

Performance Training

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The following articles encompass some techniques that may help those of you that are looking to push through to the next level in your climbing.

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Section 1: Strength Training for Climbing

Part 1: Climbing-specific Strength Exercises

It is a widely held view in sports training science that to increase sport-specific strength at an optimal rate, supplementary strength training is required. This is why sprinters lift weights and perform plyometric jump exercises – they can't just sprint every day and reach a world class-level. For climbers, it's the same: climbing alone is not the fastest way to get stronger; supplementary exercises can accelerate one's progress.

Unfortunately strength-training is not very popular among climbers – perhaps because many top climbers seem to "only" climb and they keep improving without specific training. To me, all that this suggests is if you have the right genes, you can tolerate a huge volume of climbing at a high intensity without getting over-trained or injured – obviously with this amount of climbing, one will get stronger. This is great for top climbers, but most of us are not built like that, and if we train like headless chickens, our bodies will eventually give out. We need to figure out how to train more efficiently, and strength training is the way!

This article will focus on "specific" strength exercises, which are directly related to the demands of climbing, including campus training, fingerboard training and system training. These exercises are used primarily to increase finger strength and/or pulling strength. In a later article I will discuss non-specific or "general" strength exercises that are used to prevent injuries and increase core strength, or "body tension". General exercises are important as well, as they contribute indirectly to climbing performance.

It is important to emphasize at this time that the strength-training methods described in this article are supplementary to your climbing. You do not have to cut back drastically on your climbing volume to introduce some of these exercises. For most climbers, it is adequate to do some strength exercises for 20-30 minutes prior to your climbing sessions, 2-3 times a week.

Adaptation:

The goal of strength training is to apply a specific kind of stress, or an overload, to the body and cause it to adapt so that it is better suited to handle that type of stress in the future. This overload needs to be repeated numerous times, so that the accumulated adaptations result in measurable change over time. In other words, the exercises you select need to be repeated at least twice a week, and be done for at least a month. Only then will you have an increase in strength that will be noticeable in your climbing (not just in that exercise), and will stick around for a while!

Progression:

If you're doing the same exercises regularly, you need to increase the intensity as you adapt to them. Otherwise, your body will no longer see the exercise as an overload, and will not need to adapt to it. Thus, a "progressive overload" is essential to continued progress, so when choosing exercises, make sure that you know how you will make them more difficult as you get stronger. I will explain this separately for each exercise.

Specificity

Specific strength training is only beneficial if the exercises used are specific to climbing. This means that the exercises must place demands on the body similar to those experienced while climbing. A few things to consider are: Which muscles are being used? Is it a static or dynamic contraction? What is the angle of the working joint?

Usually, we fail to do a climb because we can't hang on to the handholds anymore, so it's safe to say that lack of finger strength is the most common limiting factor. Lack of strength in the arm and back muscles (pulling strength) can also limit you in steep climbing, long reaches, and/or when there are poor footholds. Thus, if you improve these aspects of your climbing, you will climb harder.

Warming Up:

I shouldn't have to tell you this, but you need to warm-up before all training sessions. This should include a general warm-up, such as very easy traversing or jogging, followed by a specific warm-up. The specific warm-up will involve the same exercises that you will be doing in that training session, at a lower intensity (e.g. bigger holds, smaller moves, less repetitions). Improper warm-ups increase the risk of injury manifold.

Specific Strength Exercises:

Fingerboard training:

With a fingerboard, there are 2 main types of exercises that you can do: hangs, which develop finger strength, and pull-ups, which develop pulling strength. Although they are not very flashy, these exercises can be very effective.

- **Hangs:** When you climb, your fingers alternate between gripping a hold and resting, so when you train dead-hangs, it should be the same. To accomplish this, do it in sets, sort of like weight training, where you hang for 6 seconds, and then rest for 6 seconds, and repeat. This way, you fatigue the muscles gradually, and get more total 'hang-time'. The intensity of the exercise should be adjusted so that you can complete 6-8 repetitions. The best way to adjust the intensity is to hang weights off your harness. You shouldn't have to use more than about 30 pounds of extra weight; if this is the case, use a smaller hold.
- I feel that only two hand positions need to be trained with hangs: the 4-finger open crimp and the 3-finger open hand, both which can be done on a wood edge or on a hang-board. The strength you gain in these two positions should transfer to virtually all types of holds. There is no need to train every possible combination of fingers, or isolate individual fingers – that is a good way to get injured!
- If you're just starting out with this exercise, 2 sets of 6 hangs on each of the two hand positions should be enough, and you can gradually increase this number, but always err to the side of doing less if you're unsure. You should rest about 3 minutes between sets.
- **Pull-ups:** These are pretty straightforward. If you haven't done pull-ups for a while, begin with 2-4 sets of as many as you can for 4 weeks. If you have trouble completing more than 8 pull-ups, you can use bungee cords to take off some weight, or you can put your feet on a chair a few feet in front of you.
- Once you've gotten used to bodyweight pull-ups, you can start doing weighted pull-ups. The ideal range for increasing strength is around 5-8 repetitions, so adjust the weight accordingly. With pull-ups, form is key: lower yourself all the way down, pull up as high as you can, and pause at the top. Do them at a smooth and controlled pace. It's better to do 5 reps with perfect form than it is to do 12 reps with bad form!

Campus Board:

Made popular by the late Wolfgang Gullich, this is the strength exercise of choice for many top climbers around the world. A campus board is a slightly overhanging board with a ladder of wood rungs (0.75" to 1.5"), and is climbed footless. This type of exercise has a notorious reputation for causing injuries, so be careful. The best way to avoid injuries is to hold back on the intensity, rest adequately, and build up the amount gradually. I can't stress this point enough!

If you are training to improve your finger strength, you should be using the smallest rungs that you can campus on. If you want to increase arm and shoulder strength, use the biggest rungs and go for bigger moves. There are various exercises that can be done on a campus board:

Campus training is about explosive power, and this places high demands on the central nervous system (CNS). For this reason, the rest between repetitions should be at least 3 minutes if the exercises required a maximal effort, to allow the CNS to recover. Campus training can also be used to develop power endurance; for this, do the exercises at a lower intensity but do multiple repetitions without resting.

- **Ladders:** This is a good place to start if you're new to campusing, or haven't done it for a while. A ladder is basically starting at the bottom of the board, and campusing to the top using every rung (without matching on any of the rungs on the way up). I usually don't recommend campusing back down, because the risk of injury is higher. If you want to keep going after one ladder, just drop off and start again at the bottom without resting. As you improve with this exercise, you can skip rungs, use smaller rungs; or you can do the moves more slowly and statically.
- **Touches:** Hang on rung one, and lunge up with one hand almost as far as you can go, and catch the rung. Drop back down with the same hand to the starting rung. Then do it with the other hand. Repeat until you get fatigued.
- **Power throws:** The basic idea is to cover as much distance as possible in 3 moves, finishing with both hands on the top rung. To do this, hang on the first rung with both hands. Lunge up with one hand to the rung that is just below the highest rung that you can reach, and then lunge up with the other hand as far as possible. Finally, match hands on that rung. When doing this second pull, think about pressing down with the lower hand, which will give you some extra power. Make sure to alternate the leading hand (left/right).
- **Double-hand campusing:** Hang on the first rung. Quickly pull up, and reach up with both hands and grab the highest rung you can. Repeat until you get to the top. This exercise holds a great potential for increasing the ability to grab holds quickly. It also places a huge strain on your joints! So if you're new to campusing, don't even think about it, but if you're experienced, you can use it relatively safely.
- **Plyometrics:** This is where you do a downward double hand campus-move, and then spring back up with both hands, catching the highest rung possible. It is a technique that takes advantage of the "stretch reflex" that results from muscle stretch, and it allows the muscles to contract more forcefully than usual. To truly achieve this effect, you cannot pause on the lower rung; you must spring back up almost as soon as you touch down. You should be able to do double-hand campusing fairly easily before attempting this type of exercise.

System Training:

This type of exercise is used to practice specific moves, body positions and types of handholds. It is performed on an overhanging wall, with ladders of identical, symmetrical handholds, and rows of footholds below. The idea behind system training is that you train various muscles throughout the body to work together more efficiently (i.e. "intermuscular coordination").

Here's how the exercise works: pull on to the wall with one hand, and the opposite foot (e.g. left hand and right foot). Pull your body close to the wall, and "lock-off" with your arm, while reaching as high as possible with the free hand. Hold that position for about 6 seconds, then grasp the next hold with the free hand, adjust your feet, and let go with the other hand and lock off for 6 seconds. Repeat until you get to the top of the board. The exercise can be repeated with different types of handholds and body positions for each set.

Each set will take about 30 to 45 seconds, depending on how many moves you make, you should rest about 2-3 minutes between sets. Do about 8 to 15 total sets, and a workout shouldn't take longer than 30 to 45 minutes.

Some sets should involve relatively easy body positions but more challenging and varied handholds, so that the fingers are trained primarily. Then, to train the arms and other muscles, some exercises can be done on big holds, but with higher feet, bigger lock-offs, and different hold angles. The number of sets you dedicate to each component depends on what aspects you feel you need to work on most.

This type of training takes some time to get used to, and will take some experimentation on your part to figure out the exercises. There are no standards to say how a "system board" should be set up, so the exercises will be different depending on the board's set-up.

Planning

If you are going to strength train twice a week, then you can make each session a "hard" one, that is, go to the point fatigue/failure with the exercises. If you plan to do three sessions a week, which is for more advanced climbers, then two of the sessions can be "hard" and one should be "easy". In an easy workout, you decrease the intensity of the exercises by about 10-20%, so you finish the set only slightly fatigued.

Strength training should be planned in 4-week segments, in which you increase the intensity and amount of training over the first three weeks, and then in the fourth week, cut the amount in half, and lower the intensity. The reason for this is that our bodies can't handle continual increases in load, so periodically you need to have an "unloading week". This gives the body a chance to fully recover and "super-compensate", as some like to put it. You will probably find it difficult to cut back on your training load when you are making steady gains because getting stronger is addictive! Do it anyways, because this will allow you to keep making gains for month to come, and you'll avoid getting injured as well. After a one-month strength training cycle, you can do the same exercises at a higher intensity, or you can select a new complex of exercises.

Sample Plans

Here are some samples to give you an idea of what a weekly training plan should look like. You can adapt them to your schedule and change the amounts if you want to emphasize certain aspects more or less. Note that these plans would be for week one of a 4-week cycle, and thus the amounts would increase up to week three, then go down for the fourth week.

These plans may look like too much training for one week, but remember that the workouts are fairly short. Many people climb in gyms for a couple of hours in a single session, so this is a reasonable amount for most people. Example 2 is for a more advanced climber.

Example 1: Fingerboard Training, 2 days a week:

Day	Training
Monday	Hangs: 20 minutes -4 finger edge: 2-3 sets x 6 reps x 6 seconds -3 fingers pocket: 2-3 sets x 6 reps x 6 seconds Pull-ups: 10 minutes -3 sets x maximum reps with bodyweight Climbing: 60 minutes -Continuous climbing (laps) on routes 2 number grades below on-sight level: 3 routes x 2 times up and down
Tuesday	Rest
Wednesday	Climbing: 60 minutes -Bouldering 1-2 grades below on-sight grade: 3 problems (6-12 moves long) x 4 repetitions each, with 3-5 minutes rest between repetitions
Thursday	Hangs: 20 minutes -4 finger edge: 2-3 sets x 6 reps x 6 seconds

	<p>-3 fingers pocket: 2-3 sets x 6 reps x 6 seconds</p> <p>Pull-ups: 10 minutes</p> <p>-3 sets x maximum reps with bodyweight</p> <p>Climbing: 60 minutes</p> <p>-Continuous climbing (laps) on routes 2 number grades below on-sight level: 3 routes x 2 times up and down</p>
Friday	Rest
Saturday	<p>Climbing:</p> <p>-Climbing outdoors: (routes or bouldering)</p>
Sunday	Rest

Example 2: Campus Training, 3 days a week:

Day	Training
Monday	<p>Campus training: 30 minutes</p> <p>-Power throws: 3 times on each side x 1-5-8 (6-inch rung spacing, medium size rungs), 3 minutes rest</p> <p>-Double hand campus: 3 times x campus all the way up the board, (i.e. 1-3-5-7-9), 3 minutes rest</p> <p>Climbing: 60 minutes</p> <p>-Bouldering 1-2 grades below on-sight grade: 3 problems (6-12 moves long) x 4 repetitions each, with 3-5 minutes rest between repetitions</p>
Tuesday	<p>Climbing: 60 minutes</p> <p>-Continuous climbing (laps) on routes 2 number grades below on-sight level: 3 routes x 3 times up and down</p>
Wednesday	<p>Campus training (easy session): 20 minutes</p> <p>-Power throws: 2 times on each side x 1-4-7 (6-inch rung spacing, medium size rungs), 3 minutes rest</p> <p>-Double hand campus: 2 times x campus all the way up the board, (i.e. 1-3-5-7-9), 3 minutes rest</p>
Thursday	<p>Climbing: 90 minutes</p> <p>-Extensive intervals, 1 number grade below on-sight level: 3 routes x 4 repetitions each, 2:30 minutes rest between reps</p>
Friday	<p>Campus training: 30 minutes</p> <p>-Power throws: 3 times on each side x 1-5-8 (6-inch rung spacing, medium size rungs), 3 minutes rest</p> <p>-Double hand campus: 3 times x campus all the way up the board, (i.e. 1-3-5-7-9), 3 minutes rest</p>
Saturday	<p>Climbing:</p> <p>-Climbing outdoors: (routes or bouldering)</p>
Sunday	Rest

Example 3: System Training, 2 days a week:

Day	Training
Monday	System Training: 30 minutes (For all exercises, do 2 sets of 4 moves on each hand, holding each move/reach for 6 seconds) -Small crimp handhold, opposite foot on, inside edge -2 finger pocket, opposite foot on, outside edge -Pinch handhold, opposite foot on, inside edge -Sloper handhold, opposite foot on, inside edge -Undercling jug, both feet on, drop knee Climbing: 30 minutes -20 different boulder problems at an easy to moderate level, resting about a minute between problems
Tuesday	Climbing: 60 minutes -Continuous climbing (laps) on routes 2 number grades below on-sight level: 3 routes x 3 times up and down
Wednesday	Rest
Thursday	System Training: 30 minutes -Same as Monday
Friday	Climbing: 90 minutes -Extensive intervals, 1 number grade below on-sight level: 3 routes x 4 repetitions each, 2:30 minutes rest between reps
Saturday	Climbing: -Climbing outdoors: (routes or bouldering)
Sunday	Rest

Section 2: Endurance Training

Endurance training is so important to one's climbing that it's surprising – or should I say scary – how little information there is out there on the subject. For most people, endurance simply means doing routes or long traverses, and getting pumped. What more do you need to know? Lots.

Guido Koestermeyer, coach of the German Competition Climbing Team, once told me that the difference between the winners and losers is how long (or far) they can climb without getting pumped. No matter how good they are, once they're pumped, they'll make a couple of desperate moves and then fall. This is a very important realization, and has a major consequence with regard to your training. This is that most of your endurance work should occur when you aren't pumped.

This is achieved using interval training, something athletes have been doing in other sports for a long time. For intervals, you do repeated bouts of work (climbing in our case) that only result in partial fatigue, alternated with timed rest intervals, which don't allow full recovery. Fatigue accumulates incrementally with each repetition, and you only achieve "complete" fatigue (pump) at the end of the workout. This is when you stop, and end your session.

There are four different methods that I will explain that train endurance effectively. They are, in order of increasing intensity:

- Continuous
- Extensive Intervals
- Intensive Intervals
- Burns

For each method I will give a suggested grade, which depends on the level that you can on-sight (i.e. climb first try without falls) consistently. These are only suggested grades, and may vary slightly. The number of routes you should do and the length of the rest intervals are given in ranges, because more advanced climbers will need to do higher amounts to get a training effect. If you can't complete the specified number of routes, the routes you're doing are too hard, or the rest interval was too short.

The Business:

1. Continuous

For continuous climbing, pick a route (20-30 moves long), two number grades below your on-sight level. Climb it up and down 2-3 times. This is one repetition ("rep"). A workout of this type consists of 3 to 5 reps. Assuming you're taking turns with a partner, the rest time between reps will be about the same amount of time it took to do the rep. This is referred to as a 1:1 work-rest ratio.

2. Extensive Intervals

Extensive intervals are done on a route one number grade below your on-sight level. One rep is just doing the route once, but a workout consists of about 12-16 reps. The work-rest ratio is 1:1 to 1:1.5. For convenience, break up the repetitions into sets of 4, so you can alternate sets with your partner. If you're getting confused, don't worry – here's an example for someone who on-sights 5.11-:

Pick a 5.10-, and climb it. Say it takes 2 minutes to climb it. Lower off, and rest for 2.5 minutes (a 1:1.25 work-rest ratio). Climb it again. Rest again, and repeat until you've climbed it 4 times. Congratulations! That was a set of 4 reps. Now, un-tie and belay your partner for their set of 4. Once they're done, it's your turn to do your 2nd set, either on the same route or a different one. Repeat for a total of 3 or 4 sets each.

3. Intensive Intervals

If you got the last one, this will be a snap. Pick a route that is at or just below your on-sight level. Do a total of 6-9 reps, split up into sets of 3 reps. The work-rest interval is 1:2 to 1:3. For this one, you can just take turns with your partner, as the rest interval gives you ample time to trade off. Take a few extra minutes to rest between sets, if you like. Basically, this differs from the extensive intervals in that you do a harder route, less times, with a longer break.

4. Burns

This is the most intense type of endurance training, and is often referred to as power-endurance. A workout consists of 4-6 reps on a route higher than your on-sight level. It should be hard enough that you can just barely do it, or fall very near to the end. The rest between reps is long enough to allow full recovery – a work-rest interval of 1:6 to 1:10 is about right.

	Continuous	Extensive	Intensive	Burns
Moves / rep	100-150	20-30	20-30	20-30
total reps	3-4	21-16	6-9	4-6
work : rest	1 : 1	1: 1 - 1 : 1.5	1 : 2 - 1 : 3	1 : 6 - 1 : 10

Putting it all together:

Each method needs to be used 2 to 3 times a week for at least three weeks to make significant gains. Each week, you can change the variables a bit as you adapt, i.e. do more reps, shorten the rest interval, or increase the grade. It is best to use the methods in sequence, as each one builds on the last. For example, if you're four months away from a climbing trip or important competition, you could use each method for one month, in the above order.

For this type of organized training, you need to put it down on paper. Write down your weekly schedule, and then after each workout, write down everything you did, and what you need to adjust for the next workout. It is very motivating to look back a few weeks and see how much you've improved!

Keep in mind that this endurance training does not make up your entire schedule – you still need to do some bouldering and supplementary strength training, but these are beyond the scope of this article.
