



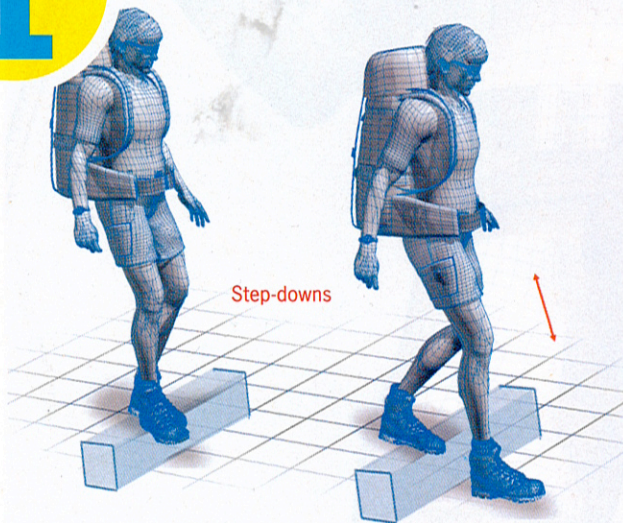
Hike Farther, Hike Stronger

Want legs that can tackle any climb, any heavy pack, any mileage? Well, don't work harder—work smarter. We grilled fitness experts and scoured the medical literature to uncover the latest, greatest strategies for building strength, endurance, speed, and flexibility. **By Evelyn Spence**

STRENGTH

1

Incorporate eccentric training to climb with power—and descend without soreness.



Step-downs

The new rules The big Grand Canyon trip you've been planning has enough vertical to max out your altimeter. To get ready, you should begin an extended affair with your local stairclimber and do leg presses in your sleep, right? That's the old wisdom, says Jonathan Chang, a sports-medicine orthopedic surgeon in Monterey Park, CA. "Recent studies have shown that you spend three times as much energy walking downhill as walking up," he says. "It just doesn't feel as tiring." To wit, a 2007 study in the *Journal of Sports Sciences* showed that 3 days after one 30-minute downhill run, subjects had shorter strides, less range of motion, and muscle damage.

Here's why: Each descending step requires a so-called eccentric contraction, meaning you're actually lengthening your quad muscles as you contract them (weightlifters call such movements "negatives"). Ignore the eccentric side of things and you'll get that telltale thigh burn—and that morning-after-the-morning-after soreness. Luckily, eccentric training may be even better for you than previously believed. A study in the *Scandinavian Journal of Medicine and Science in Sports* found that soccer players who did eccentric exercises for their hamstrings rather than traditional leg curls saw increases in both their eccentric and overall hamstring strength.

The fix You can get the same benefit for your quads, says Bill Roberts, medical director for the Twin Cities Marathon and an avid backpacker. "I always work step-downs into my routine before I leave on a trip. They do wonders for soreness." Find a 6- to 8-inch step, box, or stair. (You can work up to 10 inches, but start smaller. Wear a pack for a bonus workout.) Stand with both feet on the step, facing "downhill." Keep your arms at your sides. Balancing on your left foot, bend your left knee and lower yourself until your right heel touches the floor, then push back up. Alternate sides, doing 3 sets of 15 reps per side.

Train for the Trail

Simple solutions to strengthen 3 trouble spots

Quads Remember, it's the descents that really tenderize your thighs. That's why U.S. Ski Team Sports Science Director Andy Walshe recommends downhill lunges, starting at least 3 weeks before you get to the trailhead. Load your pack with up to 30 pounds, find a gradual slope, and lunge downhill for 50 yards. Do 3 sets, 3 times a week.



Downhill Lunge

Hamstrings Carrying a heavy load while walking on a soft surface often causes your heels to sink in. That creates tension in the hamstrings, which in turn pull on your lower back. The remedy? Stronger hams. Tony Soika, owner of Sports Performance Advancement and a former fitness director at the U.S. Merchant Marine Academy, swears by the chair walk. Sit as erect as possible on the front half of a rolling desk chair, with your hands behind your head. Walk the chair forward about 75 feet, turn around, and scoot back. Repeat 3 times.



Chair Walk

Inner/outer thighs Though the purpose of backpacking is to get from Point A to Point B, you do a lot of sideways movement along the way. This sway works little-used muscles called abductors and adductors. (And if they're weak, you can strain your hips.) Kristen Dieffenbach, an ultra-endurance athlete, cycling coach, and assistant professor of athletics at West Virginia University, recommends side skips. The motion resembles the lateral warmups soccer players do before a game; a sideways movement that has the same rhythm of a forward skip. Start with arms at your sides, feet together. Step to the side with your right foot, then skip, bringing your feet together in midair. Land on your left foot, then immediately push off again with your right. Repeat for 50 yards, then switch sides.



Side Skip



Extra Credit

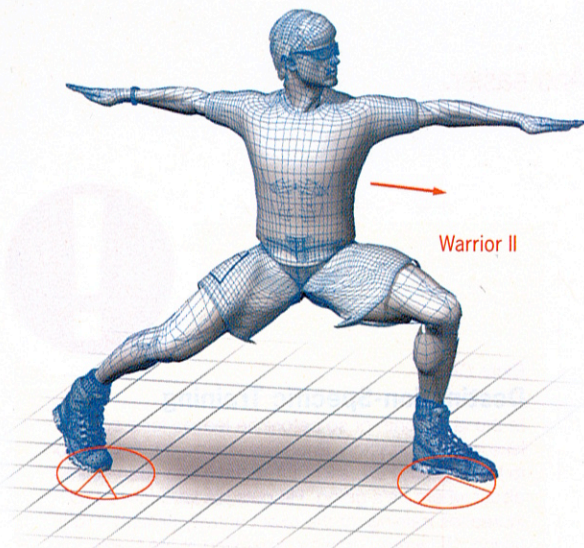
Downhill bounding with a backpack

"If you want to boost eccentric strength and power at the same time, there's nothing better than bounding downhill," says Walshe. Hike up a gradual slope with a pack (start light, and build up to 40 pounds), then turn and face downhill. Pull your arms back, push off your right foot, and leap as far as you can, landing softly on both feet with arms in front of you. Come to a full stop before leaping again. Alternate legs, and bound 50 yards. Don't try this high-impact move if you have bad knees.



2

HYPERFLEXIBILITY



Stretch your hip flexors and eliminate leg pain.

The new rules Tightness at the hip can cause problems all the way down your legs, making flexibility in the rest of your body almost impossible. Even worse, backpacking, especially if it involves a heavy load, makes your hip flexors tighter than walking or dayhiking does. "When you walk with a pack, your torso tends to lean in, folding your body slightly and compressing your hips," says Justin Price, a corrective exercise expert and owner of The BioMechanics, a personal training and wellness facility in San Diego. "Your pelvis rotates forward and the muscles around it shorten up."

Fortunately, the solution is straightforward: You need to stretch your hip flexors, those bungee-like muscles that connect your torso to your upper legs. The *American Journal of Sports Medicine* highlighted the benefits in a December 2005 study, which reported that better hip flexibility actually reduces patellofemoral pain syndrome—that ache under your kneecap. Even better, stretching your hip flexors lets you lengthen your stride and get more power out of your glutes.

The fix Cyndi Lee, owner of OM yoga center in New York City and author of *Yoga Body, Buddha Mind*, says the Warrior II pose aligns your knees, opens up your hips, and increases both leg strength and flexibility.

Stand with your feet about 4 feet apart, then reach your arms out to either side, parallel to the ground with palms down. Turn your right foot in slightly and your left foot out to a 90-degree angle. Look over your left shoulder, exhale, and lunge until your left knee is over your left foot and your shin is perpendicular to the floor. Hold for at least 30 seconds.

Extra Credit

Lunge with rotation

You can stretch and realign your hip flexors—and strengthen the muscles that stabilize your hips and legs (glutes and adductors)—by exaggerating a normal walking motion. To start, hold a medicine ball in front of you with both hands. With your back straight, lunge forward with your right foot, simultaneously rotating your arms to the right and lowering your hips toward the ground until your front knee is bent at 90 degrees. Tilt your hips up and forward until you feel a pull in the hip flexor of your rear leg, then step back and return your arms forward. Alternate legs, doing 8 to 12 reps for each leg, 3 to 5 days a week.



Train for the Trail

Simple solutions to stretch 3 trouble spots

Calves The calf stretch is easy, right? Just stick a leg back until you feel a pull. Yet Price insists most people do it wrong. "You need to make sure your calf muscle doesn't twist while you stretch," he says. Stand upright and place your hands on a wall or tree. Extend your right leg back, keeping it straight and your front leg bent (this looks like the traditional calf stretch). The subtle difference is all about preventing pronation and poor alignment: Keep your heel on the floor, raise the arch of your back foot slightly, and tighten your right glute.

Hamstrings "The lower body gets used in a pretty one-dimensional way while you're backpacking, and this shows up as stiffness and soreness in muscles like the hamstrings," says Baron Baptiste, a yoga instructor and author of *Journey Into Power*. To keep your hams limber, try Baptiste's rag-doll pose: Standing with feet together, fold over at the waist and let your upper body hang to the floor, with arms loose and torso relaxed; hold for 20 to 30 seconds. Do the pose once before each day's hike.



Rag Doll

IT band This oft-forgotten belt of connective tissue on the outside of the upper leg stabilizes the hip and the knee, especially each time your heel strikes the ground. "With extended use, a tight IT band can turn into a huge problem," says Brian Halpern, a sports-medicine physician at the Hospital for Special Surgery in New York City and author of *The Knee Crisis Handbook*. "And sometimes it takes a long time to heal." To prevent tightness and chronic inflammation, you need to keep the tissue supple. Standing upright, place your right foot behind your left. Leaving your left arm hanging loose, raise your right arm and bend to the left until you feel a pull at your right hip.



IT Band Stretch

3


Train like an elite athlete—harder. And easier.

The new rules Monday run, Tuesday lift, Wednesday run, Thursday lift...ever feel like you're so used to a fitness routine that your plateau feels flatter than the Grand Mesa? You're not alone. Whether you're a weekend hiker or an ironman, "Once your body is tolerating a certain constant level of stress, it's no longer adapting and thus no new gains are made," says Dieffenbach. "Basically, doing the same thing at the same level all the time puts your system on cruise control—and you can't get fitter, stronger, or faster."

Thankfully, there's a way to bust out of the rut: You need to break up your training schedule into segments of building and resting, a practice called periodization. It's long been used by Olympians and elite cyclists (and broken down into daily, weekly, monthly, and yearly cycles), but now recreational athletes are starting to use the same idea.

"For a given trip, you can cyclically progress to the level you need," says Calvin Zaryski, a professional endurance coach in Calgary who has trained Everest climbers. "You can adjust for the mileage, the vertical, the weight of your pack, even the temperature and weather." That might translate into the difference between summiting Rainier and bonking at 12,500 feet. Periodization recognizes that the body has different systems that need to build up, and that one system can be built upon the other—like boosting cardio first, adding strength, and then later honing in on speed.

The fix Say your big trip is in 3 months. Your first move, says Dieffenbach: Get out the calendar, mark the date, and then schedule your workouts leading up to it in three 4-week cycles. In the first 3 weeks, keep your heart rate around 55 to 65 percent of max. Increase your mileage every week, combining shorter weekday hikes with longer



Extra Credit
Destination-Specific Training
 In the last month or so before he leaves for a speed-hike or ultramarathon, Brian Robinson—the first person to hike the AT, PCT, and CDT in the same year—thinks about where he's going. He cuts his total miles and increases training for the exact activity he'll be undertaking. "If I were going backpacking in the Sierra, I'd do almost all hills—the hilliest hills I could find," Robinson says. "If I know I'll be carrying a lot of weight, I'll make sure to practice carrying at least that much."

weekend ones of 5 to 9 miles, and then back off to recover during the fourth week. For the second cycle, your weekend hikes can increase to, say, 7, 9, and 11 miles, and your weekday workouts should be more intense (70 to 75 percent of your max heart rate); you still get that rest week at the end. In the last cycle, bump up your mileage again, and add even more intensity: hills, a heavier pack, or a faster pace, depending on what you're training for. Your final rest week ends up being the week before departure, so you'll arrive at the trailhead fresh and strong. A rule of thumb to prevent injury: "You shouldn't increase your volume by more than 10 percent a week," says Dieffenbach.

Train for the Trail

Simple preventions for 3 endurance problems

Under-recovery If you're trying to get in shape at the last minute and don't let your body rebuild after a hard effort, you'll cut into your endurance gains and break down stressed muscles. In fact, your gains from working out 7 days a week are small compared to the increased potential for overuse injuries if you train more than 5 days in a row. "Generally, I like to have 3 days on for every day off," says Dieffenbach. But recovery doesn't mean a complete day of rest. "It might be an easy 1-hour ride for someone who's very fit—or a 15-minute walk with the dog for someone else."

Poor conditioning Robinson trains by spending as much time up on his feet as possible. "If you do a 7-mile run every day that takes an hour, that's not good enough for a weeklong trip at high speed," he says. "You need to practice being on your feet all day." His advice? Take advantage of full weekend days to work up to the mileage of your longest day, and repeat as often as you can.

Not enough pretrip training "I'll let you in on a guide's secret," says Tim O'Brian, who's been leading trips with Rainier Mountaineering, Inc. for 7 years and has climbed in Mexico, Russia, Africa, and South America. "It's bull when people say mountaineers and backpackers don't need to train." O'Brian has a tried-and-true recipe to get fit—even if he's pressed for time: The dumbbell step-up and step-down combination, followed by an hour on a stairclimber. Holding 20 pounds in each hand, step onto a 12- to 18-inch-high box with your right foot. Raise your left leg above the box and step down on the other side without pausing at the top, keeping your weight on your right leg until you land. Then turn around and repeat with the opposite leg. Do three sets of 20.

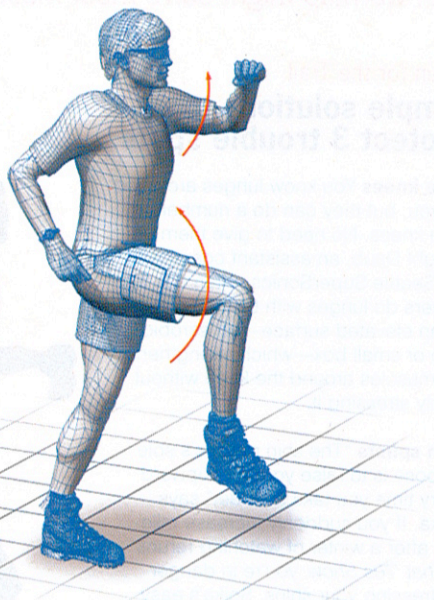
Dumbbell Step-up/Step-down



NO SPEED

4

Seriously: Going faster is mostly in your head.



Speed Skips

Train for the Trail 3 simple ways to hike faster

No time for speed drills in your routine? You can actually bump up your mph just by focusing on your form, says biomechanics expert Justin Price. "Poor technique keeps you from moving as fast as you can," he says. Here are three tips to get you started.

Shorten your stride If you overstride, you end up leaning forward to stop yourself from falling over—and actually waste energy overcoming your own displaced center of mass.

Swing those arms Your body travels contralaterally, a fancy way of saying that you gain efficiency when your opposite arms and legs move together. If you bend your elbows to 90 degrees—their most efficient position—and swing them naturally, your legs will follow.

Stand up straight "If you hunch and stare at the ground, biomechanically, you're almost propelling yourself backward," says Price. Stay erect, with your legs directly underneath you and eyes looking ahead, and you'll fly forward.

The new rules Cyclists do low-intensity, high-speed spinning workouts so their bodies learn to pedal fast. Sprinters practice drills to master lightning-quick leg turnover. What if you just want to get to your campsite quicker, or cover an entire park in one day? You can still reap the benefits of so-called neuromuscular adaptation—the idea that speed is, in a way, all in the mind.

Matt Horton, a multisport coach with Carmichael Training Systems, explains: To go faster, you train the nerves in your legs to fire faster; this in turn makes your muscles contract faster, which then increases your speed. Got it? "You want to decrease the time it takes for your brain to send messages along neural pathways to your muscles," says Walshe. Unlike with strength training, when you're seeking an actual physical adaptation (and overloading your system to achieve it), speed training is all about finesse: You're trying to perform super-fast movement patterns with textbook technique.

The best thing about neuromuscular adaptation? Its effects last a surprisingly long time. A 2005 *Medicine and Science in Sports and Exercise* study showed that the efficiency of cyclists kept increasing for 4 weeks after the end of an 8-week leg-strength training program—even though their lean-muscle mass hadn't changed. And in a 2000 study in the *European Journal of Applied Physiology*, middle-aged subjects could still perform the same level of explosive movements 3 weeks after finishing a 24-week training program

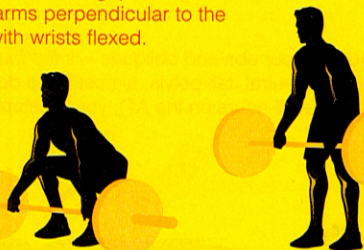
The fix To hike faster, try speed skips. Pushing off your left foot, raise your right leg to 90 degrees and your left arm up, bent at 90 degrees as if you're running. Hop on your left foot, then bring down your right leg and push off to skip forward. Repeat this motion as fast as you can, alternating legs with each step.



Extra Credit The power snatch

"If you're going to be taking quick steps, or climbing steep terrain, you can borrow from traditional weightlifting," says Soika. Olympic-style lifts target every muscle in your legs—two in your calves, three in your hams, and four in your quads—and teach them all to fire, stat. **Warning:** If done incorrectly, this exercise can cause injury. Ask a trainer to show you the proper technique.

STAND OVER a barbell and position your feet shoulder-width apart, toes pointed slightly outward and head erect. Squat down and grasp the bar with a wide grip, elbows locked and arms perpendicular to the bar with wrists flexed.



USING your legs, explode the barbell up off the floor. When the weight passes your knees, push in with your hips and pull the barbell up with your back, bringing the bar into contact with your legs at the top of your thighs.



ACCELERATE the bar upward with your legs and back until your body is fully extended, then bend your elbows, pulling the bar up with your arms as you jump your feet out to the sides. Descend into a half-squat.



FINALLY, with the bar moving up and your body moving down, your arms should relock overhead. Squat up into a standing position with the bar overhead.

5

INJURY PREVENTION

A new kind of warmup might solve most muscle tweaks.



Skips with Self-hug

The new rules You may know that many researchers think static stretching—when, say, you simply pull your ankle up to your butt—can do as much harm as good. But now experts are reaching back to the old days of calisthenics to inform the new vogue in stretching. It's called dynamic warmups—that is, doing high skips, jumping jacks, and the like *before* reaching to touch your toes. "Think about taking a rubber band out of the fridge and stretching it, then think about one that's nice and warm," says Matt Horton.

Avery Faigenbaum, an associate professor of exercise science at the College of New Jersey, says dynamic warmups do three things. They boost your body temperature, they raise your kinesthetic awareness (essentially, your body's sense of how it moves in space), and they increase motor-unit excitability, which he likens to "turning on" your muscle fibers. All of these effects prevent injury. "Static stretching turns on your slow-twitch muscles, the ones you need for steady endurance," he says. "Dynamic warmups turn on your fast-twitch fibers—so they'll be ready when you backpack up a hill, trip on a root, and need to catch yourself." A bonus: Faigenbaum, in an October 2006 study in the *Journal of Athletic Training*, reported that dynamic warmups increase performance more than static stretching does. "You work through your range of motion much better than if you just do a forward bend," he says. "Backpacking is a dynamic sport with lunging and turning on unstable ground, and this will get you ready for it."

The fix Try these two dynamic warmups for a few minutes each before shouldering your pack.

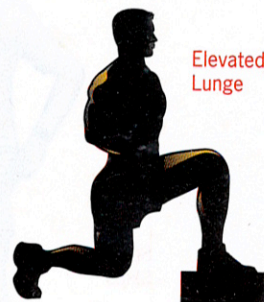
Skips with self-hug Do a standard high skip, bringing knees up to 90 degrees with each skip. At the same time, extend your arms out to the side (parallel to the ground) and then bring them in to hug your chest. Repeat both motions simultaneously.

Frankenstein walk With back upright, arms out in front of you, and palms down, walk forward straight-legged and try to touch your shins with your hands by bringing your legs up, not by bending over.

Train for the Trail

Simple solutions to protect 3 trouble spots

Sore knees You know lunges are good for you, but they can do a number on bum knees. No need to give them up: Dwight Daub, an assistant coach with the Seattle SuperSonics, often has his players do lunges with their front foot on an elevated surface—an aerobic step or small box—which strengthens the muscles around the knee without overly stressing it.



Elevated Lunge

Shin splints "The shin muscle's sole purpose is to raise your foot upward every time you take a stride," says Soika. If you suddenly increase mileage after a winter of watching reruns of *That '70s Show*, you're in danger of stressing your shins. Soika's easy fix? Walk on your heels with your toes pointed up as high as you can for 90 seconds or longer; do 3 sets a day.



Heel Walk

Weak ankles According to Justin Price, ankle sprains are directly related to the health of your feet—namely, the arch and the plantar fascia, the band of tissue that runs along the sole. Once those are strong and supple, they'll help your foot adapt to unstable surfaces and prevent rolls. Start by resting one foot on a golf ball, wearing socks, and rolling your foot over the ball for 1 to 2 minutes. Over time, you can start doing this "massage" by standing on the ball (just be sure to transfer your weight gradually). Switch sides.



Frankenstein Walk

EXERCISE ILLUSTRATIONS BY KAGAN MCLEOD (4); DON FOLEY



Extra Credit The roll-up

Your core—the band of muscles around your midsection, including your abs and obliques—is the foundation for a proper body position in any sport. "You should always keep a neutral, tall pelvis, almost like a dog tucking its tail," says Dieffenbach. Once your middle gets tired (after, say, 6 hours on the AT), your posture will fall apart, and your body actually moves into new positions and angles—stressing your legs in abnormal ways. Dieffenbach suggests borrowing a move from Pilates: Lie flat on your back with your legs straight, arms parallel to the floor above your head. Inhale as you contract your abs, then exhale as you slowly roll your torso up, reaching for your toes. Hold for a few seconds, then slowly roll back to the floor. Do 10 reps.

