

Hiking and your Feet Part 1

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How can you have “No Problem” hiking?

- Choosing Shoes
- Shoe adjacent
- On the trail foot first-aid
- After the hike foot care

The Hiking Boot



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- *Anatomy of a Hiking Boot*
- The innovations seen in hiking
- footwear have taken place in
- the construction, materials, and fit
- components of the boot.

- Basic boot design, for the most part, has not
- changed dramatically, partly due to
- the fact that the biomechanics of
- the foot have not changed.

- The design changes that have taken place
- are undertaken to allow the boots
- to function more optimally in the
- environment that are to be used in.

- To understand boot function, one
- must first appreciate how the
- components of the boot relate to the
- boot's intended use.

- *Last*
- The last is actually not a component of the boot itself, but rather
- the mold or shape that the boot is
- constructed from.

- The last is therefore one of the
- most important parts of the boot
- because it determines how the boot will
- fit on the foot.

- Each footwear manufacturer
- utilizes a proprietary last that
- determines the boot's shape and
- volume, making it important for one
- to try on boots from different
- companies to determine the best fit for
- a specific foot type.

- *Outsole*
- The outsole is constructed out
- of rubber material such as Vibram,
- designed to protect the feet and
- offer a degree of shock attenuation.

- The outsole can also provide
- stability to the boot along with traction
- on the surfaces they are used.

- Most hiking boots incorporate various
- heights of lugged rubber treads
- that help improve grip in
- dirt, mud and snow.

- The outsole
- may be laminated separately to the
- midsole or may be incorporated
- into the midsole itself.

- The method
- of adhering the outsole to the
- upper of the boot can sometimes
- allow for resoling of the
- boot if the outsole becomes
- excessively worn.(ie Retreaded)

- *Midsole*
- The midsole
- is a very important component
- of shoes especially where
- shock attenuation is important.

- As in other types
- of athletic footwear, the midsole is
- incorporated between the outsole
- and the upper of the boot

- The use of
- shock absorbing midsole materials
- is not always as crucial as in high
- impact sports.

- One is more likely to find
- shock-absorbing midsoles used in
- lightweight hiking boots, which are
- often used on a variety of terrains,
- including less forgiving surfaces,
- such as asphalt and packed trails.

- *Shank*
- The shank of the boot can be
- incorporated into the outsole or
- midsole and adds further stability
- to the hiking boot

- Midweight boots may have a half
- or full shank made of fiber-
- glass or nylon to allow some
- flexibility when hiking.

- Heavy-weight and
- mountaineering boots usually
- incorporate a more rigid full
- shank that adds more stiffness to
- the outsole/midsole.

- Full-length rigid shanks may
- impair walking comfort by limiting
- the normal flex pattern of the boot
- but...

- Full-length rigid shanks will provide
- greater stability and help reduce leg
- fatigue when carrying heavy packs or
- hiking on technical terrain.

- The rigidity of the
- shank can sometimes be offset by
- incorporating a slight rocker bottom
- configuration to the outsole to
- make walking easier.

- *Upper*
- The upper is the part of the
- boot above the outsole/midsole

- The materials used for the upper
- include full-grain leather, split grain
- leather, Nubuck leather, and
- synthetic fabrics.

- Full-grain leather is a
- full-thickness leather that is more
- durable but harder to break in.

- Split-grain leather is leather that
- the inner part of the hide has been
- stripped from, leaving the supportive
- water-resistant leather intact.

- Split-grain upper material does not repel
- water and is not as durable as
- full-grain leather, but is easier to
- break in.

- Nubuck leather is full-grain
- leather that has been abraded to
- give it a suede-like appearance.

- Synthetic uppers, such as
- Gore-Tex and other proprietary
- materials, have become more popular in
- hiking boots because
- of their lighter weight, water
- resistance and breathability.

- The height of the upper also
- helps determine the ideal use for a
- specific boot.

- Above-ankle or high
- top boots generally provide
- increased stability for the foot and
- ankle, especially when on uneven
- or rough terrain and when carrying
- a heavy backpack.

- These boots,
- however, usually take
- longer to break in and can present fit
- problems around the ankle.

- Ankle-high or mid-cut boots end
- just above the ankle, keeping the foot
- and ankle more secure than a low-cut
- or below-ankle boot.

- The advantage of mid-cut boot height
- is the lighter weight and easier break in time.

- Low-cut boots are similar in
- height to running shoes and other
- below ankle athletic shoes.

- The stability in these shoes is usually
- provided for by the midsole/outsole, the
- upper material, and the shoe counter.

- These types of boots/shoes do not offer a
- significant amount of stability on
- challenging terrain but have become
- popular due to their lighter weight

- *Lining*
- The upper material of a hiking
- boot is usually lined
- with material to provide a smooth
- protective layer between the upper
- and the foot and ankle.

- These proprietary liners offer not only
- protection but help increase the water-
- resistance of the boot and can also
- provide a wicking mechanism to
- reduce moisture from the foot.

- This can aid in reducing blister
- formation as well as playing a role in
- keeping the feet warmer in colder
- environments.

- *Categories of Hiking Boots*
- Hiking boots are
- often categorized by their intended
- use. However, fit still depends on
- ensuring the best possible match of
- the foot to the boot.

- *Lightweight Hiking Boots/Shoes*
- Lightweight hiking boots also
- include hiking shoes. These shoes or boots
- are designed for short day hikes on
- maintained trails.

Light



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- The low-cut models may resemble running
- shoes but usually have stiffer soles,
- more stability in the upper, and
- better traction than most athletic shoes.

- The upper of lightweight hiking
- boots are typically made with fabric
- and leather combinations or
- synthetic materials.

- They are usually
- low-cut to mid-cut, but do not have
- as much ankle stability as
- mid-weight hiking boots.

- These boots should fit similar to
- running shoes allowing around a
- 1/4 of an inch between the longest
- toe and the end of the boot.

- *Mid-Weight Hiking Boots*
- *Mid-Weight* boots can be
- used for anything from hiking on
- well-graded trails to trekking on
- more challenging terrain that may
- take you on rocky areas and uneven
- surfaces.

Mid



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- These boots are often mid-height
- and may be made from fabric and
- leather combinations, synthetic
- materials or split grain leather.

- The outsole or midsole may in-
- corporate half-length shanks or
- semi-rigid plastic midsoles...

- ...to protect feet from rocky surfaces and
- provide good midfoot stability, but
- still retain flexibility in the forefoot
- to allow for normal gait.

- When used for carrying backpacks with
- heavier loads, the mid-weight boot
- should be stiffer in the forefoot.

- Mid-weight boots should also fit
- similarly to a running shoe. When
- trying these boots on, make sure
- you utilize a sock with the same
- thickness as the one you plan to
- hike with to help ensure proper fit.

- Mid-weight hiking boots make
- up the largest category of hiking boots
- on the market today.

- Boots are designed to function
- well when carrying
- backpacks weighing
- less than 35 pounds.

- *Heavyweight Backpacking*
- *Boots (lightweight*
- *mountaineering boots)*

- Heavyweight backpacking boots
- are designed to be used when carrying
- loads greater than 35 pounds or when
- traveling over rock, snow or ice.

Heavy



- This category of boots also shares many
- of the same features as mountaineering
- boots.

- The uppers on heavyweight
- hiking boots are typically made of
- full-grain leather that extends above
- the ankle to serve as protection for
- the ankle and leg while providing
- increased support and stability on
- rugged terrain.

- These boots have
- minimal seams to increase their
- water resistance and may incorporate
- an insulated lining for use in
- cold environments.

- Heavyweight hiking boots
- usually incorporate full-length shanks
- or stiff nylon or composite midsoles
- to provide rigidity.

- As a result of this they can make full stride
- Hiking a little difficult. Some boots in this
- category incorporate a rocker-
- bottom outsole to allow a more natural
- gait and minimize heel slippage.

- As a result of the inflexible outsole
- and more substantial upper materials,
- heavyweight hiking boots often
- require longer break-in periods.

- It is not uncommon to develop blisters
- and irritation over bony prominences
- while adjusting to these boots.

- Since heavyweight backpacking
- boots are often used in colder conditions
- it is very important to fit these
- boots with the socks one is wearing
- while hiking.

- If you will be hiking above 6,000
- feet one must also take into
- consideration the possibility of developing
- peripheral edema that occurs at altitude
- and therefore allow room for foot
- swelling when fitting these boots.

Boot Absolute Weight:

- United States Army treadmill
- tests in 1969 determined that one
- additional pound on the foot was
- equivalent in energy output to 3.5-
- 5.25 pounds on the back.

- A similar study
- published in Ergonomics in 1986
- concluded that increasing the
- weight on the foot by one pound
- was equivalent to 6.4 pounds of
- carried weight.

- Climbers have always
- understood the significance of extra
- weight on their feet for extended
- periods of time.

- This is equally applicable to the
- casual day hiker as it is to the more
- accomplished backpacker.

- The increase in boot weight not
- only increases the energy output
- required to hike but can also increase
- the risk of developing repetitive
- motion overuse injuries to the
- lower extremities

2004

Lightweight Hiking Boots/Shoes

- **La Sportiva Venture Mid**
- **Montrail Storm GTX**
- **Salomon Solaris Low**
- **Scarpa Helium**
- **Vasque Sundowner**

2004 Mid-Weight Hiking Boots

- **La Sportiva Trango Trek**
- **La Sportiva Thunder**
- **Salomon Mega Trek 6**
- **Montrail Torre GTX**
- **Montrail Solitude (women specific)**
- **Scarpa Vento**

2004

Heavyweight Hiking Boots

- **La Sportiva Glacier**
- **La Sportiva Trango S**
- **Soloman SM Lite**
- **Montrail Olympus**
- **Scarpa VG20**

2004

Mountaineering Boots

- **La Sportiva Nuptse (double-plastic boot)**
- **Montrail Ice 9000 (double-plastic boot)**
- **Koflach Arctis Expe (double-plastic boot)**
- **Scarpa Inverno (double-plastic boot)**
- **Salomon Pro Thermic**
- **Scarpa Freney Pro**
- **La Sportiva Nepal Extreme**

2008 Hiking Boots

- **Aetrex Z788 - Total 35W/SC**
Aetrex V751 - Total 30W/SC
Ecco Expedition Sayan Mid Hiking Shoe - Total 15

How to Choose a New Hiking Boot:

- See Hand Out for Reinforcement

- Stiffness: Stiffer is better for hard-core backpackers.

- Support: Shoes that come up higher on the ankle are better for more serious hikers.

- Thickness of soles: Thicker soles are designed for harder terrain.

- **Weight:** You are likely to find lighter weights in shoes made for lighter day hiking.

- **Breathability:** It's especially important if you are in a warm climate or if your feet tend to sweat.

- **Waterproof factors:** You want your shoes to repel water if you are in wet climates or passing through streams.

- It is important that you have any orthotics you might be wearing with you when you buy boots to ensure a perfect fit.

- Try on the boots.
- This doesn't mean just stepping into them and seeing how they feel. Walk around the store. Stores have a small incline board, where you can walk up and down to test how your shoe does on inclines and declines.
- 1 hour Rule

- Learn proper care of your boots.
- If you take care of them,
- good hiking boots can last for years
- (depending on how much you use them).

Fitting Your Old Boots

- **Top 10!**

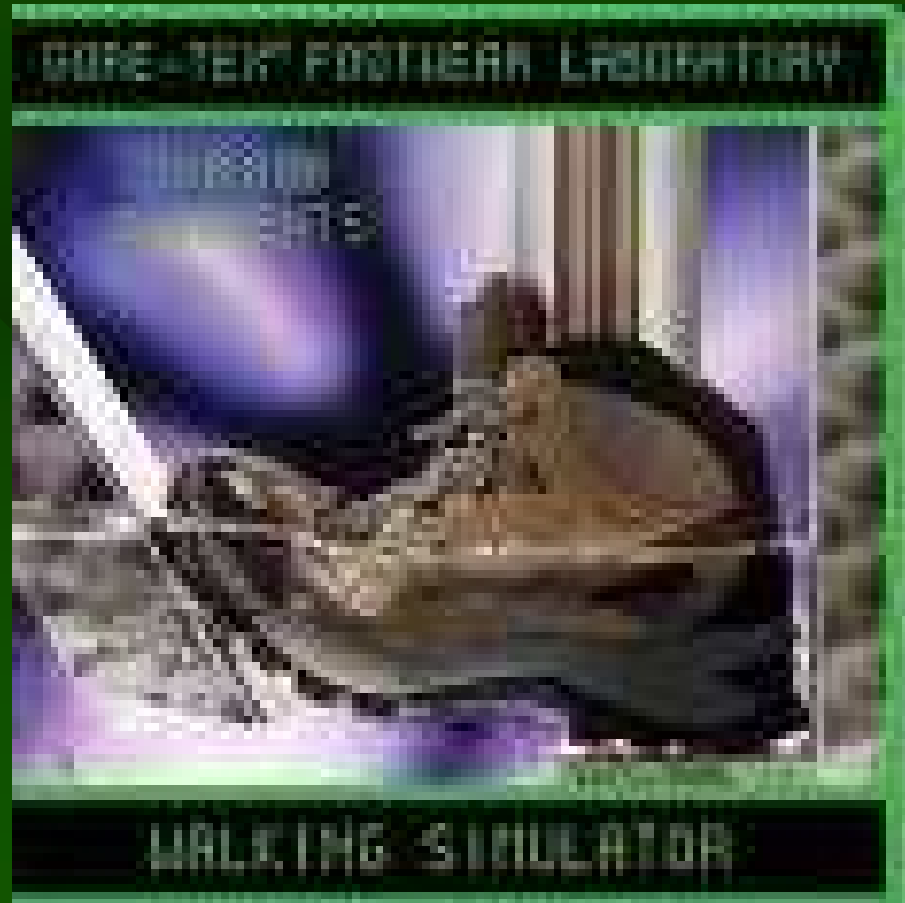
1. Make sure your boot or hiking shoe is rigid.

- Take the shoe or boot and flip it over. Grab the toe and the heel and try to bend it. If it bends in half, it is too flexible.

1. Make sure your boot or hiking shoe is rigid.

- If you have trouble doing this, place the toe of the shoe on ground, holding the heel and press down. If the shoe collapses on itself, it is too flexible and it won't be supportive.

1. Make sure your boot or hiking shoe is rigid.



2. Make sure the boot isn't too rigid.

- The shoe should bend at the toes. This is the area of the foot that bends when pushing off.

2. Make sure the boot isn't too rigid.

- If the shoe doesn't bend at all, it may be too rigid.

2. Make sure the boot isn't too rigid.

- Squeeze the heel of the shoe (called the heel counter). It should be stable and retain its shape, but not collapse. If it doesn't bend at all it could be too rigid and cause blisters.

3. Check boots for lumps and bumps.

- Look inside your old boots. Is the material wearing off at the heel or in the toe area?

3. Check boots for lumps and bumps.

- Is the material folding up or rolling in. These are prime areas for causing blisters.

3. Check boots for lumps and bumps.

- Put your hand all the way inside the boot and make sure the material in the toe area is not worn.

4. Check the insoles.

- Many think the cushier the insole the more comfortable the hike, but this is not necessarily true.

4. Check the insoles.

- In most cases the foot will be more comfortable in a rigid insole with a soft cover. Many of the spongy, bouncy insoles cause too much movement inside the boot, especially at the heel.

4. Check the insoles.

- This excess movement causes friction, which can lead to blisters. If the boot is still in good shape, but the insole has worn out, you might consider replacing it with a sport orthotic, or Superfeet ®

5. Check the sole.

- Turn the boot over and look at the sole. Look for areas of wear.

5. Check the sole.



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5. Check the sole.

- An even wear pattern with enough tread shows that the sole is ready for another year.

5. Check the sole.

- If the tread has worn down completely or significantly in one area, it may be time for another pair.

5. Check the sole.

- Common excessive wear areas are the ball of the foot, the toe area and the heel.

5. Check the sole.

- It is typical for a little extra wear at the outside of each heel, but it should not be significant or it may lead to an increased chance of ankle sprains.

6. Make sure the boot stands up straight.

- **Place your boot on a level surface. Stand behind the boot and bring your body down to eye level with the boot, looking at the back of the boot.**

6. Make sure the boot stands up straight.

- The heel counter should be straight.

6. Make sure the boot stands up straight.

- The sides of the boot should not bulge from one side or another. Bulging to one side or another means the boot either did not support the abnormal motion in your foot and has worn down.

7. Check for medial to lateral support.

- Your big toe is medial and your little toe is lateral.

7. Check for medial to lateral support.

- To check for medial to lateral support, stick your hand in your boot and extend your hand out to the toe area. Move your hand medial first and then lateral, trying to move the shoe material from side to side over the sole. If there is a lot of movement, the fabric has worn down and is no longer supportive.

7. Check for medial to lateral support.

- Imagine the fabric of the boot holding your foot in place as you go around a corner on a steep trail. This will contribute to blisters, ankle sprains and tendinitis.

7. Check for medial to lateral support.



8. Check the tongue of the boot.

- Is the tongue still holding together well?

8. Check the tongue of the boot.

- Are there any rips or tears?

8. Check the tongue of the boot.

- Is the material folding or rolling up under the tongue?

8. Check the tongue of the boot.

- These are simple things that can contribute to blisters when not checked before a trip. Don't forget to check the laces.

9) Bring the Old Boot

- Take it to the shoe fitting expert they will help you get into a better boot or tell you to come back next season

10. See a podiatrist.

- If you have experienced foot pain, arch pain, heel pain or blistering on your past hiking trips, see a podiatrist before embarking on this year's trip.

Sock Selection:

- Proper sock selection not only
- contributes to boot comfort, but
- also acts as a layer of insulation to
- keep the feet warm and to help
- reduce blister formation.

Hiking Socks



- In moderate weather, hiking
- socks will help reduce friction
- between the foot and the insole/boot
- interface.

- The fabric composition of
- the sock helps to accomplish this.

- Most hiking socks are now made of
- wool or a synthetic blend. In
- addition to reducing friction, these
- fibers also help wick moisture away
- from the foot, lessening the
- potential for blister formation.

- The most important characteristic
- of a mountaineering sock used
- in cold conditions is its ability to
- wick away moisture.

- Water is over 30 times more conductive
- than air, and moisture that forms as a result
- of perspiration can be a major contributing factor in the development
- of cold injuries.

- Wool has long been the material
- of choice for hikers due to its
- insulating and comfort characteristics
- along with its ability to absorb
- up to 30% of the sock's weight in
- moisture.

- Synthetic socks do provide cushioning;
- however, they do not absorb moisture
- as well as wool.

- Cotton socks should never be
- worn when there is even a remote
- chance that cold conditions may be
- encountered.

- Changing socks daily
- will allow the retained moisture in
- the sock to dry out.

- A thin synthetic or wool liner
- sock is sometimes utilized under a
- heavier weight sock to
- provide additional protection from
- blister formation.

- In colder conditions two or three
- layers socks may
- be used to provide
- increased insulation.

- If this combination of socks
- takes up too much space in the boot,
- the pedal microcirculation may be
- compromised, resulting in a greater
- risk of developing injury.

- When multiple sock layers are used,
- one should purchase boots large enough
- to accommodate this increased volume.

- Vapor Barrier Liners are thin waterproof
- socks usually made from coated nylon that
- fit between a liner sock and thicker wool or
- synthetic fiber-blend sock.

VBL



- This combination theoretically
- keeps the feet warmer because no
- evaporation or condensation can take place.

- The VBL also prevents the outer
- sock and boot liner
- from getting wet.

- Vapor barrier liners do, however
- have their drawbacks. It is
- necessary to change the liner sock closest
- to the skin daily

- The VBL's warm
- and moist environment
- can predispose the foot to
- tinea pedis, onychomycosis or
- bacterial infection.

- The occurrence of these problems
- can be lessened by the prophylactic
- use of antifungal powders
- or antiperspirants.

- The socks should not constrict
- the foot excessively or bunch up
- at the toes.

- Different brands of socks
- may have different sizing systems
- and their proper fit can help pre-
- vent many of the same problems
- that can occur from improperly
- fitting hiking boots.

Questions? Thank You

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More info on foot conditions

with free downloadable brochures at

dr.rambacher.com