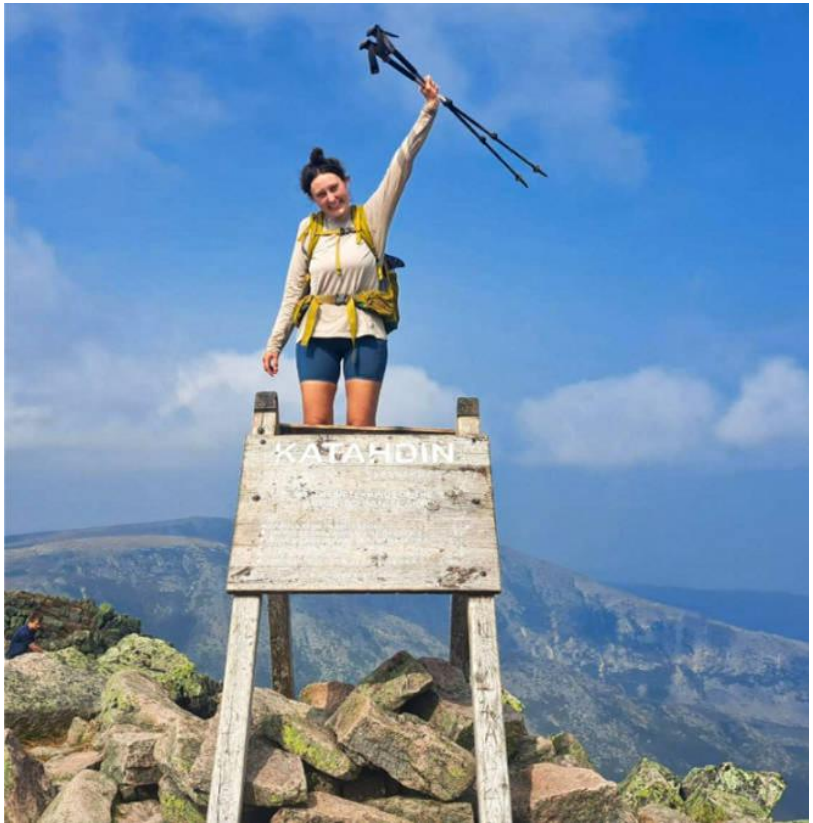
Thinking About How We Hike: Topics to Make Your Hike Better



Can we become better hikers? ***YES!***

1. I will attempt to give information and suggestions to both novice and experienced hikers.
2. This presentation is NOT about backpacking in general. It is about the act of walking on trails in the mountains, or hiking.
3. This discussion is directed at people within a reasonable range of good health. If you have specific health issues (heart, lung, other organ, or muscle or skeletal injury) you should seek medical advice before following my suggestions.
4. I intend no insult or offense to anyone with disabilities due to illness, injury, age, weight, or fitness through my recommendations.
5. When starting or increasing any exercise routine (hiking is like exercise), start easy, and increase effort and intensity slowly.
6. NOTE: Slides with light blue background were added after the original presentation in response to question during and after the presentation. This is my attempt to improve the presentation based on good feedback from club members' questions and comments

What is the difference between walking and hiking?

And, why is hiking so hard?!

Characteristics of Walking

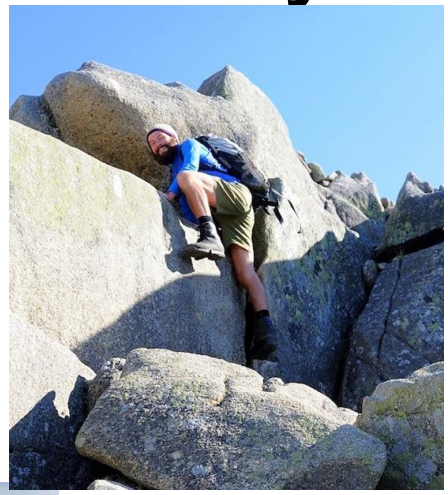
1. Trail is level or nearly level almost the whole distance
2. Smooth treadway: the surface you're walking on is free of rocks, loose rock/gravel, roots, mud, or other hazards
3. You can wear almost any shoe type
4. Relatively short: typically only last a few hours.
5. You could complete it without bringing food, water or other gear

Typical Walking Trails

Characteristics of Hiking

1. NOT level for most of the trail
2. Many rocks of various sizes; loose rocks, dirt and gravel; roots, mud, and other hazards like limbs impeding travel and vegetation encroaching on trail
3. You need hiking shoes or boots
4. Typically last a few days, but can be weeks or even months
5. You must bring food, water and other gear (heavy pack!)
6. You will be out overnight (relates to rest and recovery needed)

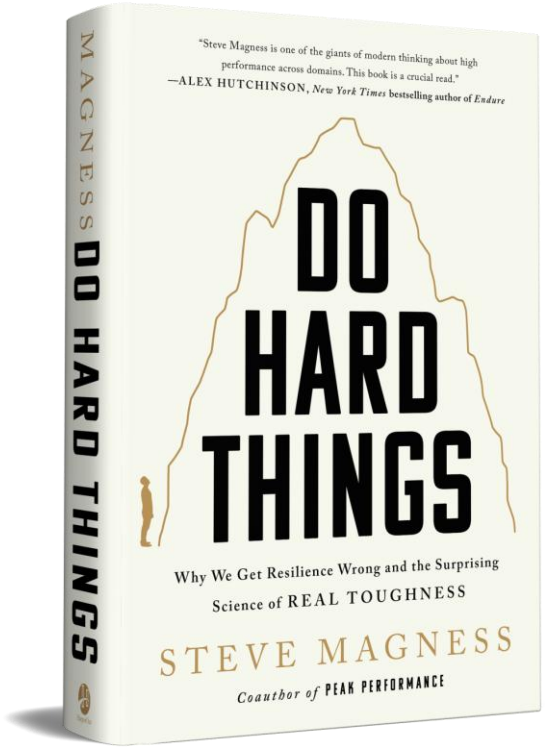
More Variety in Hiking Trails



Does walking on easy city trails prepare you with the skills you need mentally and physically for hiking on tough trails?

The Science of Toughness

In “Do Hard Things,” author Steve Magness gives the example that if you can’t walk without earbuds, talking to someone, or other distraction, you’re probably not as tough as you could be. **Toughness** is developed by ***rigorous physical training, PLUS cognitive skills and emotional support*** (military and Olympic athletes are examples of this). Toughness and resilience can be developed!



Physical Demands of Hiking

1. Longer lasting physical exertion than most people are used to.
2. Longer time on your feet, very little sitting around.
3. Carrying a heavier load than you're used to.
4. Walking up and down steep slopes.
5. Walking on rough terrain with rocks and roots that challenge your feet, ankles, knee, hip joints, shoulders and back.

How steep are the trails we hike?

1. The Appalachian Trail is the steepest of America's Triple Crown long trails (AT, PCT and CDT)
2. Yet its average incline is only 420 ft/mile, which is 8.0% slope, or 4.5 degrees. This number adds together the total ascend and descend and divides by the trail distance.

Average Slope of AT by Section

494 ft/mile, 9.4% slope, 5.3° - Springer to Standing Bear

472 ft/mile, 8.9% slope, 5.1° - Standing Bear to Damascus

416 ft/mile, 7.9% slope, 4.5° - Southern Virginia

444 ft/mile, 8.4% slope, 4.8° **- Northern Virginia (TATC's section is within this section)**

278 ft/mile, 5.3% slope, 3.0° - Pennsylvania & Maryland

362 ft/mile, 6.9% slope, 3.9° - Delaware to Great Barrington

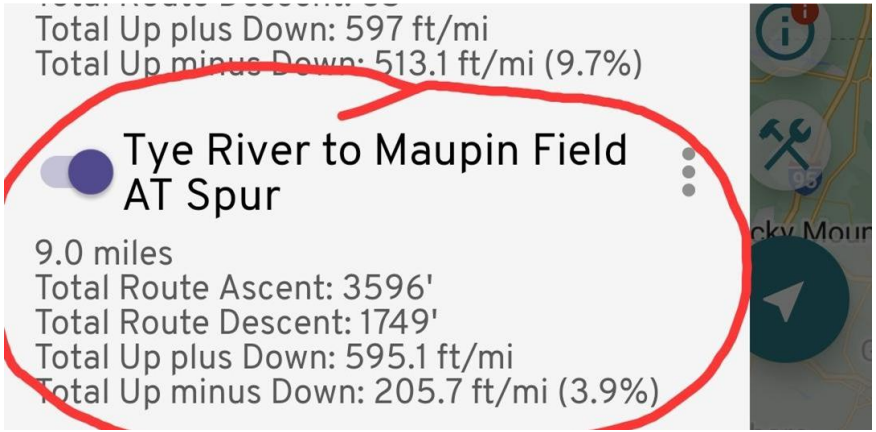
429 ft/mile, 8.1% slope, 4.6° - Great Barrington to Hanover

622 ft/mile, 11.8% slope, 6.7° - Hanover to Grafton Notch

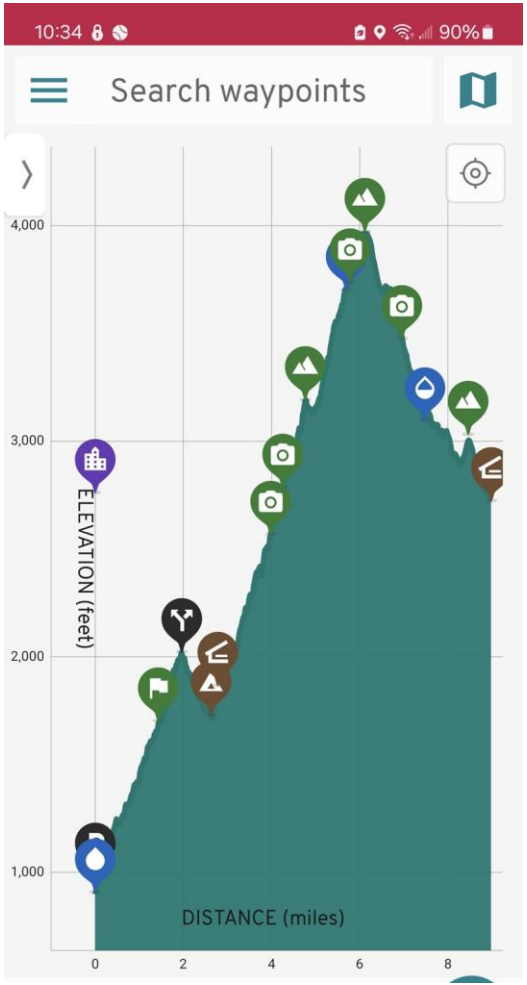
428 ft/mile, 8.1% slope, 4.6° - Grafton Notch to Katahdin

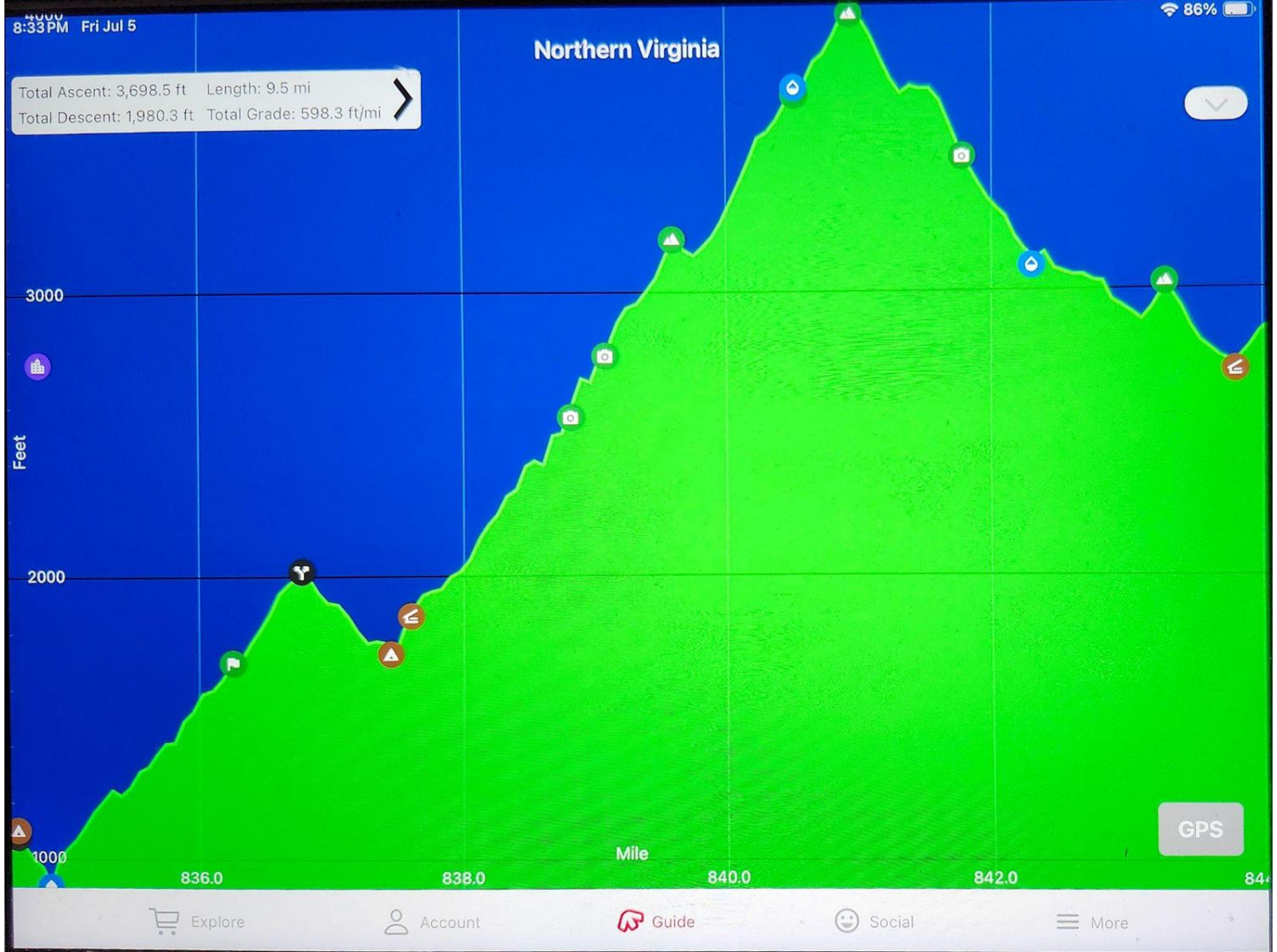
Tye River to Maupin Field Spur

All measurements according to Farout. From the bridge at Tye River over Three Ridges, and down to the Maupin Field Shelter spur trail.



The slope in this section (total “Up plus Down”) is 595 ft/mile, 11.25%, 6.46°




8:33 PM Fri Jul 5
86%
Northern Virginia
Total Ascent: 3,698.5 ft
Length: 9.5 mi
Total Descent: 1,980.3 ft
Total Grade: 598.3 ft/mi
3000
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Feet
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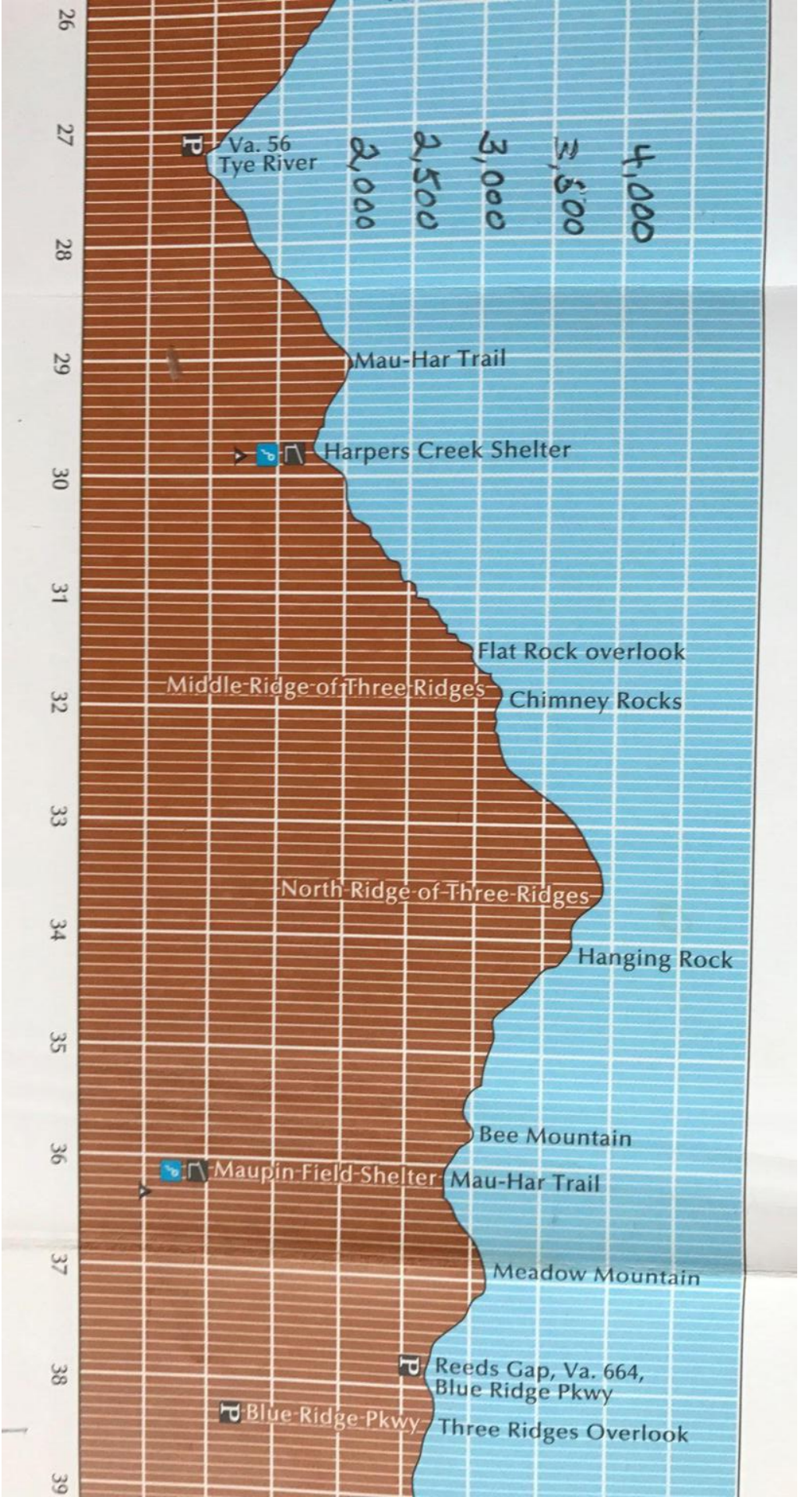
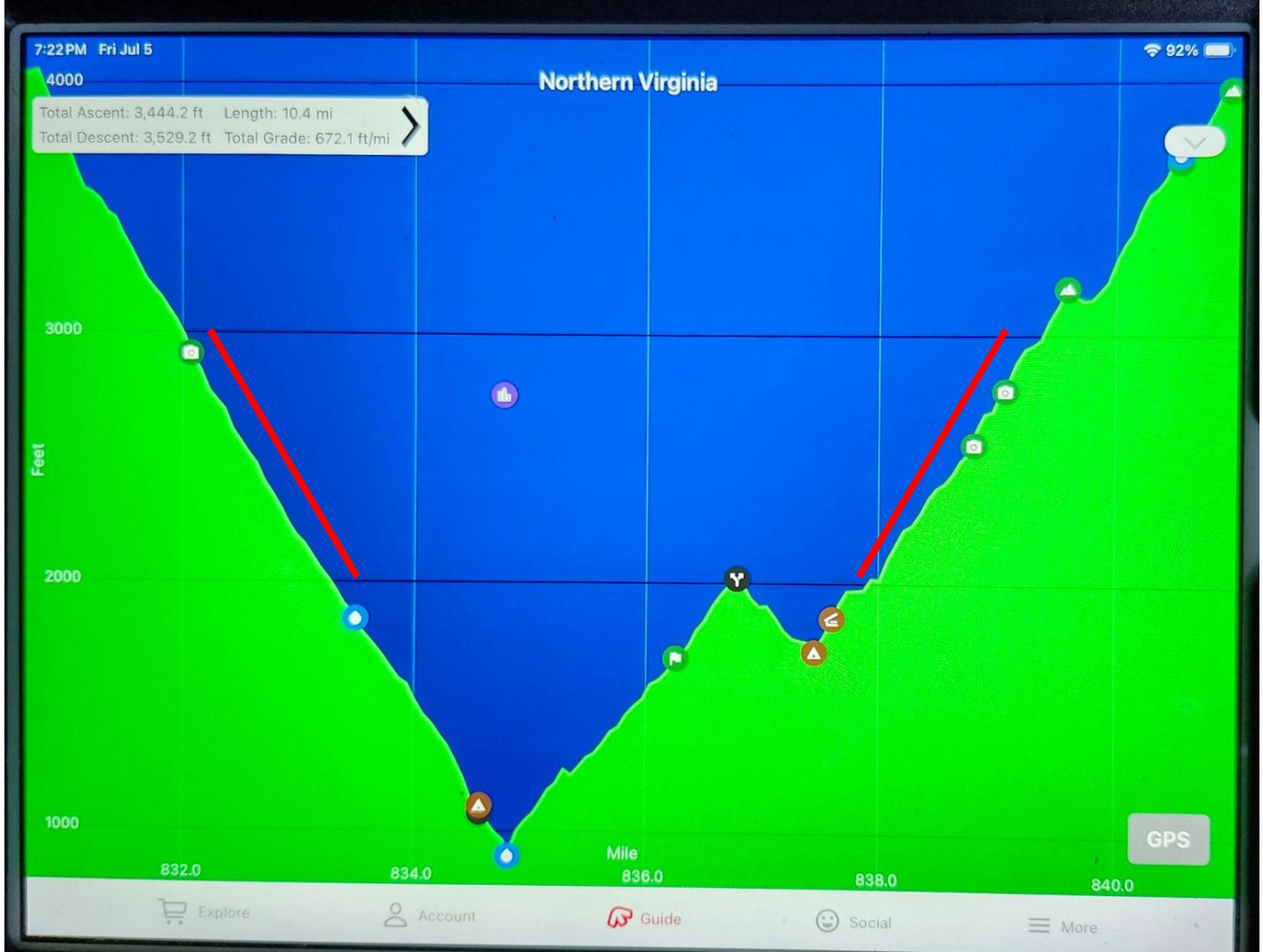

26
27
28
29
30
31
32
33
34
35
36
37
38
39
Va. 56
Tye River
2,000
2,500
3,000
3,500
4,000
Mau-Har Trail
Harpers Creek Shelter
Flat Rock overlook
Middle Ridge of Three Ridges
Chimney Rocks
North Ridge of Three Ridges
Hanging Rock
Bee Mountain
Maupin Field Shelter
Mau-Har Trail
Meadow Mountain
Reeds Gap, Va. 664,
Blue Ridge Pkwy
Blue Ridge Pkwy
Three Ridges Overlook


7:22 PM Fri Jul 5
92%
Northern Virginia
Total Ascent: 3,444.2 ft
Length: 10.4 mi
Total Descent: 3,529.2 ft
Total Grade: 672.1 ft/mi
4000
3000
2000
1000
Feet
832.0
834.0
836.0
838.0
840.0
Mile
GPS
Explore
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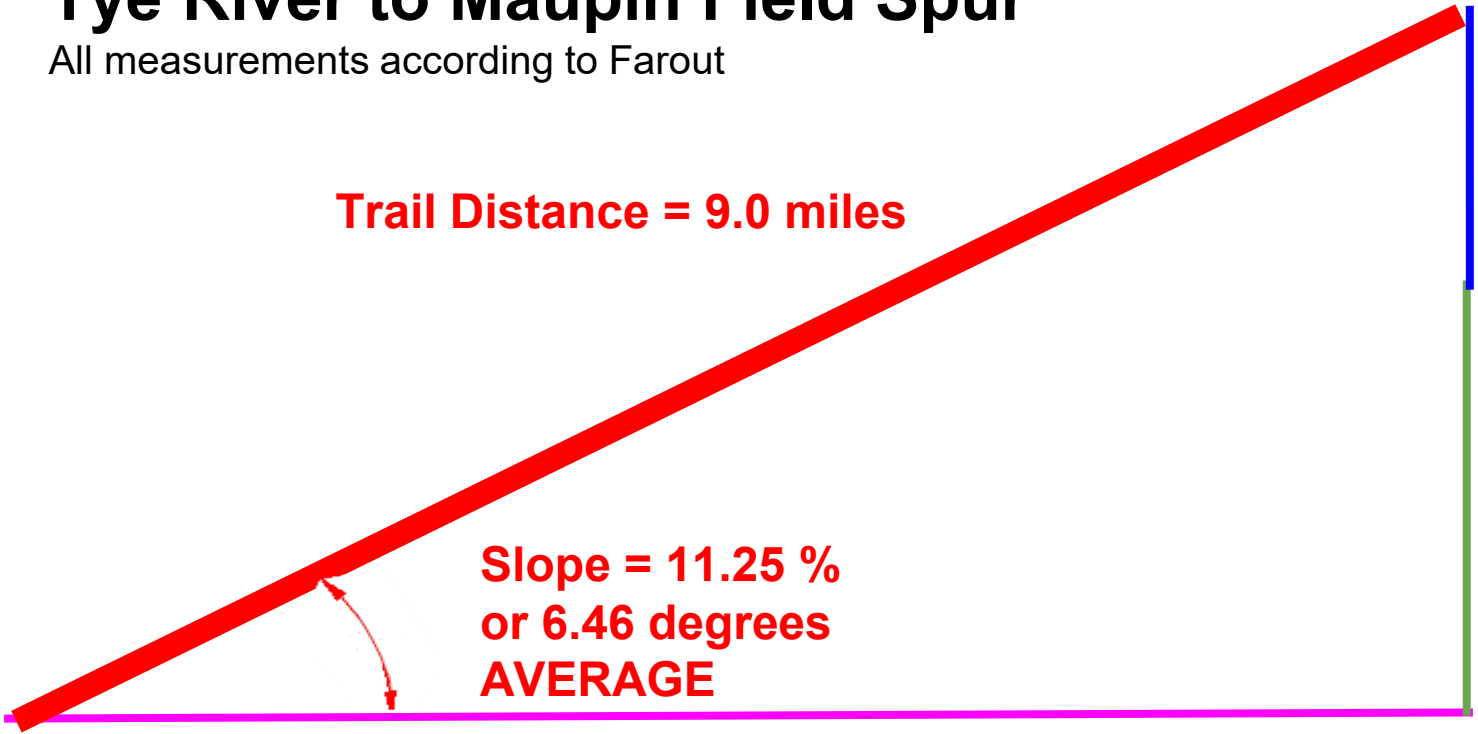
More

Tye River to Maupin Field Spur

All measurements according to Farout

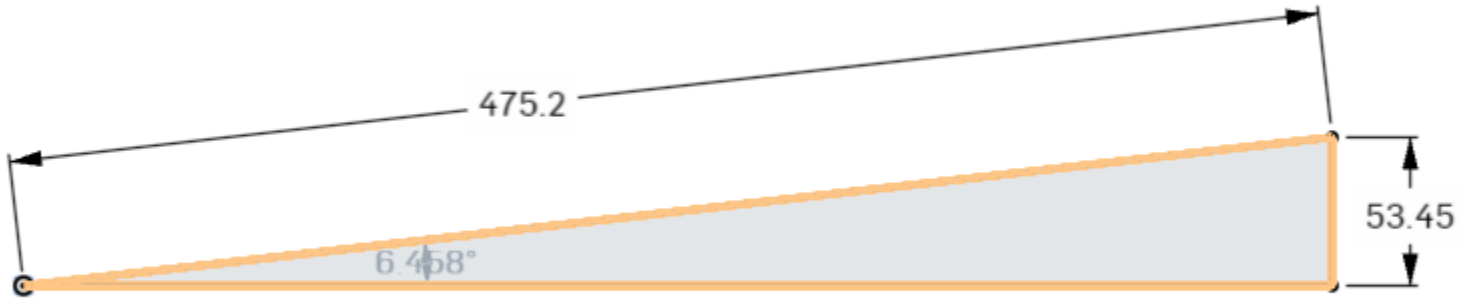


1. *At such small angles, whether 9.0 miles is the horizontal distance or the hypotenuse of the triangle, the angle measurement is still 6.4 degrees (6.42 vs 6.46).*
2. *Farout responded to my email question and said their waypoint locations show the actual trail distance, not horizontal distance (in the map plane).*

Total Ascend plus Descend = 5345 ft

(1 mile = 5280 ft)

Here is the actual slope (total ascend plus descend) from Tye River to Maupin Field spur trail drawn to scale

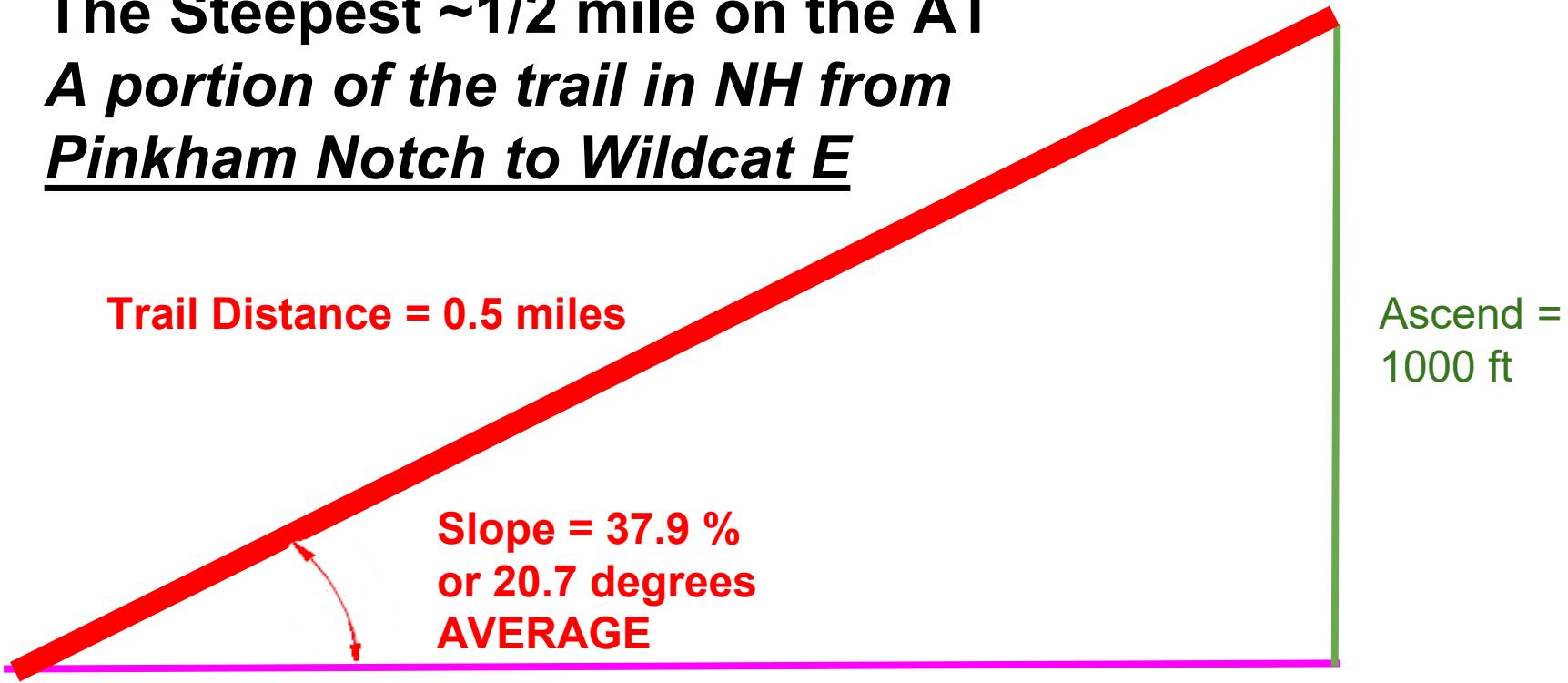


Angle measured by CAD is
6.46 degrees

1:100 scale

The Steepest ~1/2 mile on the AT

A portion of the trail in NH from ***Pinkham Notch to Wildcat E***



For comparison, the average slope of residential stairs is 30-50 degrees, with 37 degrees being the ideal.

So why is hiking our section of the Appalacian Trail, or other steeper sections, SO HARD?!

DURATION (of the hike), VARIATION (in trail tread and steepness), INCLINATION (up and down… repeat) AND WEIGHT YOU'RE CARRYING (on your back and your belly)!

Compare average weekend hiker to thru hikers

Average slope on the AT from Northern VA (Daleville, VA to Harper's Ferry, WV) is 444 ft/mi. Let's assume it's evenly split between ascending and descending.

At 20 miles per day, which MANY thru hikers would be doing everyday by northern Virginia, the hiker would do 8,880 ft total elevation change, with 4,440 ft ascend and 4,440 ft descend.

At 25 miles per day, which SOME thru hikers would be doing many days by northern Virginia, the hiker would do 11,100 ft total elevation change, with 5,550 ft ascend and 5,550 ft descend.

They would go through our section, and more, in a single day. Are they superhuman? No, they're just in shape by this point in their hike. **They have their hiker legs!**

Analogy to weight lifting

Compare to the three methods used by weightlifters to increase training load: **more weight, more reps, and more muscle time under tension**.
Therefore as hikers….

1. Get your pack as lightweight as you can in terms of gear, clothes, food and water. Don't overpack anything!
   a. And lose those extra pounds of body weight you and your doctor notice
2. Only plan to hike as far as your training has prepared you for each day. Or if you're comparing to previous hike distances, realize that you've gotten older since that last hike if it was more than a year ago.
3. THINK about your stride rate and stride length to reduce strain on legs.
   a. If you shorten your stride length from your normal gait, you will spend greater percent of time with two legs on the ground (double support).
   b. If you step up a very large step, one leg is doing a maximum effort for an extended time.

General Hiking Technique Recommendations

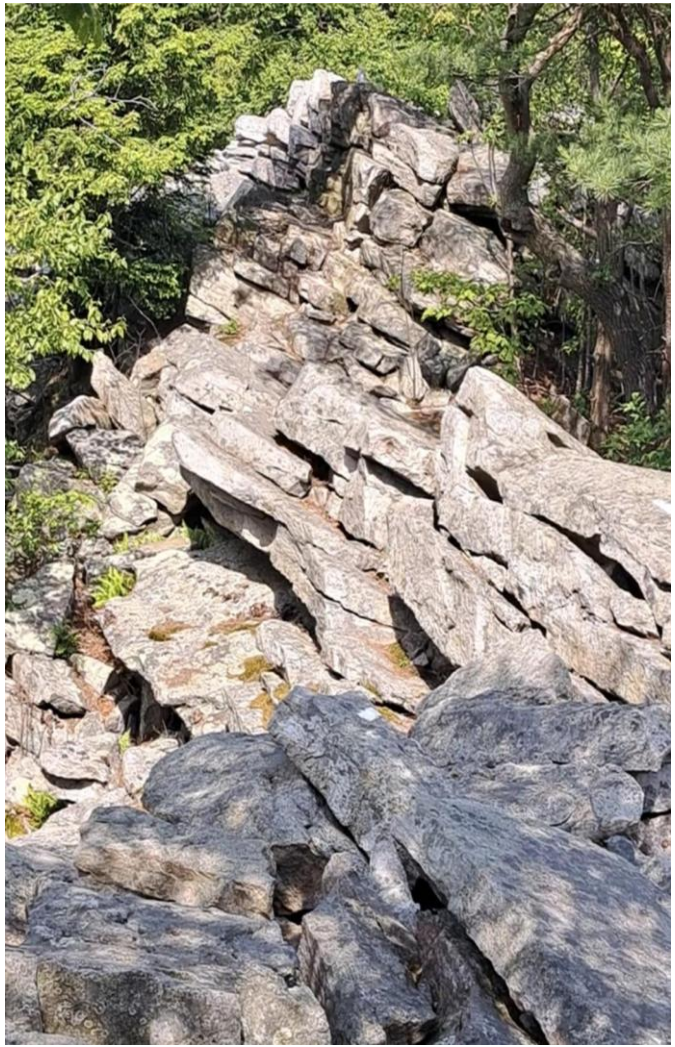
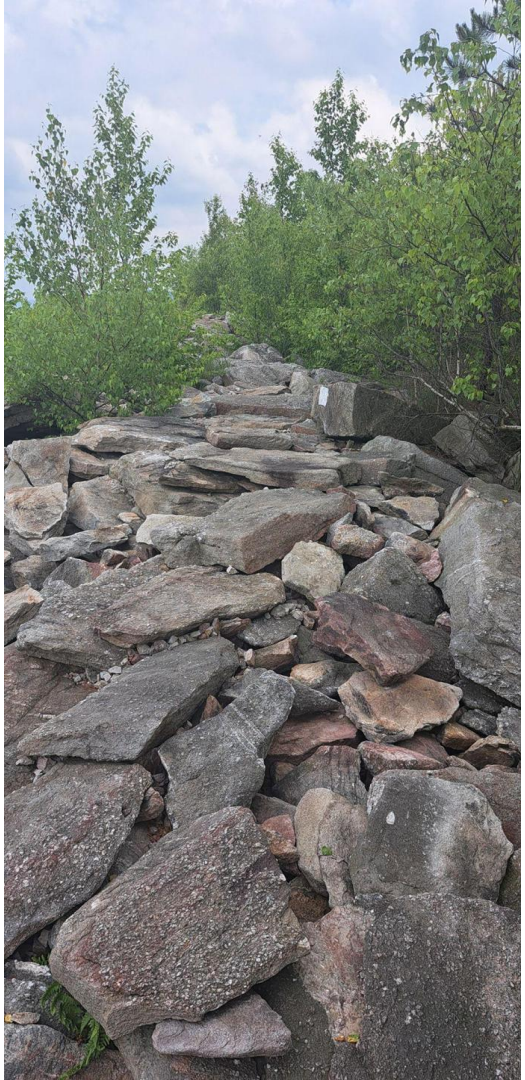
1. The four primary factors that contribute to the load on your body: pack weight, daily mileage, speed, and step length. Daily mileage is set by hike plan and not always flexible. The other three you can control.
2. Assuming you've reduced your pack weight as much as possible when you left home, and lost weight (if needed) the main weight you have under your control now is the food you carry and how much water you carry. *Don't carry more water than is needed to get to the next water source*.
3. On relatively flat terrain, walk at your normal speed, both cadence and step length.

General Hiking Technique Recommendations

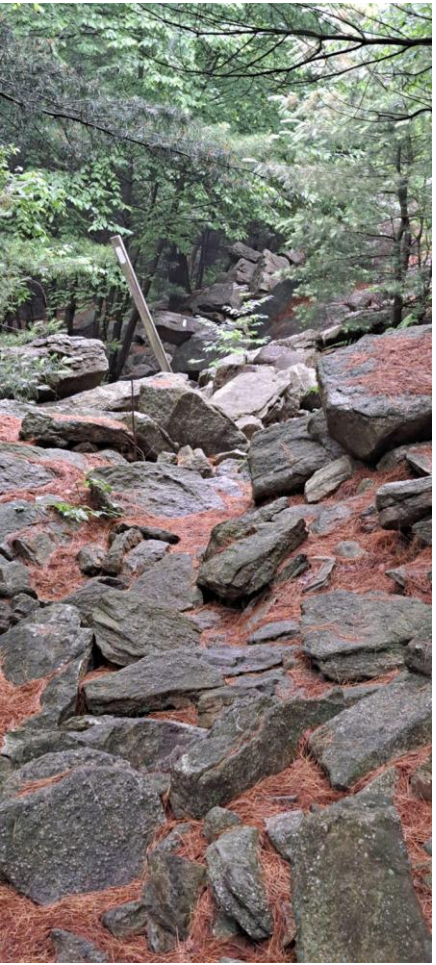
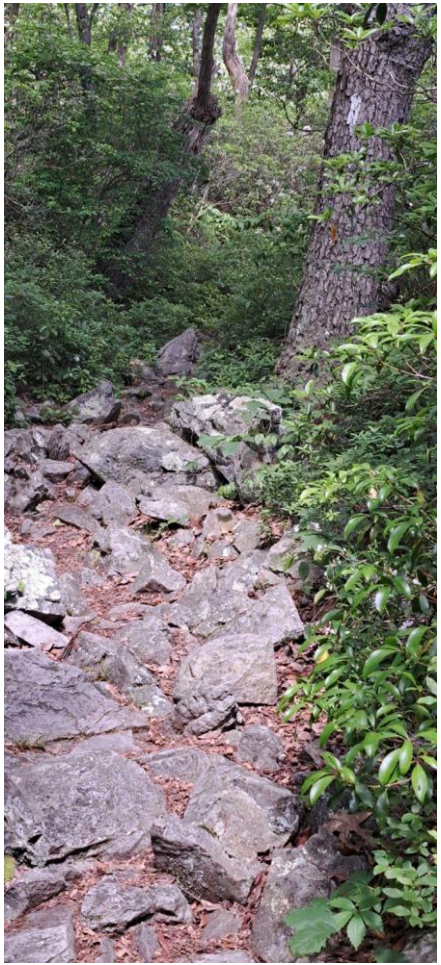
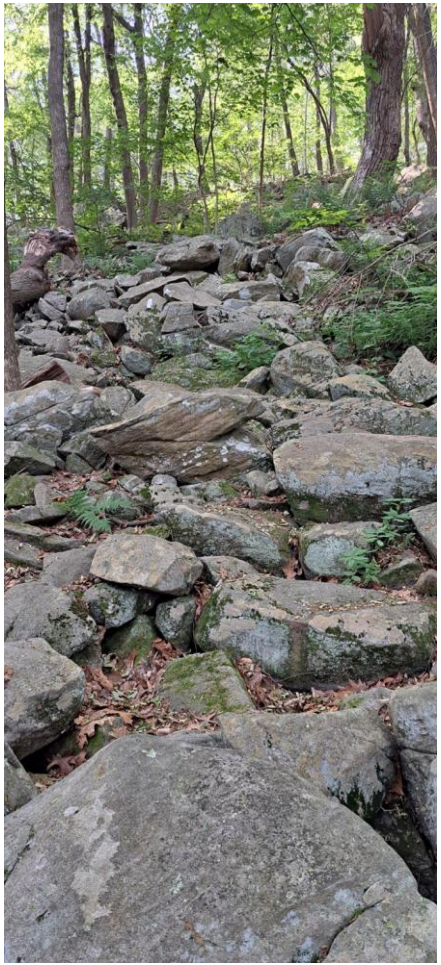
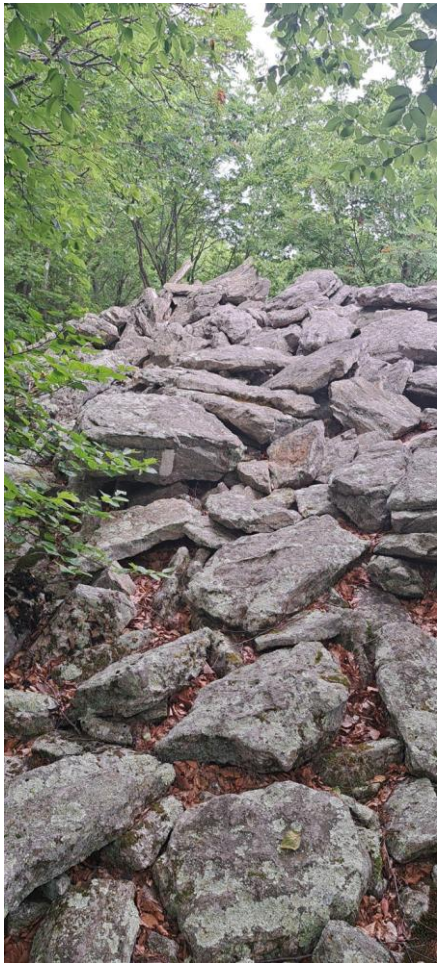
4. If the terrain is easy and tread is good, don't use your trekking poles. I'll explain why in a moment.
5. If you're going to stop hiking for some reason, take care of multiple tasks (get snack, photo, pee, adjust clothes, etc).
6. **Sit** when you can to reduce time on feet. **Stretch** your legs before restarting.
7. Take **multiple short breaks (1-5 minutes)** rather than one long break (30+ minutes). Once your breathing and heart rate recover, continue hiking unless this is a planned stop. High mileage hikers do this style of break.

General Hiking Technique Recommendations

8. Choose your path through rocky areas: **peak-to-peak or valley-to-valley?** Keep safety and physics in mind. Your muscles pay the price for unnecessary changes in potential energy (up and down).
9. Don't step on an object and straighten your leg unless you have to for balance or some other reason. That rise is work against gravity.
10. **Snack** as you go to keep your body fueled.
11. Learn how to **stretch** all your affected leg muscles and do it everyday… while hiking and at home!


We’re all “rockhoppers” (peak-to-peak) when we cross streams, but not when walking on ground partially covered with rocks. Why?

Hill Ascending/Climbing Techniques

1. Keep cadence high but shorten stride length. Reduces muscle time under tension therefore lowers long term fatigue. *Used by backpackers, mountain climbers and ultramarathon trail runners.*
2. Walk heel to toe. The push off on the toe is part of normal gait. When we walk uphill it is easy to make the mistake, especially with shortened stride length, of walking flat footed. We keep the forefoot pulled up (dorsiflexion) during the whole landing, stride, and leg swing. That puts added stress on your quads and hamstrings.
3. Keep body upright. Reduce tendency to lean forward excessively. Don't hinge at hips. *Advice of my PT who hikes. Advice also for ultramarathon trail runners. Exception for steep hills without trekking poles or hills so steep you have to put away trekking poles*

Hill Ascending/Climbing Techniques

Normal heel toe walking, but wear hiking shoes or boots!

Hill Ascending/Climbing Techniques

Bad: hinged at hips

Better: not hinged at hips

Best: not hinged at hips, and posture is upright (neck craning bad)

Hill Ascending/Climbing Techniques with Trekking Poles

Bad: very hinged at hips

Bad: hinged at hips

Good: not hinged at hips, and posture is upright

Best: not hinged at hips, posture is upright and trekking pole placed at front foot and front pole is leaning forward

Hill Ascending/Climbing Techniques

4. For very steep climbs, trekking pole technique changes from alternating (contralateral) movement to double pole movement (like skiers double poling).
5. Always keep trekking pole leaning forward slightly so you are pushing yourself uphill.
6. Activate glute muscles as well as quads. Practice walking uphill using your glutes by squeezing the glute along with the hamstring of the working leg. Many of us have weak glutes due to too much sitting and poor posture. Weak glutes can cause overload of other muscles and injury to other joints and muscles. Train glutes to make climbing easier on quads.
7. Monitor breathing and heart rate. Target is heart rate zones 2-3, not 4-5. Use “Talk Test” to gauge effort.
8. Are we there yet? Realistic expectations, know the climb, know yourself, don’t exaggerate or downplay the difficulty. Be neither pessimist nor optimist.

Hill Ascending/Climbing Techniques

9. For very steep climbs, if you're feeling winded, pick a landmark ahead and don't stop for a mini break until you get there. Once your breathing and heart rate recover, continue hiking. Pick the next landmark. Keep doing this until you're over the summit.
10. Think about something other than the climb: sing to yourself, recall a fond memory, play mental math games, meditate, etc. Get your mind off your fatigue.

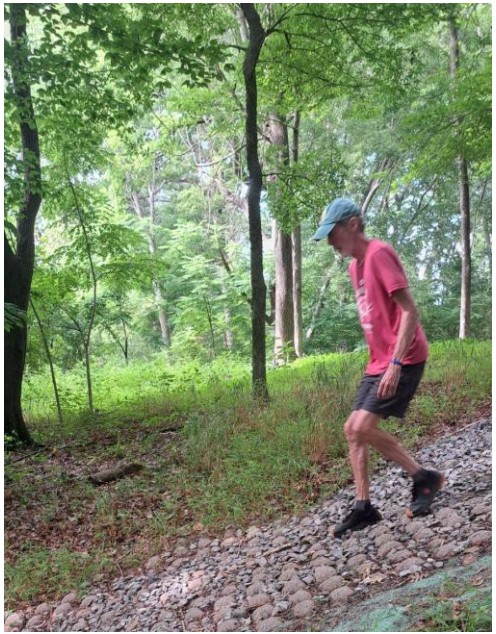
Hill Ascending/Climbing Techniques

9. If you're not using trekking poles, try putting your hands on your thighs on steep uphills and push down on your thighs. This technique is used by ultramarathon trail runners when they drop back to walking up steep hills as fast as they can sustain. This is the exception to the "don't hinge at hips" advice, only to be used on very steep inclines walking without poles.

Hill Descending Techniques

1. Shorten stride length (AGAIN!). Reduces momentum that your muscles have to control upon foot impact. Reduces pounding on feet and knees of long strides going downhill.
2. Avoid locking your knees. Keep legs bent. Use legs like shock absorbers. Keep upper body and hips loose so you can react to unwanted changes in momentum and correct them.
3. Keep body upright. Reduce tendency to lean forward. Don't hinge at hips downhill either. Any forward lean risks falling forward. **75% of hiking falls occur walking downhill** (due to eccentric loading of affected muscles and other complex neurological factors according to research). A downhill fall will be worse than an uphill fall due to distance from body to ground and the direction of your momentum.

Hill Descending Techniques



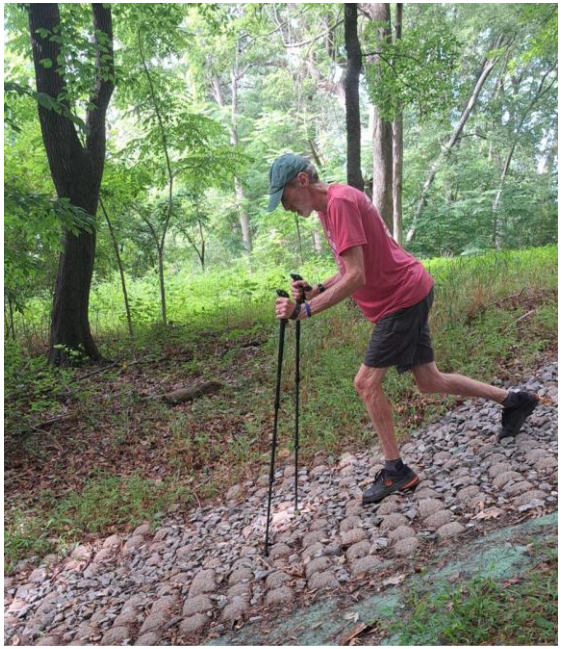
Bad: hinged at hips

Bad: leaning too far back

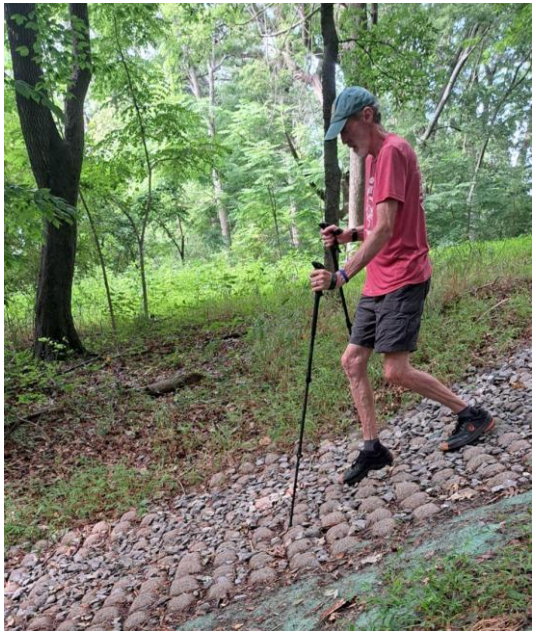
Best: not hinged at hips, and posture is upright (neck craning bad)

Hill Descending Techniques with Trekking Poles

Bad: unstable, almost falling forward



Bad: hinged at hips



Good: not hinged at hips, posture is upright, front pole lean good

Hill Descending Techniques

4. For very steep downhill steps (such as stepping down rock or log waterbars), brace with both trekking poles and land softly. However, don't lean hard onto trekking poles with full body weight because if poles slip, you will fall.
5. Whether you're using trekking poles or not, on very steep continuous downhill segments, you can step sideways to decrease loading on patella tendon and quads and transfer some load to hips and glutes. Alternate which leg is in front so you are getting a roughly even load on each side to prevent overuse injuries. Beware, this alteration of your gait comes with penalties if you keep this mode too long.
6. Engage your core to stabilize your spine, protect your lower back, and allow for efficient movement. Walking downhill causes an impact at each foot landing that can disturb your back, especially if you have lower back problems. A strong flexible core is the goal.
7. Look ahead. Read the trail. Choose your path before you get to obstacles.
8. Make sure foot is stable before following through on steps especially on steep grades. Plant heel first.

Hill Descending Techniques

9. Learn to **tie your shoes using the heel-lock method** to eliminate pressure on your toes when descending hills and reduce potential for blisters all over your feet. That's the purpose of the 2 holes in the top of the lacing area on low cut hiking shoes and trail runners. You can also do this lacing method on hiking boots.
    a. Heel Lock Lacing Technique | Kintec: Footwear + Orthotics
    b. Heel Lock Lacing - How to Tie Hiking Boots

Hill Descending Techniques

The question arose whether descending steep trails was better performed landing your foot heel first or forefoot (ball of foot) first. After more investigation into this question, my recommendation is: (see speaker notes for several of the sites with hiking downhill suggestions)

1. See #1, 2, and 3 on the preceding pages about “Hill Descending Techniques.” (slide #36). I find this advise on every website I found concerning downhill hiking.
2. See #8 on previous page (slide #39). I find the recommendation to land heel first on many websites. They seem to most reference steep descends, loose rock and similar poor stable trail surface (tread). Many of these references came from professional hiking guides/trainer, physical therapists, thru hikers now hosting websites or guiding hikes, etc.
3. I do find some references that suggest walking flat footed, meaning either complete stride with entire foot landing on the trail, or land on your heel minimally, then stay on whole foot, and reduce the push off on the ball of your foot. My thoughts on “flat footed” stepping downhill are that it would increase the time averaged surface area in contact with the ground and perhaps improve the chance that some portion of your shoe tread will engage a rigid stable surface element (rock, root, dirt) that will keep your foot stable.

Hill Descending Techniques

The question arose whether descending steep trails was better performed landing your foot heel first or forefoot (ball of foot) first. After more investigation into this question, my recommendation is:

4. I find only minimal suggestion to land on forefoot. These suggestions were only on blogger/forum type sites such as Reddit.
5. My own opinion of landing on the ball of your foot when descending steep hills is that it would create a few difficulties:
    a. This is the foot fall technique of fast runners. They are leaning forward and landing on their forefoot with their body over their foot at the time. If this encourages the hiker to move faster, it would be counter the often repeated advice to go slow and careful on descents.
    b. Biomechanically, it would increase the quad and patellar tendon stresses. These are the main causes of the hikers knee pain during and after long descents. I found reference to stepping on your forefoot disabling the ability to engage your glute muscles while descending also.
    c. It is an unnatural gait and therefore not advisable in my opinion, but if you find it works for you, keep doing it.
    d. When I tried it on the steepest descents on a recent maintenance hike, I found it very difficult to actually land on the ball of my foot on a steep descent, and I could feel the increased forces on my quads and patellar tendon (front of knee cap).
6. If you have trouble on downhill hikes, your most likely problem is either related to the original list #1, 2 and 3; weak quads and lack of engagement of glutes (may also be weak as said before in many Americans); or balance and coordination problems (that are again sometimes related to strength).

Proper Grip of Trekking Pole with Wrist Strap

1. Place your hands through the wrist straps.

2. Lower your hand to match the grip.

3. Hold the grip so that the strap is at the base of your hand supporting your wrist.

4. Adjust the wrist straps, either by pulling the strap tighter or pulling up to loosen the strap.

Trekking Pole Adjustments

1. Pole should be adjusted to make elbow flex at 90 degrees when your resting with the pole in front of you on flat ground
2. According to Leki, shorten the **bottom section only** by 5-10 cm when walking on a long uphill section.
3. According to Leki, lengthen the **middle section only** by 5-10 cm when walking on a long downhill section.
4. Without these changes to pole length, your shoulders and wrists will be out of optimum position for extended period of time and fatigue more due to

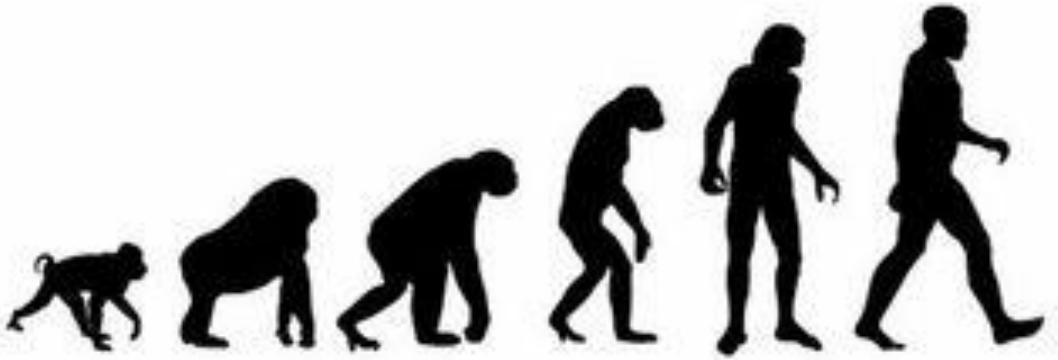
Trekking Pole Benefits and Advantages

1. Reduces force on feet during uphill and downhill walking according to studies
2. Reduces lateral forces on knees according to studies
3. Reduces injury rates and falls according to studies
4. Stabilizes hiker due to more points of contact with ground acting like handrails
5. You may walk faster
6. Reduces perceived effort of climbing hills
7. Great for fending off dogs, bears, and snakes
8. Great for clearing spider webs on trail
9. Useful for aiding balance when crossing streams
10. Move overgrown sticker bushes, vines, etc from scratching your legs
11. Reduces contact potential for ticks *(my hypothesis)*

Trekking Pole Disadvantages

1. The main disadvantage of trekking poles is that almost all research shows that you use more calories per mile when using trekking poles than when you're not using trekking poles. Up to 10-20% more energy used according to some studies.
2. The only exception I've found is one study that showed the energy expense of using trekking pole becomes about equal to not using trekking poles when the slope exceeds 20 degrees. As we've seen, very little of the AT exceeds 20 degrees on average.
3. Doesn't reduce cardio/respiratory rates, which supports evidence of increased calorie consumption and workload
4. The forces you apply to the trekking pole to reduce forces on feet and joints, correct for redirections, corrections to momentum and "near falls" have to be accounted for in your energy expenditure.
5. Your secondary/stabilizing muscles are not getting the workout (atrophy) that they could if you didn't use trekking poles. That load is transferred to your upper body, which isn't as efficient at this task.

WHY?



“Nothing in biology makes sense except in the light of evolution,” Theodosius Dobzhansky, 1973

Explaining This Trekking Pole Disadvantage

There are three explanations to the addition energy expense with trekking poles:

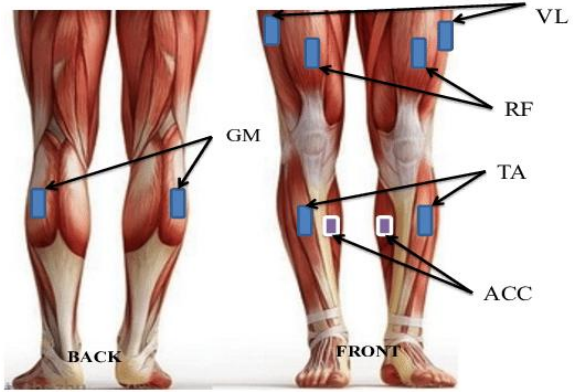
1. Over the last several million years, Homo sapiens have ***evolved away from our knuckle walking primate ancestors, or primarily tree dwelling ancestors that knuckle walked when on ground***. Therefore, when we try to use our arms for locomotion, we are employing a ***muscle-skeletal system that isn't optimized for walking*** in our current form and is therefore less efficient.
2. Our ***arm muscles are much weaker than our leg muscles***. Trekking pole use employs the tricep muscle. Triceps are weaker than our biceps, and much weaker than glutes, quads and hamstrings.
3. ***Our posture*** doesn't transfer the forces of using our arms for locomotion to our legs as efficiently as with our knuckle walking primate relatives that have ***different arm/leg length ratios, different postures, and different gaits***.

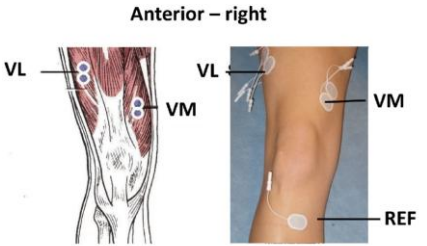
Using Two Trekking Poles or ONE?

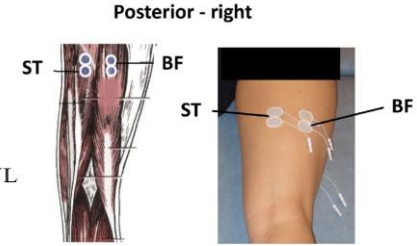
Some people prefer to use only one trekking pole. This seems to be a personal preference thing. If one trekking pole is sufficient to give you the feeling of balance and stability, then that may be all you need. Two poles would confer the hiker with a more stable and symmetrical gait, and assist with ascending and descending hills, but there are many fine backpackers that only use one trekking pole or none

Remember, trekking poles only became common among AT thru hikers in the 1990's and 2000's. Before that, maybe they used a single WALKING STICK. I found that the modern trekking pole, specifically designed for hiker use, was designed in 1980's.

Scientific study of muscle activation and endurance

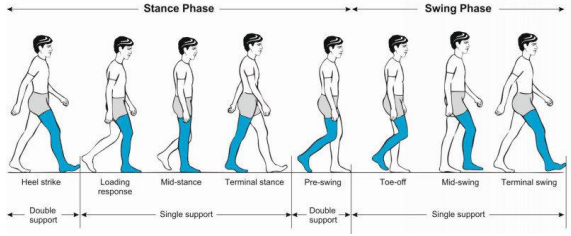




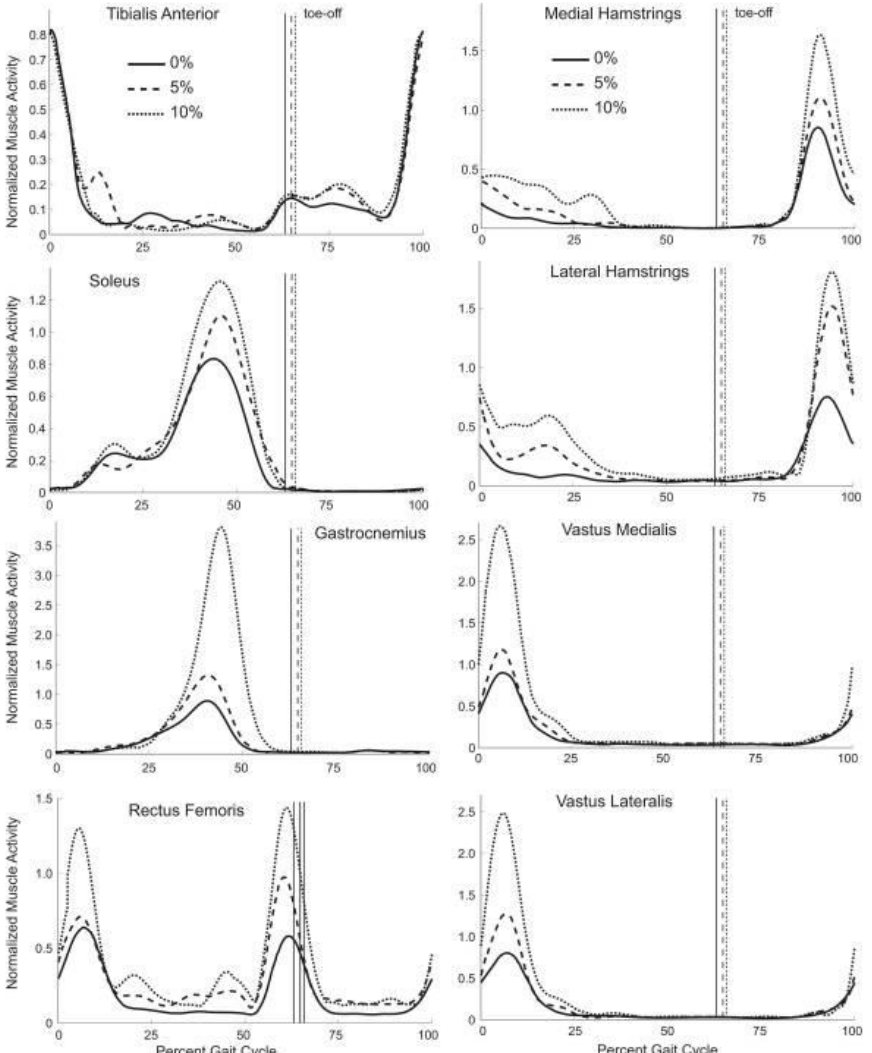


Electromyographic (EMG) signals from lower limb muscles on inclined walking **without** backpack

Source: "Predicting the Metabolic Cost of Incline Walking from Muscle Activity and Walking Mechanics"

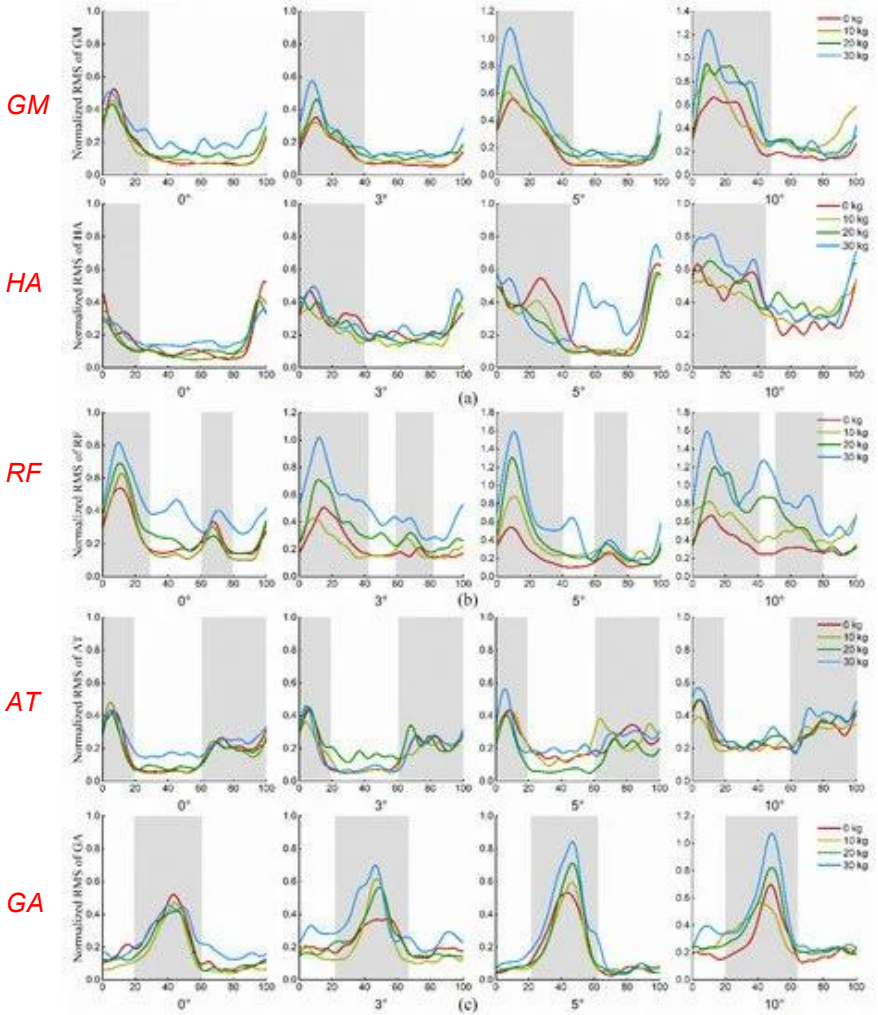


Gait cycle



Electromyographic (EMG) signals from lower limb muscles on inclined walking **WITH** backpack of various weights

Source: "Effects of Backpack Loads on Leg Muscle Activation during Slope Walking"



How to aid recovery at the end of a hard day of hiking

1. Elevate your legs by putting your legs up against shelter wall, tree, boulder, etc. Reduces swelling, helps remove lactic acid, urea, creatinine and other waste from muscles.
2. Stretch at camp to reduce pain tomorrow (no hiker hobble!). Stretch the muscles and joints used most in hiking (feet, ankles, calves, soleus, quads, hamstrings, hip flexors and glutes)
3. Eat and drink while setting up camp. Your body will have maximum absorption of nutrients in the first 30-45 minutes after exertion.
4. Keep drinking all evening. You were probably dehydrated.
5. Eat a high calorie/high protein meal to rebuild muscle.

Recommendations

1. Train your mind and body. Your mind has to handle the relative lower stimulation of hiking (possibly alone). You body has to handle the exertion for ~8+ hours that is beyond what most of us do on a daily basis.
2. Get the best shoes, socks, and possibly trekking poles that you can afford
3. Take walks carrying a pack or weighted vest with the weight you expect to carry on your hike.
4. Hike with other people with more experience. Learn all you can from them about how they walk, how they choose path through rocky areas, peak-to-peak or valley-to-valley, etc. Watch how they walk!

Recommendations

5. Train harder until you're CONFIDENT that you have the endurance and strength you need for the hiking you want to do.
6. See a PT if you have ailments or injuries. Do the daily training they tell you to do. Depending on the ailment, expect healing to take weeks or months.
    a. If you can't afford professional medical help, go to https://www.aaos.org/ and lookup your ailment. Then follow the advice with the stretching and strengthening exercises.
7. Go hike! Go hike again… Become the best hiker you can be. Your skills and knowledge should grow over time. Have fun!

These are the Legs of QUADZILLA

Is running a good exercise to prepare for hiking?

1. Yes because it can greatly improve your cardiovascular health and endurance.
2. Yes because it has a calorie per hour output that is much closer to that demanded by hiking
3. Yes because it keeps you on your feet and toughens your lower body in some ways
4. Yes because it gives you mental toughness if you run without earbuds on at least some long runs
5. Would your doctor or physical therapist be happy if you began a running routine? Probably yes. It’s very good for general fitness, and many people should lose some weight.

Is running a good exercise to prepare for hiking?

6. Yes running **intervals** can help with improving your recovery time
   a. Run fast/hard/uphill or flat, rest 30 seconds to 2 minutes, repeat…. until you feel fatigue reducing your running form
   b. If you've never done intervals, start easy!

Calories Per Hour for various Exercises

Walking, 2.0 mph, slow pace
176
Walking, 3.0 mph, mod. pace
246
Walking, 4.0 mph, very brisk pace 281
Backpacking, general
493
Running, 5 mph (12 min mile)
563
Running, 6 mph (10 min mile)

Is running a good exercise to prepare for hiking?

1. No because long distance running uses the muscles of the back of your legs predominantly. Hiking requires different leg muscle activation patterns and quad and hip flexor strength.
2. No because running on flat land is different than hiking on moderate or steep inclines.
3. No because running does almost nothing for the upper body strength needed for carrying a pack
4. No, running is harder on the joints for some people than walking or hiking

Is **Bicycling** a good exercise to prepare for hiking?

1. Yes because it engages the glutes, quads, hamstrings, calves and shin muscles at various portions of the pedalling cycle. These muscles are all needed for the strenuous uphill hiking and the resistance load of downhill hiking.
2. Yes. It combines the cardiovascular/endurance type workout with a strength exercise.
3. Yes because you have the option to exercise indoors on a stationary bike at the gym or outdoors on a regular bike.
4. Yes because you can do interval workouts on a bike to improve your recovery capacity.
5. Yes because if you have knee problems, your doctor or physical therapist will almost certainly start you off with pedalling a recumbent bike.
6. Yes because you can vary the load and time of your exercise as you go from beginner to experienced cyclist.
7. No. You should still add other training to your preparation for hiking. Cycling doesn't strengthen your upper body and its not the same muscle pattern as hiking

Effect on our muscles of walking on an inclined treadmill.

The average treadmill incline is between 10–15%. A higher incline makes a workout more challenging, and can increase activity in your leg, hip, knee, and ankle muscles. For example, walking at a 9% incline can increase activity in your calf muscles by 175%, quads by 635%, and glutes by 345%.

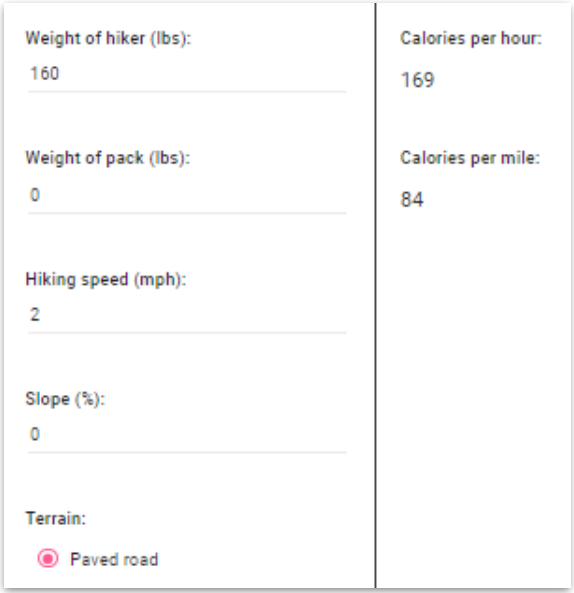
Even better, add your backpack or weighted vest!

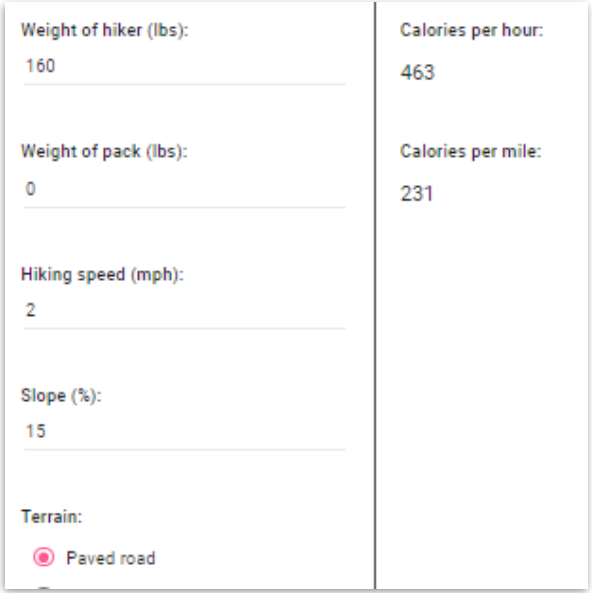
If you scoff at the idea of walking on a treadmill helping prepare you for hiking the AT, consider this…

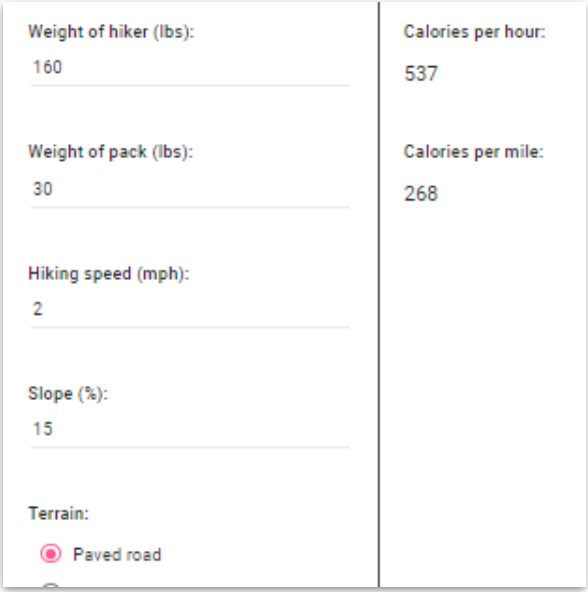
1. You're probably thinking of walking on a treadmill without added weight on your back, without incline and for a short time.
2. The incline of 15% on most treadmills is steeper than most of the AT
3. If you wear a weighted vest or backpack, you are walking very similarly to the trail, except for the rocks and roots
4. DON'T hold the console or handrails!!!

If you scoff at the idea of walking on a treadmill helping prepare you for hiking the AT, consider this…

1. According to the Pandolf Equation used by the military to estimate food needs of soldiers… as one example….
2. You can increase the energy demand of walking on a treadmill from 169 cal/hr, to 463 cal/hr by adding 15% slope and then to 537 cal/hr by adding 30 lb backpack







Don’t hold on to handrails or console while walking on an inclined treadmill… you’re depriving & deceiving yourself

Holding onto the handrails or sides of a treadmill can make your workout less effective and increase your risk of injury:

Reduced effectiveness

Holding onto the handrails can reduce your balance, the benefits of an incline, and the number of calories you burn. It can also make walking feel like "make-believe walking" and running feel like "fake-running".

Increased risk of injury

Holding onto the handrails can lead to an unnatural gait that puts stress on your joints, hips, and back.

Stair Climber

They are steeper than treadmills (about 35-40 degrees, or 70% slope). Great workout! You can also add backpack or weighted vest to this workout. But one limitation: because your foot lands flat on the tread, it doesn't work the calf and soleus muscles the same as walking on a real sloped surface.

Proper Form just like treadmill:

Head up, stand up straight, bend knee and keep aligned with toes, use handrails only if needed for balance, not for weight bearing.

Sample of the many Possible Leg Weightlifting Exercises

1. Squat with knees always in line with toes, but modifications such as knees ahead of toes and knees behind toes, feet hip width, or wider. So 4 styles of squats.
2. Lunges: forward, backward, sideways, skater lunge,
3. Stair step ups (start with 1 step, then progress to 2 steps at a time)
4. Bulgarian squats
5. Deadlift, kettlebell swing, Romanian deadlift
6. Poliquin step down
7. Calf raises: double leg, single leg, without and with heel drop
8. Abductor and adductor leg lifts
9. Bridge double and single leg
10. Hamstring curls

All can be done without weights at first and then add weight slowly, increase weight only when you comfortably exceed 12-15 reps, then reduce reps to 6 or 8 with added weight.

Expect to increase weights only after 3-4 weeks of lifting 2-3 times per week.

Do you have “Training Impatience?”

1. You won't see much gain in strength for 6-8 weeks. During that time, your muscles and nerves are adapting. Then your body adds muscle to accommodate the stresses being placed on your muscles through exercise. This is why New Year’s Resolutions fail and by the end of February, the gyms are back to the regular folks. BTW, this is also why thru hikers take 6-8 weeks to get their “trail legs”!

2. Overuse injuries occur from doing too much activity too soon, without giving muscle tissues enough time to adapt properly. Hiking without training for an adequate length of time and of sufficient intensity makes injury more likely.

My example of progress through exercise

1. I’m a skinny old man, but I’ve hiked 520 miles in 2022, 550 miles in 2023, and this year 340 miles of the AT. Average pack weight was 22-32 lb depending on food and water carried that day.
2. I’ve run a full 26.2 mile marathon (4:30) which I hadn’t done for 40 years, and set PR for ½ marathon (1:54) for last 10 years.
3. I gone from 2 pullups to 2 sets of 5 pullups
4. My leg extension went from 2 sets of 8 @ 70 lb to 2 sets of 10 @ 90 lb in the 6 months before my hike in May

Benefits of thinking and training for hiking!

1. If you think about your hiking style/skills to become a better hiker, you will enjoy the hike more.
2. If you exercise to become stronger, more flexible and have more endurance, you will become a better hiker.
3. If you have more strength, flexibility and endurance, you will FEEL BETTER EVERY DAY and maybe live longer,

and GO ON MORE HIKES!