



## PHYSICAL FITNESS & CONDITIONING for Mountaineering

The purpose of this information is to help you set and reach fitness goals. Our training goal is to help you get physically and mentally prepared to fully engage in the sport of mountaineering. Your climbing goal will be to perform strong and steady throughout your adventure.

Rainier Mountaineering, Inc. (RMI) offers numerous adventures on Mount Rainier and Mount McKinley, and worldwide from nearby Mexico to far-away Everest. While different objectives require varying levels of commitment, sound fitness gained through a well-guided program is the single best way you can ensure a safe and successful adventure regardless of the destination you have chosen.

Start on a good foot and seek your **physician's approval** and the **advice of a physical trainer/fitness expert** before taking on a serious training program. A sound fitness program addresses cardiovascular fitness (fitness of the heart) and motor fitness (particularly strength, endurance and balance).

**Cardiovascular fitness** is measured through your **aerobic capacity**, your body's ability to take in and use oxygen. At sea level, the restrictive factor in delivering oxygen to the muscles is the heart's ability to pump blood, not the capability of the lungs to take in oxygen. It is at altitude, where oxygen is effectively less available, that lung capabilities come into question. Aerobics should be directed at conditioning your heart muscle even though it can also improve somatic muscle fitness.

**Motor fitness** is needed to complement cardiovascular fitness. Motor fitness refers to **strength** (the ability to exert force), **power** (the ability to exert force rapidly), **endurance** (the ability to withstand exertion), **balance** (the ability to maintain stability), **agility** (the ability to perform actions quickly and smoothly), and **flexibility** (the ability to bend without breaking).

**Fitness and Acclimatization:** The fitter you are, the more effectively you can acclimate (i.e., adjust) to altitude. That is simply because fit climbers expend less energy for a certain task (i.e., a day of hard climbing), leaving their bodies ready for the task of acclimatization.

It is important to understand what your goals are so that you may maximize your training. This is especially important given the time constraints placed on a mountaineer by weather, route conditions, objective hazards, and the effects of altitude. Proper physical conditioning will allow you to perform better by climbing longer, stronger and faster, be more comfortable on steeper and awkward terrain, carry heavier loads, recover quicker at rest, and enjoy the entire adventure more completely. Training goals will vary from mountain to mountain. Here are two examples:

### ***Mount McKinley 22-day Expedition:***

- Be able to carry a 60-pound pack for five to eight hours a day for several successive days.
- Be able to recover from a difficult day of climbing within an eight- to twelve-hour period.
- Be able to perform as an asset on a summit day of fourteen hours (on slopes up to 40 degrees).
- It is wise to take a look at your ***current fitness level*** before getting started on a new fitness program. A comprehensive assessment (done under advice of a trainer at your local gym) can certainly be an important tool toward your fitness goals.

### ***The Fitness Program***

Start your entire fitness training program well in advance of your climb, and increase the intensity and duration of your exercising as you gain fitness. Very generally, a six-month minimum is needed to implement an effective program. Your first weeks in this new fitness program will most likely be focused on getting into a routine. Discipline yourself to begin both the cardiovascular and motor fitness training from the outset, but start carefully to avoid overuse or over-enthusiasm injuries. Use a variety of exercises, activities, locations, etc. to keep physically challenged and mentally engaged. Be cautious of month-by-month formulaic programs which tend to over-simplify expectations and promises. You should have a plan that is both regimented specifically for you and be flexible enough to meet your personal needs.

The more your training can simulate real climbing, the more you will benefit. The following exercises can be used in your fitness program.

### ***Use aerobic exercises to develop cardiovascular fitness***

There are a variety of aerobic exercises which are fantastic for training. They include: climbing and descending hills, stairs or stadium bleachers, any kind of skiing, snowboarding, running and cycling.

Other excellent aerobic activities which can benefit you but tend to be less focused for our needs include: aerobics classes, stationary cycling, circuit weight training, boxing and martial arts. Swimming can also be valuable. For the purposes of this expedition it would serve you better to use aerobic activities more suited to our goal of maximizing cardiovascular fitness ***and*** maximizing the strength and endurance needed for climbing.

In addition to the benefit of cardiovascular fitness, there needs to be concentrated effort on developing your aerobic ability for the descent from the summit. We should prepare for the event of a big storm moving in at the end of the day and thus train so we have the ability to get down quickly. A good strengthening program for the legs, especially quadriceps and knees, can really pay off on the mountain. When training with a pack, use a bathroom scale to hold it accountable.

**Some training recommendations for aerobic exercising include:**

(1) Keep your **training range** at 65 to 85% of your maximum heart rate. There is a well known formula for ascertaining your *maximum heart rate* that is based on your age, which you subtract from the number 220 (beats per minute). Arbitrary at best. We suggest that you begin with that formula, and then be aware of how you feel. Your perceived exertion can actually be a better indicator of how you ought to be performing on a given day. Individually, we differ enough, and certainly we have good days and bad days, such that "how we feel" should come into play. For example, a 39 year old has a maximum heart rate of 181; i.e.,  $220 - 39 = 181$  beats per minute. The training range, then, is between 118 and 154 beats per minute.

(2) We recommend that the **time** you spend working aerobically should be a solid 30 minutes a day, and shouldn't exceed 60 minutes. In order to train for the lengthy days in the mountains, you've got to get out and do lengthy training climbs; nothing else will prepare you as adequately.

(3) The **frequency** of your aerobic workout can be rather unlimited. You can train every day if you like. Be careful that you don't overdo it and set yourself up with injuries. You should include some rest time each week.

### ***Use interval training to advance your cardiovascular fitness.***

The technique of interval training calls for including surges in the activity while maintaining an elevated heart rate. Here are some examples:

(1) If you are a runner, begin by running at a moderate intensity for twenty minutes. Every ten minutes thereafter, increase your pace for three to eight minutes, then return to the moderately intense level.

(2) If you are at the track, run around the track once at a moderate pace. Sprint 220 yards, then run one lap again. Repeat.

(3) If you are using a step mill, step moderately (at the high end of your aerobic training range) for ten minutes. Every five minutes thereafter, increase your pace for 1 to 1½ minutes, then return to moderate intensity.

Remembering that the heart's ability to pump blood to the body is a major limiting factor in our athletic performance, then here is a training technique which can help us overcome that limitation. What we are doing here is going beyond standard cardiovascular fitness. Interval training, when used over a longer period of time, can aid in increasing the heart's capacity for pumping blood through the body.

This is a very strenuous manner of training, and it shouldn't be initiated at the last minute. We have had success with interval training when we have a minimum of three months of training time.

## ***Use weights, calisthenics and stretching to develop motor fitness.***

We suggest that when you work with weights, limit it to 2 sets of 20 repetitions with lighter weights (lighter than the heavy weights customarily used to intensify muscle growth). Your first 15 reps ought to go easy; your last five with each set should be tough. Rest for 30 to 60 seconds between sets.

Below are sample workouts which we have found successful. This program develops both cardiovascular and motor fitness. We have intentionally omitted describing the specific mechanics of the workouts as there exists a huge arsenal of exercises and machines to match an individual's personal situation (personal history and present fitness level).

It is important that in addition to a sound lower body, you develop a sound upper body as well. A sound torso (both back and stomach) is especially important for mountaineering where heavy pack weights add a new dimension to our physical activities. These training principles are essentially the same for our upper and lower bodies. Use a physical trainer to help you build a program specific to your lifestyle and needs.

**Stretching, balance, aerobic and abdominal exercises** can be done every day. You should work with **lower body** and **upper body weights** at least twice a week (once every 3 days). Don't fail to include a good **warm up** and **warm down** in your workout.

### ***Warming up and warming down***

- Include 10 to 15 minute **aerobic warm up** and a 5 to 10 minute warm down in your program. This is an important component of any program. Keep your heart rate in an aerobic range; don't get anaerobic.
- Examples include walking, jogging in place, step mills, treadmills, cycling, and jumping rope.

### ***Stretching***

- Include 15 minutes of quality **stretching** into your program.
- Focus on slow, **static** stretching. Avoid bouncing, **ballistic** stretching.
- With static stretching, hold the stretch for 30 to 60 seconds, breathing through the stretch. Hold it only to the point of tension, not to the point of pain.
- Don't stretch through pain; you are stretching and tearing muscle fibers with this activity.
- Be patient. The reward of proper stretching is the joy of movement which results.

- Remember that stretching is a warm up and warm down exercise as well as a “real” workout for your body. Your goal is the reduction of muscular tension, not an attainment of extreme flexibility. Improper stretching can lead to injury and disillusionment with this aspect of motor fitness training.
- Stretch at the beginning of a workout, just after the warm up, and also, even more importantly, **after** the workout when the muscles are at their warmest and most supple state. Stretching after a workout will do a tremendous amount of good toward alleviating muscle soreness and decreasing the chance of injury.

### ***Lower body weights***

- (1) 1 to 2 sets of calf raises. Use a platform which allows you to make the full range of motion as you stand up on your toes and then drop your heels. Use body weight only.
- (2) 2 sets of leg curls. Your hams should be 1/3 to 1/2 as strong as your quads.
- (3) 2 sets of individual leg extensions.
- (4) 2 sets of squats. Use a machine to isolate the gluteal muscles and prevent back injury.

### ***Upper body weights:***

- (1) Begin by exhausting the larger muscles first. This includes the chest and back, and shoulders.
- (2) Work both the biceps and the triceps.

### ***Points to focus on:***

- (1) All weight sets should be performed focusing on excellent form and technique. You should hire a physical trainer for at least a day to assist you with developing good technique. It may also be beneficial to meet again with this person periodically to ensure good form and to measure progress.
- (2) Perform repetitions with a two-count positive motion and a four-count negative motion.
- (3) Breathe out on exertion.
- (4) Use proper rest periods between sets.
- (5) With all these exercises, slowly increase the weights over time. Be patient.
- (6) Tendon strength increases at a rate roughly ten times less quickly than muscles. Don't supercharge your muscles on an aggressive weight program only to injure your tendons.

## ***Abdominal exercises***

- Focus on the quality of the exercise, not the number.
- Changing up the exercises (cross-training the abdomen) is key to increasing abdominal fitness.
- The abdominal muscles adapt remarkably well to a punishing workout – continue to change up your workout, even if you don't switch exercises, switch the routine.

## ***Balance Exercises***

- Balance exercises reward you with increased body awareness and can aid in your ability to negotiate tricky terrain under a heavy pack.
- Distinguish between **static** and **dynamic** balance exercises. Static exercises will keep one or both feet on the ground. Dynamic exercises involve the body in motion. Both are important for the development of this motor fitness skill.
- Balance is a motor skill like strength, and can be improved over time.

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Include some of these into your workout. Here are some possibilities:

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### **Static balance exercises:**

- (1) Walk heel-to-toe in a straight line. Then return by walking backward. Then try with your eyes shut.
- (2) Stand in balance on one leg. Fold the other leg beneath you and hold it by the knee or foot.
- (3) Stand in balance on one leg, then squat, and then return to the stand position.
- (4) Try the same exercise, but standing on a piece of foam.

### **Dynamic balance exercises:**

- (1) Skiing, snowboarding, roller skating, ice skating are obvious and fun.
- (2) Tennis, racquetball, table tennis, basketball and volleyball are all also great for balance.
- (3) Clamber up and down hills, the hard way – over rough trails or “off piste” over boulders and logs, through the woods, etc. This is a particularly effective exercise.

## ***Training Log***

We have found that a **training log** helps to keep people on track. It keeps you honest for one;

but more importantly, it is rewarding to see progress occurring over the longer term. A log book can help you recognize and then seize some motivation and satisfaction, especially if you have been training for months.

***Good luck. Train hard. We look forward to seeing you on the mountain!***