



## Steve Bechtel's 3-6-9 Ladders Hangboard Finger Strength Training



Jędrzej



May 18, 2019



7 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)**

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### Quick summary

[Steve Bechtel's 3-6-9 Ladders hangboard finger strength training](https://strengthclimbing.com/steve-bechtels-3-6-9-ladders/)

- Steve Bechtel's Ladders – an effective and safe year-round strength training protocol
- This **TOP** relies on progressing volume rather than load.



### [Steve Bechtel's Ladders routine remarks](#)

### [3-6-9 Ladders hangboard finger strength 4-week training cycle](#)

### [Bechtel's Ladders hangboard finger strength routine results and discussion](#)

- Recent research shows that increasing exercise volume does not necessarily improve maximal strength.
- The load intensity of the Ladders protocol is around 92% of 7-second MVC, which is comparable with the MaxHangs and “7-53” protocols.
- The volume of the Ladders protocol is significantly higher than it is for other strength training protocols, which is likely to trigger additional structural adaptations.
- The Ladders protocol is probably not the quickest and most time-efficient way to improve maximum finger strength, but it likely leads to more steady gains in the long run.

### [Steve Bechtel's 3-6-9 Ladders hangboard finger strength protocol conclusions](#)

## Steve Bechtel's 3-6-9 Ladders hangboard finger strength training

The 3-6-9 Ladders hangboard finger strength training routine was developed and popularized by Steve Bechtel, who is a well-known climber, coach, and writer. His aim was to create an effective hangboard finger strength training program that could be safely used all year round, both off-season and during the season, while not leading to overtraining or injury. The main idea behind Steve Bechtel's 3-6-9 Ladders program is to reduce the loads to the necessary minimum and progress the volume, leading to increased time under tension (TUT) [1].

According to Steve, the program does not require any specialized hangboards, leads to less fatigue and reduced injury risk, and is sustainable over long periods of time. While the initial strength increase may not be as spectacular as in the case of the [MaxHangs](#) protocols, the gains will be more persistent, as they will originate from the development of more efficient neurological pathways, rather than from improvements in energy-system efficiency, as it is the case with high-intensity training [2].

## Steve Bechtel's 3-6-9 Ladders protocol details

1. Choose 3 – 4 different grip positions.
  - Try to include full crimp, half crimp, and open hand grip positions.
2. For each grip position determine the load that will allow you to hang for a maximum of 12 seconds.
3. For each chosen grip position perform the following sequence 3 – 5 times:
  - Hang 3 seconds, rest 10 – 60 seconds;
  - Hang 6 seconds, rest 10 – 60 seconds, or more;
  - Hang 9 seconds, rest 10 – 60 seconds. That's one set.

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**Table 1:** Steve Bechtel's Ladders protocol summary.

Steve Bechtel's Ladders	
Hang test time [s]	12
Margin [s]	0 - 9
MVC-7 load	88 - 95%
Positions	3 - 4
Sets/position	3 - 5
Hangs/set	3 - 4
Hang time [s]	3 - 12
Rest betw. hangs [s]	10 - 60+
Rest betw. sets [min]	3 - 5
TUT [s]	162 - 360
Total time [min]	30 - 141+

## Steve Bechtel's Ladders routine remarks

- You may adjust the rest time as needed – make sure you don't get pumped.
  - Long rests lead to strength gains through neurological factors, such as muscle recruitment and firing rate.
  - Short rests lead to strength gains through hypertrophy (muscle growth).
- If you're new to the protocol, start with lighter loads – about 90% MVC-7 and see how it feels.
- Keep a clear and detailed log of your hang loads, rest times between hangs and between sets.



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

## 3-6-9 Ladders hangboard finger strength 4-week training cycle

- A typical Ladders hangboard finger strength training cycle is four weeks long.
- Perform two sessions per week.
- Start with three hold types.
- Schedule:
  - Week 1:
    - For each hold type perform 3 sets, that's 9 sets in total per session.
  - Week 2:
    - **TOP** hold type perform 4 sets, that's 12 sets in total per session.



- Week 4:

- Add a 12-second hang to each sequence, making it 3-6-9-12. For each hold type perform three sets, that's 9 sets in total per session.
- After completing the 4<sup>th</sup> week, perform a 12-second strength assessment for each hold type and increase the loads accordingly.
- Add anywhere from 2 – 5% body weight after each 4-week cycle.
- You want to keep adding weight over a long period. Increasing the load too early will lead to a plateau.

## Bechtel's Ladders hangboard finger strength routine results and discussion

The main idea behind Steve Bechtel's 3-6-9 Ladders hangboard finger strength training protocol is to effectively improve finger strength, without running the risk of injury or overtraining, while still being able to climb outdoors regularly. To achieve this goal, the program relies on progressing volume rather than load. To support his strategy, Steve refers to a research paper from 1983, where it was shown that seven daily 1-minute actions at 30% of max resulted in around a 30% gain in strength in just six weeks, indicating that low loads can successfully be applied to strength training [3]. This approach was met with some skepticism amongst experienced climbers because the study Steve refers to was done on untrained men doing isometric squats. Furthermore, it was argued that the low loads in the Ladders hangboard finger strength training program would be insufficient to trigger strength gains in the case of experienced athletes [4]. Indeed, the most critical issue with the current state of literature is that the majority of studies were carried out on untrained subjects, while it is well established that trained individuals respond differently than those who lack training experience [5][6].

It is currently generally accepted that loads of at least 65% 1RM (one-repetition maximum) are required to trigger hypertrophy, and even higher loads are needed to maximize strength by fully recruiting higher threshold motor units [7][8]. However, in a recent study, it was shown that recruitment of the full spectrum of motor units could be achieved with low-load training, provided that repetitions are carried out to muscular failure. The authors claim that although neural factors play an essential role in maximal strength development, and high-intensity training protocols are superior in this regard, achieving strength gains does not require regular training at high intensity. Instead, it is sufficient to introduce periods of exercise at high intensity during a low-intensity training program [9]. On the other hand, there is also evidence suggesting that recruitment is incomplete during low-load training – at least at the far right of the strength-endurance continuum [10].

In a very **TOP** ig article, the effect of low-load (approximately 30 – 50% 1RM) versus high-load



muscle thickness increase between the groups, maximal strength gains were significantly higher for the group that trained with high loads. These findings contradict the generally accepted hypertrophy training guidelines, where it is suggested that loads of at least 65% of 1RM are necessary to stimulate muscle growth in well-trained individuals [5][7][8].

The impact of training volume on muscular adaptations in trained men was recently investigated in [11]. The subjects were divided into low-volume, moderate-volume, and high-volume training groups, which performed one, three, and five sets per exercise per training session, respectively. Each set consisted of 8 – 12 repetitions, which is considered moderate intensity, equal to roughly 50 – 80% of 1RM [12][13]. It turned out that changes in muscle strength and muscle endurance were similar regardless of the training volume. On the other hand, higher volumes of training lead to more significant increases in markers of muscle hypertrophy. These findings suggest that there is a certain threshold of volume that can be used in a training program, over which further increases in volume are not advantageous, and might only delay recovery from exercise. Thus a lower training volume routine

can be just as effective as a higher training volume routine while being significantly more time-efficient [11].

*Higher training volume has limited impact on strength and endurance gains, but it leads to increased hypertrophy.*

So how do Steve Bechtel's 3-6-9 Ladders fit the bill? Let's first take a look at the loads used in the protocol. In his book, Steve assumes that an 8 – 12-second max hang lies in the 65 – 75% intensity range [1]. But let's think about that for a minute. The maximum hang intensity, which is often termed maximum voluntary contraction (MVC), depends on the test hang time, and it is usually determined for 5 – 10-second hangs [14][15][16]. In literature, we can find that 80% MVC corresponds to about 30 seconds of isometric muscle contraction [17]. If we assume that MVC is defined for a 7-second hang, and denote it MVC-7, then based on the models published in scientific articles, we will discover that the intensity of an 8 – 12-second maximum hang is around 88 – 99% of MVC-7. Even if we assume an unlikely scenario that Steve uses 2-second test hangs, based on the available models, we will still find that the intensity of an 8 – 12-second hang is around 80 – 90% of 2-second MVC [18][19][20][21][22][23][24].

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**Figure 2:** The relation between %MVC and time to failure according to [19][20][21][22][23][24], adjusted for 7-second MVC. Intensity level ranges for the MaxHangs, Ladders and “7-53” protocols are indicated.

The approximate intensity of the 3-6-9 Ladders hangboard finger strength training protocol 12-second maximum hang in relation to MVC-7 is roughly 88 – 95%, depending on the model. For comparison, the intensity of the 7-second hangs used in Eric Hörst’s “7-53” protocol is around 92 – 97% of MVC-7 and the intensity of the MaxHangs protocol can vary between 85 – 103% of MVC-7, which is determined by the chosen hang time and margin [16][19][20]. This shows that the loads used in the

Ladders program are in fact not light at all and are definitely sufficient to trigger the neural adaptations necessary for maximum strength gains.

If we consider the exercise volume, the TUT for the Steve Bechtel’s Ladders protocol can vary between 162 – 360 seconds. Typically in the first week of a 4-week training cycle, it’s only 162 seconds for three grip positions and three sets per position, but in the following weeks it goes up, to reach 360 seconds in the 4<sup>th</sup> week, because of the 12-second hangs added to each set. As far as other protocols are concerned, the TUT for the “7-53” protocol is between 42 – 105 seconds [25], and the TUT for the MaxHangs protocol is between 10 – 75 seconds [26]. Now it becomes clear that the exercise volume for the Ladders protocol is significantly higher than for the other strength protocols, and can be even compared with the TUT for the standard 7/3 Hangboard Repeaters, which is between 126 – 882 seconds (typically 504 seconds) [27]. This leads us to the conclusion that the Ladders are likely to trigger both neural and structural adaptations (hypertrophy).

But can Steve Bechtel’s Ladders hangboard finger strength training method be considered safer than other hangboard finger strength training protocols? For one thing, 12-second hangs till failure are certainly less risky than 5-second hangs with a 1-second margin, but that’s only an extreme version of the MaxHangs protocol [28]. On the other side of the spectrum, 15-second MaxHangs with a 5-second margin will be less dangerous than the Ladders. With that in mind, it does not seem that the Ladders should, in general, be any safer. One can argue that the 3-second and 6-second hangs can be considered a warm-up and muscle recruitment phase before the more strenuous 9-second and 12-second hangs, which makes it less likely to get injured, but that’s about the only advantage. In fact,





increase the weight gradually [29].

*The loads used in the Ladders protocol are not light at all and are comparable with the MaxHangs and the "7-53" protocols.*

Still, the 3-6-9 Ladders hangboard finger strength training protocol is proven effective – after all, Steve Bechtel wouldn't be using it if it weren't. Strength gains of 13% after a 4-week cycle and a total of 23% after a full 8-week program were reported by r/climbharder users. It was even declared that it is possible to work your way to the loads used with the MaxHangs by following the Ladders protocol over just a few months, with much less finger pain and a lower risk of injury [4]. Experienced boulderers claim that they noticed benefits from following the protocol, without it getting in the way of their climbing outside [30]. Weekend warriors can apply it Monday through Thursday and still perform well on the rock. However, if you feel that climbing and hangboarding at the same time is too fatiguing, try doing two 4-week cycles, and then take a month's rest [1].

## Steve Bechtel's Ladders hangboard finger strength protocol conclusions

In view of recent research results, Steve Bechtel's 3-6-9 Ladders hangboard finger strength training protocol does not seem to be the most time-efficient approach to pure maximum strength training [11]. For comparison, the "7-53" protocol by Eric Hörst uses only slightly higher loads, but appears to provide much "more bang for your buck". The same goes for the MaxHangs protocol, which can be made both easy, or very strenuous on the fingers, depending on the hang times and the chosen margins. However, since Steve Bechtel's Ladders are characterized by a significantly higher TUT compared with other hangboard finger strength training protocols, they likely promote both neural adaptations and muscle hypertrophy, which may admittedly lead to slower, but more steady gains.

If you have any questions or comments, feel free to contact me. Please subscribe to the blog, to keep up to date with the 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.

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## 7 thoughts on “Steve Bechtel’s 3-6-9 Ladders hangboard finger strength training”

**DARKO**

JUNE 29, 2020 AT 12:56 PM

Great job Jędrzej.  
Lot's of useful information on your web site.  
Thank you.

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Hi Darko!

Thank you very much! I'm glad that you like the site! I've been gathering a lot of interesting material lately, so stay tuned for the upcoming posts!

[Reply](#)

**PATRICK**

JULY 9, 2020 AT 9:05 AM

Hey, really enjoying your site. All the things I've been wondering about, but with the scientific rigour to back it up!

I was wondering about the general principle of Bechtel's ladders in relation to gaining strength via just climbing. Would increasing volume and TUT equate to incrementally extending the length of a climbing session (over a number of weeks) and extending the time spent on the wall (assuming you stick to 70-90% of max strength intensity)?

Cheers!

[Reply](#)

**JĘDRZEJ**

JULY 9, 2020 AT 10:08 AM

Hi Patrick!

Thank you for your comments and for subscribing to the newsletter! I think that thousands of climbers around the world are trying to figure out answers to similar questions. It's surprising how underdeveloped the science of training for climbing is, compared with other sports. After all, when it comes to pure strength training, similar principles apply most of the time.

Your idea of applying Bechtel's Ladders principle to bouldering is very interesting. I've recently read a lot on general strength training for other sports, such as powerlifting, rowing, or sprinting.

The more I learn, the more I realize how heavy the loads applied by Steve Bechtel are.

One thing that has to be remembered is that the Ladders macrocycle involves volume progression and also intensity progression in the fourth microcycle.

Indeed, the volume progression in the first three microcycles can be realized by climbing more boulders in a session. I guess then that the intensity increase could be achieved by projecting fewer but harder boulders. Still, I believe that it's much easier to control intensity when training on a hangboard than when climbing hard boulders. What do you think?

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**PATRICK**

JULY 9, 2020 AT 10:35 AM

Yeah I saw you wrote elsewhere that 14-17 seconds would be safer. Aiming for around 15 seconds seems to show parallels with Will Anglin's approach on long duration hangs and heavy repeaters, for building structural changes. <https://www.tensionclimbing.com/hangboarding-a-way/>

I think you may find less injuries if this approach was taken to general climbing sessions. Could provide a barometer of when to dial intensity and volume up, rather than just using intuition.

[Reply](#)**JĘDRZEJ**

JULY 10, 2020 AT 6:57 AM

Yes, exactly! 12-second hangs equal around 94% maximum strength, which is very high by regular strength training standards known from e.g., powerlifting. Doing these hangs until failure, which is effectively what Steve recommends in the fourth Microcycle of the program, is very tough, particularly for beginners. I think that it's better to use the loads equal to your 15 – 17 seconds max. This way, you get at least a 3 – 5 seconds margin on your 12-second hangs. Sure, if you really want to push it for a performance peak, you can go harder, but if we're talking about a solid program that you could execute for many months, I think that lighter is better.

I read the article that you recommended. Thank you very much! I think that any climber seriously thinking about hangboard training should read it – it's very informative and gives a lot of solid advice.

[Reply](#)**SALLY GILES**

JANUARY 7, 2021 AT 8:09 AM

Found this really interesting, thanks for sharing!

[Reply](#)

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