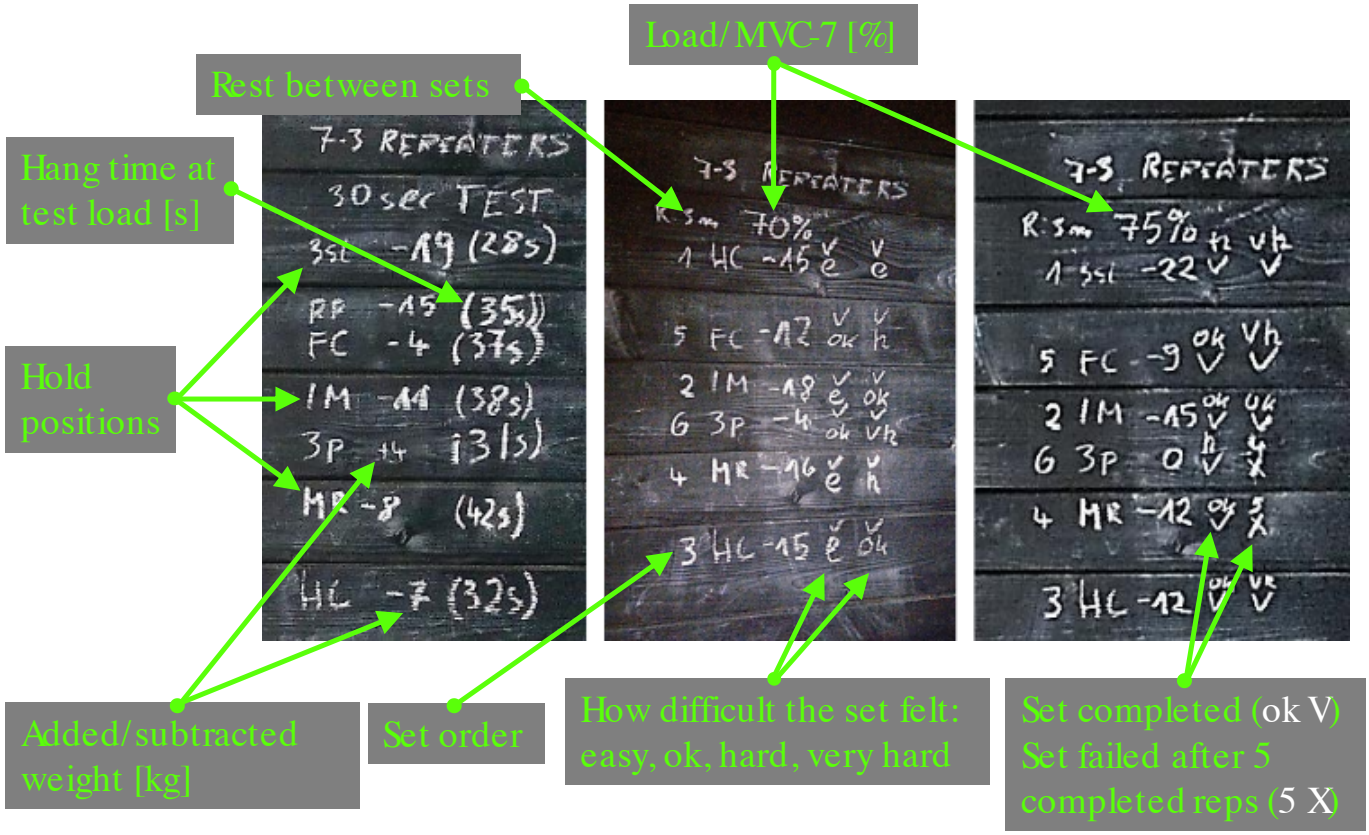

Figure 1: Make sure to keep a log of your hang loads, rest times between hangs and between sets.

Hangboard Repeaters strength endurance protocol results and discussion

The traditional 7 seconds on, 3 seconds off Hangboard Repeaters protocol was thoroughly explored by the Anderson Brothers in their article from 2015 [9]. They report strength gains as high 21.5% after a 4-week cycle and 32.0% after full eight weeks of hangboard training with their Rock Prodigy Method (RPM). On top of that, their hangboard protocol was proven to have a direct impact on the climbers' performance of the rock.

The mean redpoint climbing grade improvement within the group of climbers taking part in the experiment was +1.44 YDS letter-grade within the first season and +2.50 YDS letter-grade after multiple seasons. The mean onsight climbing level was improved by +1.51 YDS letter-grade within the first season and +2.03 YDS letter-grade after several seasons. A somewhat surprising result, taking into account that Hangboard Repeaters are a strength endurance fingerboard training protocol. In contrast, Eva López reported strength gains of only 20.6% in four weeks and up to 28% after full eight weeks of TOP gth training dedicated MaxHangs protocol [2].

climbers who took part in the Eva López's experiment were mostly well-trained sports climbers (French 7c+/8a, YDS: 5.13a redpoint climbing) so a specific ceiling effect may have taken place, similar to the one observed by Eva herself [10].

> *Popular and safe fingerboard protocol - excellent introduction to hangboarding.*

While Eric Hörst claims that Hangboard Repeaters grip strength endurance protocol is not the ideal exercise for building strength endurance, it's still probably the most popular hangboard protocol around. It's also relatively safe, as it is easy to control the loads and easier to predict failure than it is in the case of maximum strength protocols [11]. I think that it is an excellent introduction to hangboarding, notably if you reduce the initial load to 40 – 50% of your MVC. The low load will allow the fingers to undergo the necessary structural adaptations, required for the more advanced hangboard protocols.

If you have any questions, feel free to contact me. Please subscribe to the blog, to keep up to date with upcoming posts on cutting edge methods of climbing training!

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About the author

Jędrzej

A veteran hangboarder and a Moonboard fan, Jędrzej is crazy about training for climbing. There's nothing he likes more than trying out different protocols and applying the newly acquired skills on the wall. Jędrzej also enjoys playing the electric guitar, baduk, and reading articles on the science of sports training. He holds a Ph.D. in electrical engineering.

CLIMBING FINGER STRENGTH ANALYZER EVA LÓPEZ INTHANGS STRENGTH ENDUR...

11 thoughts on "Hangboard Repeaters strength endurance protocol"

MARTIN
JANUARY 6, 2020 AT 10:31 AM

Hi Jędrzej,
love your website! Well done. Seems to be very new. Contains very interesting training stuff.
I'm an old veteran climbing guy who loves still training for climbing.
Can you recommend a specific training which focuses on gaining more forearm muscles?
Or what would you do when plateauing with your finger training?

Best Regards,
Martin

Reply

TOP

Hi Martin,

Thank you very much for your comment. I'm glad you like the site! It is, in fact, quite new, I only launched it in October. I hope you will find it helpful and inspiring for your training.

Regarding your questions, strength improvements are a combination of neural and structural adaptations. Neural adaptations are the way the activation signal is transferred to your muscles, the number of muscle fibers activated at the same time, fiber firing rate, etc. Structural adaptations include muscle size, capillarization, the quantity of glycogen your muscles can store, metabolic pathways, and so on. If you can combine or cycle these adaptations in a smart way, you are bound to gain strength continuously (within reason, of course).

The standard way to increase muscle size is to use Hangboard Repeaters, or Intermittent Dead Hangs (IntHangs). These are high volume exercises at low loads (50 – 80% MVC-7), with long hanging times, short rests, and a lot of sets. All this makes these protocols intensive and stressful on the body. Furthermore, to notice improvements, you need to stick to the protocol for at least 6 weeks, but 8 – 12 weeks would be much better.

On the other hand, protocols leading to neural adaptations, such as the Max Hangs, 7-53, or Bechtel's Ladders, require high loads (above 90% MVC-7), fewer repetitions, and long rests. This makes them easier to follow, mainly because gains are quickly noticeable, and this helps you stay motivated. However, a plateau is usually promptly reached.

It's up to you to decide which protocol is best for you at the current time. It's best to begin the training cycle with the neural methods and then switch to the structural methods. This way, you will be able to use higher loads and shorter rests with your Repeaters or IntHangs.

If you reach a plateau, the most straightforward answer is "just change something." I remember that between 2017 – 2018, I focused solely on Repeaters. I kept adding load, but at one point, I plateaued. I then switched to MaxHangs and started gaining strength again. Then I turned to One Arm Hangs, and now I'm doing Bechtel's Ladders.

I highly recommend Bechtel's Ladders, because in my opinion, they let you combine neural and structural adaptations, and they have a naturally built-in system of varying intensity. I've been continuously improving with this protocol for the last six months, and I still haven't hit a plateau.

To sum up, there are no simple answers here – it all depends on your current strength level, your previous training history, injury history, and your goals (do you boulder, or sport climb?). I hope I at least in part, answered your questions. If you would like me to help you design a hangboard training plan for this winter, write me an email – I'll be glad to help, for me, it's an opportunity to learn!

Kind regards,

Jędrzej

TOP

MATEUSZ
APRIL 4, 2020 AT 7:50 AM

hej Jędrzej,

very interesting blog. Reading your 8 month plan you had. very interesting – keep going with this website!
br,
Mateusz

Reply

JĘDRZEJ
APRIL 5, 2020 AT 2:05 AM

Hi Mateusz!

Thank you! I'm very glad you liked the article:) I'll give my best to keep the content interesting, so stay tuned for upcoming posts!
Best regards,

Jędrzej

Reply

MARTIN
APRIL 10, 2020 AT 6:44 AM

Cześć Jędzej,

I have just found your blog and find it a great overview and inspiration, due to its holistic and scientific approach. I do a lot of EXCEL-Sheets for training analysis myself and love to go deep into it.

I have been climbing for more than 10 years now, mostly sport climbing. During the last 3 years I have been fortunate to find great conditions for a lot of endurance training on real rock. A hangboard I used from time to time supplementally in the gym.
After moving to another place with no rock just behind the house, it was finally time to install a hangboard at home (plus the problem we all have these days – no gym access).

hangboard. So mainly 7/3-Repeaters of different intensities and max-hangs. I will follow on what I've learned there for a while, in order so see where it goes. But would then gradually introduce some aspects of the strength training concepts you have presented in your blog.

If you are so kind, I'd like to ask some questions:
1) After how many month of conditioning using classic hangboard routines would you start introducing some tougher protocols? I'm asking mainly, because they seem to rely on a lot of MVC-Testing, which might overload fingers and elbows for inexperienced hangboarders.
2) Whats your general experience with combining endurance and strength exercieses in a day or in a week? Whats important to know when planning? Generally one says, strength before endurance. How would you order them in a training plan? And whats your opinion and/or analysis on this? Does it heavily compromise strength gains or even leads to injury quicker?
3) Im afraid of doing e.g. two 4-week cycles before resting, as you explained in the "bechtels-3-6-9-ladders" article. ("try doing two 4-week cycles, and then take a month's rest"). Do you think, that for an intermediate climber with low experience in hangboarding like me, it would make more sense to apply shorter rhythms in the makro planning? Like 3 weeks intensive, 1 week no or only light hangboarding, and so on – instead of constantly increasing loads?

Bardzo dziękuję z góry za opinię 🙂

Pozdrawiam,
Martin

Reply

JĘDRZEJ
APRIL 14, 2020 AT 12:13 PM

Hi Martin!
Thank you for the excellent questions! I have to tell you, in the end, you got me confused, your Polish is perfect!;)
Here are the answers to your questions:

1) MaxHangs training
As far as the difficulty of the protocols is concerned, it's up to you how tough you make them. For example, the intensity range for the Eva Lopez MaxHangs can range between 75% MVC-7 (15-second hang with a 5-second margin) up to 103% MVC-7 (6-second hang with a 1-second margin). However, I will agree that the Bechtel's Ladders (88 – 95% MVC-7) and the Horst "7-53" (92 – 97% MVC-7) protocols give less freedom to adjust the loads.

If you're afraid of the 7-second MVC testing, you can use lower loads and longer hang times. Use the models I plotted in the Bechtel's ladders article to recalculate. For example, based on Rohmert's model, an 11-second MaxHang is 95% MVC-7, a 15-second MaxHang is 90% MVC-7, and a TOP d MaxHang is 84% MVC-7. So, e.g., if you determine that you can MaxHang for


~~30 – 100 % MVC 1-4 or lower loads, it becomes non-linear and less accurate.~~

With ten years of sport climbing under your belt, and after following some Repeaters and MaxHang programs, you seem fairly advanced. Generally, a year of systematic Repeaters training with progressively increasing loads twice a week should get anyone prepared for any of the discussed strength training protocols. I think you should be ready, but to stay on the safe side, try to keep the loads below 93% of your MVC-7. You can safely use 15-second hangs to determine your MVC loads.

If you choose Bechtel's Ladders, which I think is the best option when you have no access to a gym, I would advise starting with a load that lets you hang for 15 seconds in each trained position, rather than the 12 seconds prescribed by Steve. You can always increase the weight if the exercise seems too light, but keep in mind that it becomes progressively tougher towards the end of the cycle, so you don't want to overdo it.
The MaxHangs and Horst "7-53" are better when you want to execute a swift strength training routine as a part of a more extended training session.

Regarding potential injuries, I don't think that weighted hangs are particularly dangerous for the elbows. When talking about elbow injuries, we usually mean tendinosis, which is a degenerative condition, coming from repetitive overuse. Hangboard pull-ups and campus boarding are much more likely to cause elbow tendinosis.

But you should be careful about your fingers, that's for sure. I think I never had any finger issues because before I started doing any weighted hangs, I'd done years of Repeaters training.
From my observations, I could see that finger injuries often occur when people do tons of climbing and then add hangboard training on top. This way, instead of becoming stronger, they are degenerating their tendons, and something eventually breaks. Climbing is fun, but if we're talking about a well-designed training program, then often less is more, and regeneration is equally essential as the training itself.
Still, based on your climbing history, I'm pretty confident that your fingers are ready for advanced hangboard training. Just ease into it and stop at any sign of finger pain. Don't forget to perform a series of progressively heavier recruitment hangs before you start with your target intensity.

Also, be very careful about your shoulders. You need to warm them up properly before hangboarding. Make sure to do some jumping jacks, push-ups, rubber band exercises, chest stretching, and pull-ups before you start with the core of your training session. It's only a 10-minute investment, and it will go a long way.

2) Endurance training
I think it's reasonable to combine endurance and strength training, both within a single session and during the week. I, for one, always conclude any strength training or strength endurance training session with a 10 – 20 minute set of endurance repeaters at my Critical Force level. So definitely strength first, and endurance last.

If you follow a block program, which is a rather advanced training strategy, then you may want to alter strength training sessions with endurance training sessions within a single week. This way, you can train one central aspect of climbing while devoting minimum effort to maintaining another element at a decent level. For example, when focusing on strength, you could do two strength training sessions and one endurance session every week, and then reverse the proportion after some ti

training routine once a week and performing recruitment hangs before every session should be enough. Keeping a constant level of endurance during a strength training phase may be impossible or require much more effort.

I don't think you will compromise your strength gains if you conclude a strength training session with a set of AEROBIC repeaters. In fact, the lowering of your blood pH caused by lactic acid production will potentially trigger additional growth hormone release and have a synergistic effect on your strength. With that said, if you execute multiple sets of STRENGTH ENDURANCE repeaters after a session of Bechtel's Ladders, this will make no sense. You will do more damage than good and get injured for sure after a (short) while.

3) Pauses between cycles
Strength training cycles can be short. Even three weeks should be enough to see gains, as opposed to structural training, where 8 – 12-week cycles are prescribed. So sure, start with shorter cycles and see how it goes. This way, you will gain a lot of experience, and you will be able to plan better for the future. Remember, you don't have to stick to the protocols to the letter for them to be effective. The thing about hangboard training is that just doing it is already enough to see gains!

I hope these answers will be helpful but feel free to let me know if I missed anything! I would also love to learn some of the conclusions you made from your own training! Please write me an email if you have something interesting to share!

Mit freundlichen Grüßen
Jędrzej

Reply

TASOS
MAY 2, 2020 AT 5:49 PM

Hi,
Well done gathering all the information in one place.
I got interested on the CF value and I build up a spreadsheet for calculating it. But what's the real use of it? If I want to train endurance I just work with 40% of my MVC-7. if I dont get to failure at 20min next time I will work with 45% and so on.
It will be very helpful though if 2 things are done.
One, if someone sets boundaries between the CF value and the MVC-7 for various types of exercise (endurance, power endurance etc). For example if you have CF value of 45%, and we know that 90% is for strength then we have 45% of margin. Let's say +2/3 of the margin (45+30=75%) is your work load is power endurance.
Second, if someone finds a formula for dividing the working time (Tlim) to sets and reps so that you are not force to do 1 set to failure to get to the desired W'.
Is there any chance that you can do this?

TOP

JĘDRZEJ
MAY 5, 2020 AT 1:20 PM

Hi!

Thank you for your comment! Indeed, I felt like information about hangboarding is scattered all over the internet. I wanted to create a site where it would all be summed up and verified, so I'm glad you appreciate that!

I think you asked some excellent questions that are unfortunately very difficult to answer. As far as CF is concerned, your approach is perfectly valid, and after two or three tests, you can likely determine your CF with decent accuracy. I don't think you need to be accurate more than down to 5 pounds. Still, I believe that determining the full endurance profile, including the 80% MVC and 60% MVC tests, can give you a lot of insight into your performance and serve as an excellent reference point for monitoring your future progress.

Surprisingly not many climbers know that there is more to hangboard endurance training than standard 7/3 Repeaters at 60 – 80% MVC. Those who do, often train at 40% of their MVC by default, not realizing that they might be training in two different endurance regimes. Taking into account that Critical Force is seemingly best improved by training precisely at CF load, the idea is pretty handy.

I think your idea of relating the loads for training different types of endurance to CF and MVC is quite brilliant! However, someone would have to determine these load percentages by performing tests on a group of climbers. They would need to compare the power endurance improvements in climbers training at different MVC-7 load percentages and see who gets the best results. If someone does, this is going to be awesome 🙂

Regarding your second idea, if I understand it correctly, this is something I've had in mind for quite some time now, but I haven't had the time to get round to doing it. You first need to determine a person's W' recovery rate, which I think should be fairly easy to do. Then you can write an application that will automatically calculate loads, sets, and reps and rests in such a way as to deplete W' to the desired level every time they train. This would be a great tool for designing power endurance training sessions. 🙂

To sum up, I think that compared to other sports, there is a lot to discover about climbing training, and to me, it's totally awesome that we are having these discussions in the first place! 🙂

Thanks again for your insightful comments! If you'd like to have a more detailed discussion, feel free to contact me by email.

Reply

JERIMIAH G GENTRY
AUGUST 20, 2021 AT 1:54 AM

TOP

been an 11a climber. I have finally committed to some continuous periods of training with a basic 3-2-1 mesocycle structure. I'm in the power endurance phase and doing things like boulders on the minute on the moon board and hb repeaters. If I were to try to do my Boulders on the minute on the same day as repeaters which would you recommend doing first? If that's too complex a question with too many unknowns feel free to just say "pass!"

Thanks again for the site it is a great model of good communication

Reply

JĘDRZEJ
AUGUST 20, 2021 AT 4:56 PM

Hi Jerimiah!

Thanks for the comment! In all honesty, I wouldn't recommend doing Repeaters for power endurance and bouldering on the same day. It's too much – you'll get tired and injured. A well-tailored Repeaters session may take a day or two of full rest to recover from. The same goes for hard Moonboarding.

Still, if you really want to try combining Repeaters with bouldering, I would go for bouldering first since you'll be less likely to get injured when rested. You may then finish the day with a set or two of Repeaters, but it's better not to overdo it.

With Max Strength training, it's the other way round. It's generally fine to do a short MaxHangs session first and then go climbing.

Reply

YANN
AUGUST 27, 2021 AT 3:36 PM

Hello!
Below 65% of my MVC-7, I need to take off some weight on the 20mm edge. Would it not be better, in the long run, to use a bigger edge and take off less weight, because at the end of the day it triggers the same intensity and physiological responses but with less mechanical stress mostly when you train strength a the same time and/or train frequently?
Thank you

Reply

TOP

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