

## Training for Hiking

by Tommi Paavola (first published on PTontheNET.com in August 2006)



How many ways can you really train the movement of a hiker whose performance is just a series of steps or strides? Is there any other conditioning involved in addition to cardiovascular development?

On a recent stroll along the Appalachian Trail in New York, I started to analyze the diversity of the foot contact on a hiking path. In addition to the basic stride and gait mechanics, the foot and ankle complex of my fellow hiker went through some interesting movements and positions, despite the support of the ankle-high hiking boot. This observation started a paradigm shift, and I became assured that supplemental conditioning and training is helpful for hikers of all levels. The more uneven terrain and obstacles that are encountered, the more diverse movement scale your foot goes through. This article provides a thorough exploration of movements specific to the hiking environment.

### Multi Planar Ground Contact

An interesting biomechanical detail emerges when we look at the ankle in ascent or descent situations. Walking uphill causes the foot and ankle to absorb and produce force in considerable dorsiflexion and often without a typical heel strike of gait. Downhill ground contact starts with the heel strike and proceeds into plantar flexion before the center of gravity moves over the foot. As the pitch of the uphill increases, the hip needs to flex more in order to keep the center of gravity over the foot. The opposite happens moving downhill as the foot reaches forward to meet the ground in order to slow down the downward momentum.

This concludes in the fact that walking on a flat surface or stepping up or down on a flat surface (i.e., stairs) does not necessarily cover the full range of motion, either in the ankle or the hip joint, that is required in hiking.

Here is the challenge for trainers who work with hiking enthusiasts. The reality is that we live in a world of flat and even surfaces where proprioceptive and sophisticated movements do not really exist. So now, when your clients' "office feet" are thrown into the proprioceptive jungle of an exciting hiking trail without preparation, it will feel like their first time on ice skates. Their physiologically illiterate feet and ankles are not conditioned for functioning at full capacity, and performance suffers. How can we optimize and improve the quality of the ground contact and help them enjoy their favorite activity?

Optimizing each ground contact is important for hikers as they are repeating it over and over again. An optimal ground contact requires flexibility, mobility and strength from the foot and ankle complex (during loading and unloading). The ankle is required to move through large ranges in each plane of motion (dorsiflexion, plantar flexion, pronation, supination). Lack of movement ability in these patterns will be made up somewhere higher in the chain, which can cause the knee, hip or back to become a cranky traveling companion. Proper function of the ankle complex is an essential piece of equipment for a hike.

As Gary Gray says, "When the foot hits the ground, everything changes."

### Multi Planar Strides and Steps

The actual unit of locomotion (i.e., a step or stride) follows the same multi-planar pattern of movement. Rocks, trees, brooks, roots, etc. often decide the route for us. Finding the most economical and safest way on the obstacle course adds a number of more technical movements in our expedition. The more versatile movement skills we have, the better we are able to navigate the trails.

Stepping in all planes (forward, sideways, diagonal, rotational, even backwards!) does not only prepare for the challenges in the terrain but also provides rich movement nourishment in the form of injury prevention and functional flexibility. The hip works together with the foot, and they need each other for optimal function. Movements such as lunges or step ups involve the stability and mobility of the hip area through proper loading and unloading of the gluteus, adductor and hip flexor families.

Again, the hills create a need for a hiking-specific approach in stepping. Uphill requires more gluteus and hamstring involvement, and the deceleration requirements of the downhill get the quadriceps cooking like nothing else.

## Thoracic Spine Rotation

Perhaps this should appear in the injury prevention paragraph below, but I will explain why it applies here. First, the normal gait requires balancing counter-rotation of the upper body. Rotational range of motion of the thoracic spine is important because otherwise the rotation happens somewhere where it can cause problems (i.e., lumbar spine). This, on its own, is relevant in walking or running performance.

What happens when we carry a backpack? The bigger the pack, the more it immobilizes the arms from swinging and the T-spine from rotating. I personally often end up swaying from side to side like a penguin to replace the rotation with a lateral flexion when I carry the gear of a longer hike. The lack of rotation will eventually become a problem when the lower back or the hip starts to hurt. The weight of the pack itself compresses the spine and adds to the pile. Enhancing and maintaining the thoracic rotation is specific to hiking and should be part of the hiking enhancement program.

## Key Concepts of Hiking Specific Conditioning

Supplemental conditioning for hiking is based on the following key concepts. All of the areas are naturally interrelated and affecting one another, but for the sake of structure, the following presentation could help us.

1. Optimize the body's overall movement ability
  - A - Enhance the foundational movement and motor patterns
  - B - Create a functional core
  - C - Improve rotational patterns
2. Enhance the movement skills specific to hiking
  - A - Enhance the function of the foot and ankle complex in all planes
  - B - Train striding/stepping in all planes
  - C - Improve and maintain the rotation of the thoracic spine
3. Prevent injuries
  - A - Use reactive training to prepare for non-contact situations where the body responds quickly to a proprioceptively demanding challenge (slippery surface, poor foot placement, imbalanced weight distribution)
  - B - Apply dynamic flexibility and multi-planar movements to decrease the negative effects of repetitive patterns

A brief note on injury prevention: As in any activity involving repetitive movement patterns, the flexibility exercises as well as exercises optimizing the muscle balance are important. Preventing non-contact injuries that often happen due to a proprioceptively challenging situation in a fatigued state can be decreased by adding reactive components into a hiking enhancement program. The following is a sample program for enhancement of hiking performance for a recreational hiker who has a foundation of cardiovascular and functional movement training. Basic guidelines include:

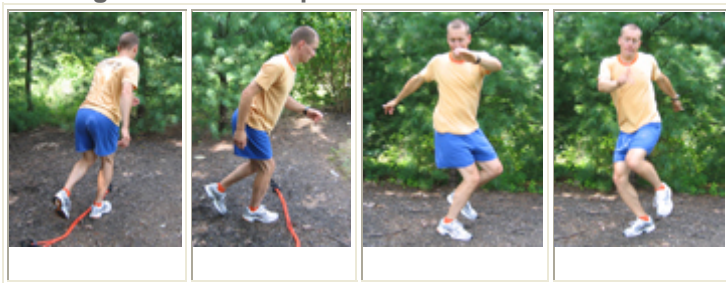
Start four to six weeks before the desired peaking  
Do the program two to three times a week  
Progress by adding one set every week  
Perform in a circuit

### 1. Hikers Wake Up Routine



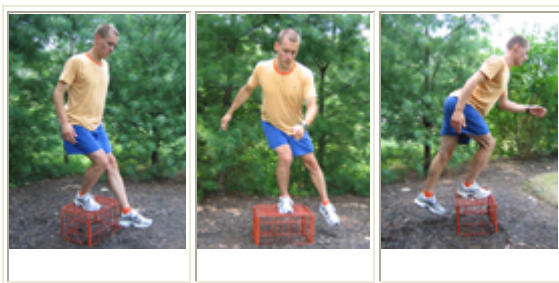
Multi-planar dynamic flexibility and activation (key concepts 2A, 2C, 3B from above list)  
 10 repetitions of each three arm movements  
 Keep the fingertips as far from the body as possible  
 Let the hip move in all planes

### 2. Dodge the Snake Hops



Multi-planar single leg reactive hops (key concepts 2A, 3A)  
 Sagittal plane hops, frontal plane hops, transverse plane hops  
 Quiet and quick (still stable) ground contact with the whole foot  
 10 repetitions each

### 3. Reach Down Series



Multi-planar single leg reaches off the box (key concepts 2A, 2B, 3B)  
 Anterior reach, lateral reach, posterior reach  
 Smooth movement with no pause between repetitions  
 10 repetitions each, no rest in between  
 Add a backpack for progression

#### 4. Hikers Lunge Series



Multi-planar lunge combo w/DB shoulder height (key concepts 2A, 2B, 3B)  
Anterior, posterior, lateral, opposite lateral  
10 repetitions each lunge, no rest in between  
Five to 20 pound dumbbells at the shoulder height

#### 5. Push-Pull



Alternating pull and push pattern w/bands or cables (key concepts 2C, 3B)  
Squat position, simultaneous push and pull movement  
Use resistance bands or cables  
Focus on scapular movement and thoracic rotation

Hiking is an activity with neuromuscular as well as mental, social and spiritual stimulation in the most diverse and inspiring movement environment available on the earth. It does not get any more total body than that!