



## CHAPTER 4

# PHYSICAL CONDITIONING

**An appropriate mountaineering conditioning program includes a proper blend of aerobic and anaerobic cardiovascular training, strength training, flexibility training, skill development, cross training, proper fueling, and adequate rest and recovery based on the fundamental training concepts described in this chapter.**

Many mountaineers dedicate an hour or two several days a week to sport-specific conditioning, reserving weekends for longer outings in the mountains. The best way to train for a certain activity is to do that specific activity. However, in situations when that isn't possible, numerous training options help climbers prepare for their sport. This chapter provides guidelines for developing a personal systematic conditioning program to optimize each climber's training time.

## GOAL SETTING

In order to begin the journey toward mountaineering fitness, the first requirement is to understand what that means for each climber. *Fitness* is

defined here as the full-body conditioning needed to easily perform movements that may be encountered in the mountains while maintaining a reserve of strength and stamina for unforeseen challenges. Before designing a suitable training program, each climber needs to set a personal end goal and the steps needed to get there.

**SMART goals.** First, set goals that are Specific, Measurable, Action-oriented, Realistic, and Time-stamped: SMART. For example, a goal to “climb Mount X by Y route in three days by the end of the coming summer, through a workout program that includes five weekly workouts and a 6- to 8-mile hike gaining 3,000 feet of elevation every other week, gradually increasing pack weight by 3 to 5 pounds per outing” has all the elements of a SMART goal and will be more motivating than a vague goal to “get fit for mountaineering.”

## **MOUNTAINEERING FITNESS COMPONENTS**

The level of fitness required for a beginning-level one-day rock climb differs from that needed for an advanced two-day ice climb; both fitness programs will look different compared with that of someone training for a three-week trek. With an end goal in mind, each climber can plan individualized training.

### **CARDIOVASCULAR TRAINING**

*Cardiovascular endurance* is the body’s ability to perform a repetitive activity for an extended length of time. During cardiovascular work, the body uses large muscle groups simultaneously, either aerobically or anaerobically. A strong cardiovascular base is mandatory for all aspects of mountaineering.

*Aerobic exercise* is any cardiovascular activity that requires a significant amount of oxygen for sustained effort; it can be categorized as being short (2 to 8 minutes), medium (8 to 30 minutes), or long (more than 30 minutes). When compared with anaerobic activities, aerobic activities are performed for longer durations and at lower intensities.

To start preparing for mountaineering, a climber should be able to complete a 5-mile (8-kilometer) round-trip hike with roughly a 13-pound (5.9-kilogram) pack, ascending and descending 2,000 feet (610 meters) in less than two and a half hours. In addition to having such baseline hiking capability, climbers should build to four or more cardiovascular workouts per week (depending on the objective) as they approach their targeted goal.

While some of these workouts should be in the mountains or at least have an uphill emphasis, most can be done close to home. Cardiovascular training options for mountaineering should include activities that load the spine in an upright position. Suitable examples are using inclined treadmills, elliptical cross-training machines, stair machines, or revolving stair climbers; hiking, hill walking, snowshoeing, or cross-country skiing; doing step aerobics; and trail running. Biking, paddling, and swimming can be included in the off-season, as rehabilitative alternatives as needed to enable continued training or as supplemental cross-training alternatives (see “Cross Training” below).

*Anaerobic exercise* is near-maximal cardiovascular training that takes climbers to the upper levels of their aerobic training zone and beyond. Such training involves working at heart rates that are higher than those that can be sustained during aerobic sessions. Anaerobic exercise helps climbers when they need a sudden burst of energy to respond to emergencies in the mountains or to link a series of powerful moves together on a climbing wall. Anaerobic training helps climbers increase their leg turnover rate, or how quickly they can move across varied terrain, in order to increase speed. It boosts climbers’ entire aerobic zone so that activities that once made them breathless will feel more comfortable. Examples include pack-loaded stair climbing, walking quickly uphill while wearing a pack, or sprinting uphill without a pack.

To periodically assess your personal cardiovascular fitness level, choose a favorite nearby hiking route that is snow-free year-round and use it as a test piece every few weeks. Each time you hike it, challenge yourself in some way: add weight to your pack—no more than 10 percent per week, or 3 to 5 pounds (1 to 2 kilograms) per outing—and go as fast as you have on a previous hike with less weight; or complete the hike in a shorter amount of time. Meeting either of these challenges indicates increased cardiovascular fitness.

An easy way to add pack weight is to fill several 2-quart bottles with water. In early season, to save wear and tear on your joints if necessary, dump the water before descending. As you near your training goal, however, be sure that you can also carry down the weight that you carry up. If you struggle with breathlessness while carrying a light pack, concentrate on developing endurance during weekly training sessions. If your legs feel heavy when you start to increase pack weight, focus on building more strength.

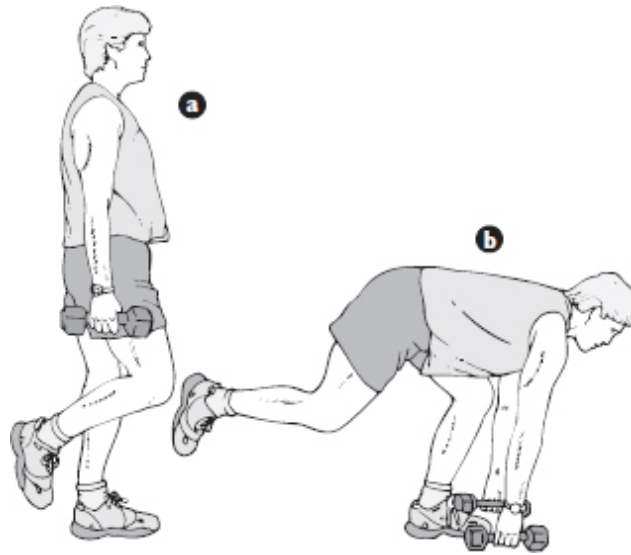
## **STRENGTH TRAINING**

Strength training is crucial to success in mountaineering, because it gives climbers the power and force to withstand challenges, whether predictable or unforeseen, in the mountains. Strength training prevents injuries by helping the body adapt to overloading, provides muscle balance, improves performance, boosts metabolism, and increases lean muscle mass, which in turn can help reduce overall body fat. Climbers should strive to be stronger than they think they will need to be. When the endurance aspect of mountaineering is factored in, the conflicting demands on a climber's body will result in a loss of strength, and that extra training will end up being just enough.

Mountaineers benefit from strong upper-back, core, and leg muscles; solid balance and agility; and flexibility in the calves, knees, torso, and ankles. Rock and ice climbers benefit from strong and balanced upper-body muscles as well. Include full-body strength training year-round to maintain a baseline level of strength, and then build as needed at appropriate times. During the preseason, use single-limb (unilateral) free-weight exercises to correct any weaknesses in legs and hips, particularly in the full range of motion that may be encountered on alpine outings.

Exercises such as static lunges, one-legged dead lifts (see [Figure 4-1](#)), step-ups, and step-downs (see [Figure 4-2](#)) ensure that legs and hips do equal work. Many of these exercises can be performed at home using body weight, initially, then a loaded pack as balance improves and strength increases. Since the calves will take the brunt of the load whenever a climber is on steep terrain, include straight-leg variations of calf exercises (see [Resources for this chapter](#)).

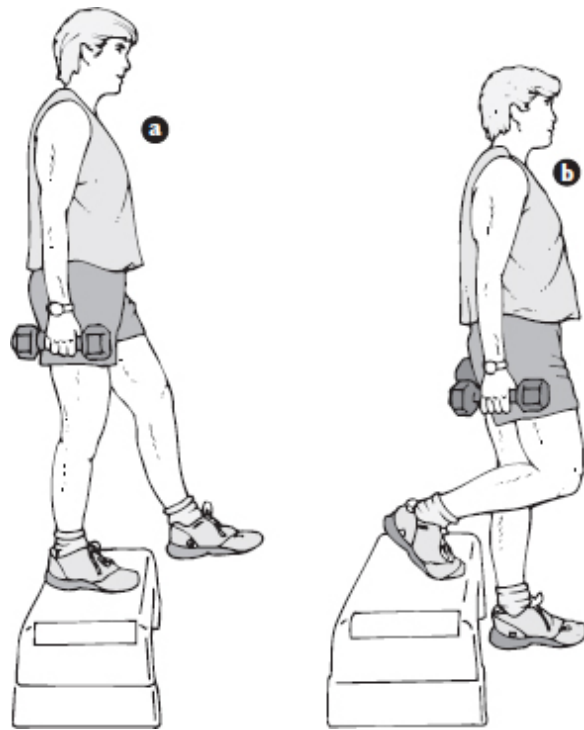
**One-legged dead lift.** This excellent, sport-specific, unilateral mountaineering exercise develops stability in the ankles, hips, and feet as well as strength in the entire leg, including gluteals and lower back. Stand balancing on one foot while holding a dumbbell in one or two hands ([fig. 4-1a](#)). Keep the other foot lifted but near the floor in case it is needed to touch down for balance. Hinge forward at the hips with as much or as little knee bend as desired and reach the dumbbell(s) to the floor ([fig. 4-1b](#)). Exhale and return to a fully upright position with each repetition. Complete two to three sets of 6 to 15 repetitions per leg (depending on the phase of training you are in) and repeat with the other leg.



*Fig. 4-1. One-legged dead lift: a, stand balanced on one leg, holding dumbbells; b, hinge forward at the hips, reaching dumbbells to the floor, then exhale and return to upright position.*

**Step-down.** This is one of the most effective and specific unilateral mountaineering exercises to strengthen the quadriceps for downhill travel. Use a 6- to 12-inch (15- to 31-centimeter) step whose height allows you to do the exercise under control without any lateral (side-to-side) knee movement. Start on top of the step, with toes pointing forward and a light dumbbell in each hand (fig. 4-2a). Slowly step off the front of the step as if walking downstairs, controlling the downward movement as though you are stepping onto eggshells. The leg on the step is the working leg, so keep your focus on it. When your foot reaches the floor (fig. 4-2b), reverse the movement, starting on your toes and using the leg that's still on the bench to lift yourself back up. Keep your working knee tracking over your middle toe rather than collapsing toward the midline of the body. Control both the lifting and lowering portions of this exercise. Complete two or three sets of 6 to 15 repetitions per leg (depending on the phase of training you are in) and repeat with the other leg.

**Snow shoveler.** This functional movement integrates the upper and lower body with torso rotation and prepares climbers for lifting a heavy pack onto their back, digging snow pits or latrines, or carving ice blocks for wind breaks and snow shelters. Replace floor crunches with exercises like this to optimize training time. Hold a sizable dumbbell in both hands. Stand with your feet wider than shoulder width apart. Squat toward the floor, maintaining a neutral spine (fig. 4-3a). The weight will be directly below your chin.

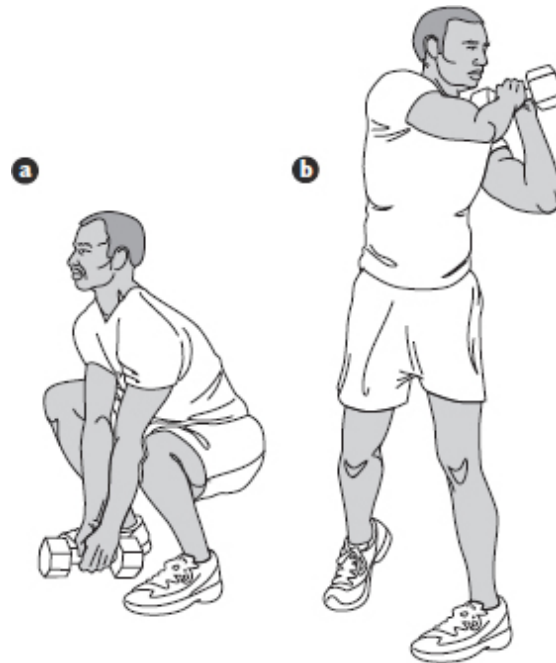


*Fig. 4-2. Step-down: a, slowly step off the step as if walking downstairs; b, slowly reverse the movement, starting on toes and using the leg still on the step to lift yourself back up. Keep the knee tracking directly over the middle toe.*

As you rise to a standing position, pivot to one side as though completing a golf swing, keeping the dumbbell's weight close to your shoulder (fig. 4-3b). Your eyes should follow the dumbbell as you move it to the top of the arc, ending near your shoulder, not overhead. Squat again, then lift to the other side, alternating sides with each repetition. Keep your abdominals tight to avoid overextending your back. Complete two to three sets of 6 to 15 repetitions per side (depending on the phase of training you are in).

During the middle of the preseason, once you have developed good muscle balance and core strength, incorporate full-body, full-range-of-motion exercises, including variations on the squat, dead lift, bench press, pull-up, and row, among others. Because of the dynamic and unpredictable nature of performing self-arrests with an ice axe, be sure to have full range of motion in your shoulders as well as good strength and joint integrity throughout your chest, shoulders, and torso. Pull-ups, push-ups, and core exercises will enable climbers to get into position rapidly and hold the ice axe in place on icy slopes while stopping themselves from sliding. Options that help increase strength and stamina include lifting free weights, walking uphill, dragging a sled, carrying a weighted pack, training with body-weight exercises (in other

words, using your own body for resistance, as in push-ups or pull-ups), and using bands, bouldering, and hang boards developed specifically for climbers.



*Fig. 4-3. Snow shoveler: a, holding dumbbell in both hands, squat with a neutral spine; b, stand up, pivoting to one side and swinging dumbbell up to shoulder; following it with your eyes and keeping abdominals tight. Repeat, pivoting to the other side.*

Consider which muscles your upcoming activities will involve and match your training exercises to the movements that will be required for those activities. For example, if you will be snowshoeing on an approach for a winter mountaineering outing, develop strength endurance in the hip flexors for repeated high-steps. Add ankle weights or ski boots to short anaerobic uphill or strength workouts. Do not, however, add ankle weights to long endurance workouts, as they can alter a climber's natural stride, not to mention cause an overuse injury. If you are weak on overhanging movements, develop your core and grip by training the abdominals, obliques (the side abdominal muscles involved in rotating the torso), forearms, and fingers, in addition to the larger muscle groups in the upper body.

Use the hiking test piece as a guideline for refining the strength training program. If your ankles fatigue when you hike on uneven terrain, add unilateral balance exercises or incorporate short weekly training sessions walking on gravel or sand or traversing slopes to help them adapt to such terrain. If your quadriceps muscles are sore following steep hikes, increase

the number of sets of step-downs, front squats, or lunges and focus on strengthening the front of the thighs. As you add pack weight, if your shoulders and neck get tired, add exercises such as upright rows or shrugs. By tracking such challenges on those training hikes, climbers can determine what body areas need additional strengthening.

## FLEXIBILITY TRAINING

Flexibility refers to the active range of motion of muscles around a particular joint. Stretching muscles can help prevent discomfort after strenuous workouts, but it can also help with changes in body alignment (such as during weight gain or loss), with injury recovery, and with correcting faulty biomechanics. While experiencing minor stiffness when starting a new training routine is normal and expected, climbers may help prevent delayed-onset muscle soreness (DOMS) by stretching. DOMS occurs most often after workouts that stress the body with the eccentric, or lowering phase, of an exercise, such as extended downward travel with a heavy pack, downhill trail running, or bouldering that requires dropping from height onto your feet. When returning to training following time off, ease back into the routine with lower intensity, weight, duration, and volume (that is, fewer sets and repetitions) to prevent experiencing mild pain, soreness, stiffness, and joint aches.

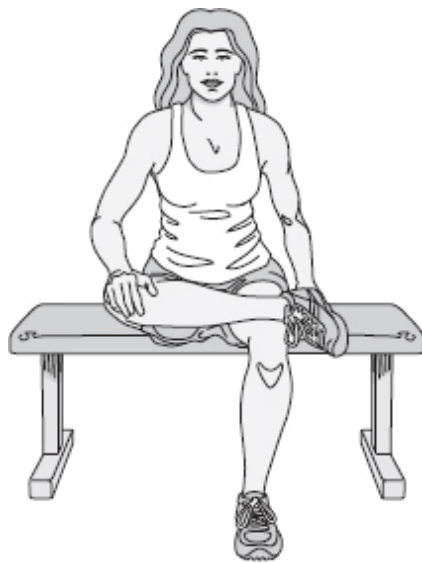
**Frog stretch.** This is a great lower-body stretch to open the hips for vertical rock climbing. Stand with the feet slightly wider than shoulder width apart and sink into a full squat, keeping heels flat on the floor and allowing your torso to lean forward slightly but not collapse over your knees ([fig. 4-4](#)). Press your elbows against the inside of your knees to increase the stretch in your hips and inner thighs. Hold for 30 to 60 seconds.

**Seated gluteal stretch.** This stretch aids the glutes and lower back ([fig. 4-5](#)). Sit on a bench, armless chair, or car bumper so that both shins are perpendicular to the ground and both thighs are parallel to the ground (in other words, knees at right angles). To stretch the right hip, cross the right ankle over the left knee. Press your chest forward with a straight spine (avoid collapsing the chest toward the knee) until you feel a deep stretch in the outer right hip. Hold for 30 to 60 seconds, then repeat with the left ankle over the right knee. Note which hip is tighter (if either), and in future stretching sessions start by stretching that hip first. Do this stretch while standing on the trail for an additional balance challenge.





*Fig. 4-4. Frog stretch: keeping heels on the floor and leaning torso slightly forward, squat down as low as comfortable and press elbows against knees to open up hips.*



*Fig. 4-5. Seated gluteal stretch: sitting with shins perpendicular to the ground and thighs parallel to each other, cross right ankle over left knee, press chest forward with a straight spine, and hold. Repeat with left ankle over right knee.*

## **SKILL DEVELOPMENT**

*Skill* refers to technique and mastery of coordination. Skilled mountaineers are precise with their movements and use less energy in completing an activity as compared to novices. A beginner climbing four days a week may risk overtraining, whereas a highly conditioned climber can perform the movements with less exertion and strain and may be able to climb at higher frequency without overdoing it. Experienced mountaineers have a sense of when to back off of the intensity or volume of their training sessions and work on less taxing but equally important skills.

Skilled mountaineers also are more comfortable and confident in situations that could cause novice climbers to panic, make mistakes, have poor judgment, or experience accidents that might lead to injury. Develop skill by putting into practice all the techniques discussed in this book and getting appropriate training where needed.

## **CROSS TRAINING**

The final component to consider when preparing for mountaineering is cross training. Cross training simply means doing supplemental physical activities not directly related to your sport. At higher skill levels, cross training recruits muscle groups in different patterns and provides psychological and physiological breaks from excessive repetition. Cross training provides body and muscle balance for sports such as rock and ice climbing that involve high repetition from small muscle groups.

While cross training may not relate directly to sport performance, keeping the joints healthy and preventing overtraining *does* relate to long-term performance. Cross training for the climber may involve horizontal pulling movements or rowing training to balance out the vertical component that dominates the sport. A cross-training sport commonly included in many mountaineering programs is cycling; this seated activity does not load the spine as mountaineering does, but it provides a nonimpact outdoor training mode that is gentler on the legs than the high-impact activity of running.

## **FUNDAMENTAL TRAINING CONCEPTS**

Once you understand what training components are involved in mountaineering conditioning, you can start to manipulate them to create a customized training program.

TABLE 4-1. SAMPLE YEAR-ROUND STRENGTH TRAINING PROGRAM					
PRESEASON			IN-SEASON	POSTSEASON	OFF-SEASON
Early	Middle	Late			
Fewer sets with moderate number of repetitions	Moderate number of sets with fewer repetitions, focusing on strength	Moderate number of sets with high number of repetitions, focusing on strength, endurance	Maintenance, with moderate number of sets and repetitions	Focus on imbalanced areas developed from sport-specific activities	Training of weak points

Source: Courtenay W. Schurman and Doug G. Schurman, *The Outdoor Athlete* (see [Resources](#)).

## FITT PARAMETERS

The four FITT parameters—frequency (how often you exercise), intensity (how hard you exercise), time (how long you exercise), and type (what exercise modes you do)—together constitute the training load, or stress. A person who trains for a one-day beginner rock climb has a low workload: low frequency, low intensity, low time (duration). An advanced high-altitude mountaineer getting ready for an expedition has a high workload: high frequency, low to high intensity, high time (duration). The greater the workload, the more carefully designed the training program needs to be, with sufficient rest and recovery days, in order to prevent physical and psychological burnout.

**Frequency.** How often climbers train depends on their current fitness level, their end goal, and their desired level of achievement. According to the American College of Sports Medicine and the American Heart Association, a suitable fitness program for average healthy adults includes three to five aerobic workouts per week of 20 or more minutes each *and* activities that maintain or increase muscular strength and endurance a minimum of two nonconsecutive days a week. Mountaineering is a strenuous activity that requires far more training than what an average healthy adult needs on a daily basis. As climbers progress to more demanding alpine goals, the frequency of their cardiovascular, sport-specific, and strength training workouts will increase, and their workouts will vary in intensity and time (duration).

**Intensity.** How hard a workout is determines its intensity. The optimal cardiovascular intensity for fitness improvement is 65 to 95 percent of a person’s maximum heart rate. Most early preseason workouts should be at a

low intensity. Gradually build cardiovascular endurance before adding high-intensity anaerobic workouts in late preseason.

Strength training should also start with low-intensity workouts. Work with lighter weights for a moderate number of repetitions (for example, sets of 8 to 10 repetitions), especially if you are relatively new to strength training. Next, progress to a phase emphasizing gaining strength by performing more sets with heavier weight and fewer reps. As you peak for reaching your training goal, focus on increasing strength endurance by using lighter weights than in the strength phase but completing more repetitions. [Table 4-1](#) indicates how strength sets and repetitions will vary according to the phase of training you are in.

**Time.** Cardiovascular and strength workouts range in length, also known as duration, according to the end goals, training cycle, and exercise type. Aerobic exercise in a climber's training zone should be done for at least 15 to 20 minutes per session in order to see improvements. A strength workout as short as 8 to 10 minutes can provide some benefits, although a typical strength workout ranges from 20 to 60 minutes, depending on the frequency of the strength training.

**Type.** Workouts vary according to the specific cardiovascular exercises and strength exercises they encompass. Exercise selection depends on individual preference, location (climate and terrain), season, and sport discipline. Choices will vary from one athlete to the next: a rock or ice climber may spend more time at indoor climbing gyms and focus on upper-body and core training in the off-season, while a high-altitude alpine climber may opt for backpacking trips year-round and focus on core and lower-body conditioning exercises in the off-season. Supplemental cross training outside of the chosen sport provides rest and recovery as well as additional training stimulus for the cardiovascular and musculoskeletal systems.

## TRAINING GUIDELINES

In addition to properly manipulating the four FITT parameters, climbers should also adhere to the following training guidelines.

**Train specifically.** Match the cardiovascular modes and intensities of a training program to the primary movements of the intended sport. Sometimes it is difficult to practice a sport—ice climbing is challenging in a warm winter, rock climbing is difficult in the middle of a city, and high-altitude trekking

may be impossible for those who live at sea level. And sometimes it is beneficial to include cross training for rehabilitation or injury prevention.

For most of a training program, however, choose comparable activities that work the muscle groups in the same ways the intended sport works them. In a well-rounded program for mountaineering, spinal-loading choices, such as hill climbing, stair climbing, and using inclined cardiovascular machines (for example, an elliptical trainer, treadmill, stair climber, or stepmill)—all with or without a pack—as well as trail running without a pack, should be the dominant cardiovascular choices. Non-spinal-loading cardiovascular activities such as biking, rowing, and swimming may be included for cross-training purposes.

**Train functionally.** Keep the exercise selection functional, choosing exercises that integrate as many muscle groups as possible rather than train the body in isolation. Training with free weights provides far greater benefits compared with using weight machines, because training with free weights requires you to balance weight and exercise coordination in all three dimensions, which loads the spine the same way it is loaded when climbers are on a hiking trail, snowshoes, a pair of skis, a slope, or a rock ledge.

**Increase gradually.** Increase training volume by no more than 5 to 15 percent at any given time. If a training program starts with 20-minute workouts, add 2 minutes to subsequent cardiovascular sessions. This suggested progression is based on the amount of musculature used, impact on joints, and relative support provided for the body. Activities that rely heavily on smaller upper-body musculature or rigorous full-body movements (for example, cross-country skiing or technical climbing) should increase by no more than 5 percent at a time; high-impact activities that use large muscles (such as trail running or telemark skiing) should increase by no more than 10 percent at a time; and low-impact activities (for instance, hiking or scrambling) or seated, supported activities (such as biking) should increase by under 15 percent at a time.

**Include adequate recovery time.** The impact of high-intensity workouts requires more recovery time. Endurance days may be done at low intensities; but if pack weight or hilly terrain is added, follow them with a recovery day. Low-intensity recovery cross-training exercises may include walking, swimming, dancing, easy flat biking, yoga, or yard work. Such light days help prevent overtraining by allowing tired muscles to rest before they perform

again. As climbers grow older, they may need additional recovery time as well as training time to reach their training goals.

## NUTRITION HABITS

Comprehensive nutrition guidelines are beyond the scope of this chapter, but no discussion of conditioning is complete without addressing basic nutrition needs (see [Chapter 3, Camping, Food, and Water](#), for other considerations regarding food and water). Six basic habits for good nutrition that do not require calorie counting, measuring food, or giving up favorites are recommended here. They focus on healthy choices and are as applicable to the occasional weekend sport-climbing vegan mountaineer as they are to the die-hard steak-consuming mountaineer who wants to climb the Seven Summits. All that these habits require for performance and measurement are each climber's own hands.

**Habit 1.** Eat *slowly*, and try to stop eating when you reach 80 percent full (that is, still slightly hungry), to teach yourself what your level of “comfortably full” feels like. After eating slowly for 20 minutes (the approximate amount of time it takes for satiety signals to reach the brain), if you are still hungry, have more.

**Habit 2.** Include vegetables with each meal. A cup of leafy greens or a half cup of other vegetables qualifies as one serving; try to include one to two servings every meal for women, two to four for men. Eat from every color of the rainbow for maximum phytonutrient benefits.

**Habit 3.** Include protein with each meal. Think “palm-sized” according to the size of your own hand—one palm for women per meal, two palms for men. Good sources of protein include whole eggs; lean beef, pork, or lamb; poultry or seafood; and lentils or beans.

**Habit 4.** Make sure to get healthy fats with each meal—fats that are rich in omega-3 fatty acids and low in omega-6 fatty acids. Nuts, seeds, nut butters, extra-virgin olive oil, avocados, and fish oils are all excellent choices. Women should include one thumb-sized portion each meal, men should include two.

**Habit 5.** Eliminate or reduce starchy carbohydrates on days you don't exercise, replacing them instead with added servings of fruits or vegetables. If you *have* exercised that day, include one fist-sized (cooked) portion of starchy carbohydrate for women, two for men, choosing from such foods as wild rice, quinoa, sprouted grains, squash, pasta, or other whole grains with little to no

added sugar. If you must have a sweet snack like a doughnut, make sure to include veggies, protein, and some healthy fat with it, and sit down and treat it like a full meal. In most cases, by going through the extra effort, you'll decide it's not worth it or wait until you're legitimately hungry for a complete meal.

TABLE 4-2. SAMPLE TRAINING BLOCKS AND GOALS FOR ONE YEAR					
PRESEASON			IN-SEASON	POSTSEASON	OFF-SEASON
Early	Middle	Late			
Establish baseline.	Increase cardiovascular endurance and build strength.	Enhance mental toughness and stamina; peak and taper.	Maintain performance level.	Focus on imbalances developed from sport-specific activities.	Prioritize training of weak points.

Source: Courtenay W. Schurman and Doug G. Schurman, *The Outdoor Athlete* (see [Resources](#)).

**Habit 6.** Drink plenty of plain potable water, especially if you consume any soda, alcohol, caffeinated beverages, or juices. It's best to eliminate those beverages entirely, but if that's not possible, increase your water intake to 60 or more ounces per day—more on days when you are training longer than an hour, enough to keep your output clear.

## FITNESS PROGRAM TRAINING BLOCKS

In order to develop a suitable program, start by noting the date you want to attain your end goal. In many cases, registering for a climb or making a deposit on a trip provides a deadline that is hard to change. There may also be a short window of opportunity for a given climb, for example for ice climbs in most parts of the world. Once a firm date is set, break the time between that end goal and the training program starting point into six distinct training blocks; each block of time will have a different objective. [Table 4-2](#) illustrates how an entire year may be divided into training blocks.

**Preseason.** In the *early phase* of preseason training, the goal is to establish a solid foundation, or baseline, on which the rest of the training builds. Frequency, intensity, and time for both cardiovascular training and strength training will probably be fairly low. In the *middle phase*, as the focus of preseason training shifts to increasing cardiovascular endurance, frequency and time of cardiovascular exercise will gradually increase while intensity remains low. Focus on building strength specific to the chosen activity with increased intensity (more weight, fewer repetitions, more sets) for strength

exercises. In the *late stages* of preseason training, the focus will shift to enhancing mental toughness and increasing stamina, adding intensity to one or two weekly anaerobic sessions, adding pack weight and distance to long weekend conditioners, and training for more strength endurance (lighter weight, higher repetitions) as the in-season approaches. The late phase of the preseason will be devoted to peaking and tapering for a climb or for the start of the season for the intended sport. Preseason can last as long as one to six months.

**In-season.** A sport's in-season might mean getting out to the mountains as frequently as several times a month or more. In-season encompasses a series of climbs or trips, generally in summer (ice climbing would be winter). The training goal in-season is to maintain performance level during the intended activity.

**Postseason.** After the completion of in-season activities, the training focus is on addressing any imbalances that arose from the in-season activities. Common to climbing is the need to balance a season of horizontal and vertical pulling by adding horizontal and vertical pressing movements, thus improving shoulder stability. The postseason lasts two to four weeks, immediately following the completion of the in-season events.

**Off-season.** During the off-season, training prioritizes any weak points that have emerged such as quadriceps that fatigued on steep downhills, hips that got tight on longer trips, or a low back that fatigued with heavier pack weight. The length of the off-season is the time that remains between postseason and the next preseason—generally several months, unless a climber participates in multiple sports.

**A sample year.** If a novice climber is training for a first, very easy mountaineering outing, the early phase of the training program may last only one to two weeks, with two or three weeks for each of the other five training blocks. A more experienced mountaineer, or a climber who is working toward complex goals that require more than half a year of training, might spend a month in each training block and cycle several times through the middle phase of preseason training, alternating between a strength-building phase and an endurance building phase, separating each ramp-up with a week of active recovery. Each block in a training program has a different focus, so the daily workouts should reflect that focus.



# **BUILDING AN ANNUAL TRAINING PROGRAM**

This section provides details on how to set up an annual training program, with a sample calendar based on a northern-hemisphere mountaineer who typically climbs most during the late spring and summer. This calendar would vary depending on where climbers do most of their mountaineering.

**Postseason.** After an intense season of mountaineering, the body needs a break. The postseason includes shorter aerobic workouts, reduced pack weights, and cross-training workouts unrelated to the in-season activity. The goal in this training block is to rest, both physically and mentally. For the example northern-hemisphere climber, postseason would generally encompass the month of October; many of these climbers shift to training for winter activities after several weeks of reduced intensity, to get ready for snow sports such as snowshoeing, cross-country skiing, downhill skiing, or winter ice climbing.

**Off-season.** This is the ideal time to evaluate what worked well in the training program from the previous season. Include strength training sessions that address any muscle imbalances that may have developed or been identified during the in-season activities. Add flexibility training if there is any residual stiffness that might have stemmed from a season of repetitive movement or overuse. Intensity and time remain low, but frequency of training may increase once a climber is fully recovered from in-season activities. For the example northern-hemisphere climber, off-season would be November and December. But if that climber is participating in winter ice climbing during the off-season, adding a focus on calf, core, and forearm training would be appropriate to swinging ice axes overhead for longer periods of time.

**Preseason.** This is the time to include unilateral strength exercises for balance and agility to address any problems detected in the off-season. Introduce pack carrying and other sport-specific training for the intended activity at somewhat reduced intensities from those of the previous postseason, and gradually build back up to weight-carrying and distance-traveling goals. Increase training volume by 15 percent or less per week. For the example northern-hemisphere climber, preseason would be January to April.

**In-season.** Participate in as many trips, climbs, or events as desired, and schedule suitable recovery time following outings. Shift the training focus to maintenance. Do full-body strength training twice a week and weekly

anaerobic training when appropriate. For the example northern-hemisphere climber, in-season would incorporate the months of May to September.

**Training for two in-seasons.** A mountaineer who climbs in two seasons—for example, both summer rock and winter ice—can take one to two weeks of “off-season” for evaluation and flexibility training between the end of one in-season activity (summer rock climbing or winter climbing) and the beginning of the next. In such cases, climbers will have two seasons to prepare for and smaller lead-in times for each sport. The advantage is that participating in two sports helps a climber maintain a baseline of climbing strength and flexibility so that preseason training does not have to be as extensive.

**Training for year-round climbing readiness.** The climber who is outdoors year-round—for example, climbing alpine ice in the summer, climbing rock in spring and fall, and traveling over glaciers in austral summer—may need a program with four seasonal cycles leading up to specific high-priority climbing objectives. “Off-season” might refer to any one of the seasons that is lower priority, and training frequency, intensity, time, and type will vary according to what is the highest-priority goal.

## SAMPLE TRAINING PROGRAM

When climbers assemble their goals and exercise preferences, evaluate their skill level, and combine all the fitness components and training parameters together, they have a personalized training program that will work uniquely for them. Each climber’s program will look different from anyone else’s, based on individual body type and size, goals, age, and social environment. A single program *cannot possibly* work for every mountaineer.

The template shown in [Table 4-3](#) illustrates just one example of how all the program variables might fit together into a complete six-week preseason training program suitable for a goal such as a 7-mile (11.3-kilometer) outing with a 20-pound (9.1-kilogram) pack covering an elevation gain and loss of 3,200 feet (975 meters). The progression begins with baseline hiking of 5 miles (8 kilometers) round-trip with 2,300 feet (700 meters) of elevation gain while carrying a 13-pound (5.9-kilogram) pack and gradually transitions to steeper terrain by increasing elevation gain by 300 to 500 feet (91 to 152 meters) per outing and gradually increasing pack weight to 20 pounds (9.1 kilograms). At each step along the way climbers then choose types of cardiovascular exercise and specific strength movements to fit personal preferences, lifestyle factors, and individual body needs.

TABLE 4-3. SAMPLE SIX-WEEK PREPARATION FOR STRENUOUS DAY HIKES						
WEEK	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	WEEKEND (1 DAY)
<b>BUILD STRENGTH</b>						
1	40 minutes aerobic 75% to 85% MHR; 30 minutes strength	60 minutes aerobic 65% to 75% MHR, 15-pound (6.8 kg) pack	Off	60 minutes aerobic 65% to 75% MHR, no pack	30 minutes full-body, sport-specific strength	2,300 feet (701 m) gain, 5 to 6 miles (8 to 9.7 km) round-trip, 13-pound (5.9 kg) pack
2	40 minutes aerobic 75% to 85% MHR; 30 minutes strength	60 minutes aerobic 65% to 75% MHR, 17-pound (7.7 kg) pack	Off	65 minutes aerobic 65% to 75% MHR, no pack	30 minutes full-body, sport-specific strength	2,600 feet (792 m) gain, 5 to 6 miles (8 to 9.7 km) round-trip, 16-pound (7.3 kg) pack
3	45 minutes aerobic 75% to 85% MHR; 40 minutes strength	30 minutes uphill or stair intervals, 20-pound (9.1 kg) pack	Off	70 minutes aerobic 65% to 75% MHR, no pack	45 minutes full-body, sport-specific strength	2,600 feet (792 m) gain, 5 to 6 miles (8 to 9.7 km) round-trip, 19-pound (8.6 kg) pack
<b>BUILD STAMINA</b>						
4	45 minutes aerobic 75% to 85% MHR; 45 minutes strength	35 minutes uphill or stair intervals, 22-pound (10 kg) pack	Off	60 minutes aerobic 70% to 75% MHR, no pack	45 minutes full-body, sport-specific strength	2,900 feet (884 m) gain, 6 to 8 miles (9.7 to 12.9 km) round-trip, 19-pound (8.6 kg) pack
5	45 minutes aerobic 75% to 85% MHR; 45 minutes strength	40 minutes uphill or stair intervals, 25 pound (11.3 kg) pack	Off	65 minutes aerobic 70% to 75% MHR, no pack	45 minutes full-body, sport-specific strength	2,900 feet (884 m) gain, 6 to 8 miles (9.7 to 12.9 km) round-trip, 23-pound (10.4 kg) pack
6	60 minutes recovery (easy) cardio 65% MHR	30 minutes 75% to 85% MHR cardio; 45 minutes strength	Off	45 minutes aerobic 65% MHR, no pack	Off	3,200 feet (975 m) gain, 7 miles (11.3 km) round-trip, 20-pound (9.1 kg) pack

*Note:* MHR stands for maximum heart rate.

*Source:* Courtenay W. Schurman and Doug G. Schurman, *The Outdoor Athlete* (see [Resources](#)).

## BEYOND TRAINING: RECOVERY

All the hard training in the world will mean nothing unless you give your body the recovery time it needs to repair damage, replenish muscle glycogen stores, and prepare to work hard again. High-intensity cardiovascular and strength workouts require more recovery time than do endurance or recovery workouts. While endurance days (for example, aerobic workouts lasting over an hour) are done at lower intensities, as soon as pack weight or hilly terrain

is added, also insert a rest day, unless the program calls for back-to-back training in preparation for a multiday trip. Recovery days at lower intensity (less than 65 percent of maximum heart rate) may include cross-training exercises such as walking, swimming, dancing, easy flat biking, yoga, or yard work. Such easy days help avoid strain by allowing tired muscles to rest before they perform again. Mountaineers over the age of 50 may need to plan on even more recovery time and training time to reach their fitness goals.

Pay close attention to your body. When warming up for workouts, if you still feel tired or sore from a previous workout or climb, reduce the intensity or complete a shorter workout than scheduled. If your finger or elbow tendons are tender to the touch following a hard climb or workout, insert cross training to allow for adequate recovery. Place strength training sessions or highly demanding rock or ice climbs at least 48 hours apart so that the targeted muscles, tendons, and ligaments can recover before they are stressed again. If multiple days of climbing are anticipated, try to alternate days of higher-intensity workloads (or carries, in the case of expeditions) with those of lower-intensity workloads (or “climb high, sleep low,” in the case of high-altitude expeditions). Tendons and ligaments take longer than muscles to adjust to increased workloads. They also take a frustrating amount of time to heal once they are injured.

Although it is difficult for most mountaineers to take time off from a favorite activity, it is better to let the body heal completely before resuming; otherwise, an acute irritation may turn into a chronic injury that requires a much longer time away from the sport. Knowing that you have done the physical training necessary to succeed will empower you to face challenges or worst-case scenarios not only in the chosen activity but also in daily life. The first step toward achieving mountaineering goals is acquiring the knowledge needed to get there; the rest is up to you.