

Blister Care for Runners

Blisters suffered by runners are the result of friction and/or pressure. Some of the causes of blisters are:

- Toe deformities (bunions, hammer toes, claw toes)
- Abnormal foot biomechanics (plantarflexed or elevated metatarsal)
- Hindfoot malalignment (pes cavus, pes planus)
- Varus or valgus foot positions
- Activity level: an increase in distance and/or increased speed/intensity
- Shoes: new or poorly fitted
- Moisture: blisters are less common in dry feet or feet that are very wet due to lower friction

Friction blisters are an acute response to relatively high intensity stress on the skin. Lower intensity chronic stress may result in thickening in the form of a callus or corn. Very often blisters form under a callus.

Prevention:

It is important to understand that the recipe for blisters is heat + moisture + friction. So the best way to prevent them is to eliminate or decrease at least one of these factors.

1. **Shoe fit:** There should be a thumb's width between the end of the shoe and the tip of the longest toe. Shoes should be tried on late in the day to allow for swelling. Athletic socks and orthotics (if you wear them) should be worn when trying on shoes.
2. **Socks:** Synthetic socks with wicking properties decreases moisture. Double layer socks or two pairs of socks decreases shear forces, but decrease wicking. Some runners wear ankle length stockings under a pair of synthetic socks. Denser weave socks provide more cushioning and insulation. Socks should have a snug fit. Blister Guard technology uses Teflon fiber; this is used in combination with traditional fibers by a number of companies. Beware of seams...consider turning sock inside out.
3. **Antiperspirants:** These can help to decrease moisture; several studies have shown a decreased incidence of blisters in people with recurrent blisters from mild exercise. Beware though, a high incidence of irritant dermatitis has been shown with some antiperspirants.
4. **Drying Powders:** These claim to help absorb moisture. Studies have shown that wet talcum powder increases frictional forces. Military studies have failed to show a decrease in blister occurrence.
5. **Lubricants:** These initially decrease friction; after approximately one hour, friction forces return to baseline. As the lubricant is absorbed into the skin and into socks, friction increases. If used, lubricant should be reapplied frequently, after previously applied material is wiped off.
6. **Skin Tougheners:** These agents form a coating to protect and toughen skin (tincture of benzoin, tea and betadine soaks). They also improve the adherence of tape and blister patches. Some runners advocate running without socks and running barefoot to toughen the skin.
7. **Orthotics:** Help maintain the foot in a functionally neutral position, thereby decreasing abnormal forces.

8. Shoe Laces: Often cause pressure or friction problems. Multiple lacing techniques are available to alleviate these problems.
9. Gaiters: Are helpful for trail running. They help to protect against dirt, rocks and grit getting into shoes often resulting in blisters.
10. Insoles: There is some evidence that the incidence of foot blisters can be reduced by the use of closed cell neoprene insoles. Studies using Spenco insoles found a significantly decreased incidence of blisters compared to controls. This is felt to be due to decreased friction forces.
11. Frequent sock and shoe changes: Frequent sock changes keep them dry and clean. If lubricants are used, this allows for frequent reapplication. Frequent shoe changes help minimize dirt. Different shoes will have different pressure points, which may also help reduce blister occurrence.
12. Foot Nutrition: A daily application of creams and lotions to keep calluses soft.
13. Maintain Hydration: Fluid deficiency causes loss of skin turgor which can result in the skin folding over on itself and rub more easily.
14. Maintain Sodium Status: Hyponatremia causes swelling of the hands and feet. Soft, waterlogged tissues are more vulnerable to physical abuse.
15. Taping: Forms a barrier between the skin and socks, so friction is reduced. Can also be used for treatment of hot spots and blisters.
 - a. Duct tape -very sticky; fabric core
 - b. Elastikon -(J&J) medium thickness elastic porous tape
 - c. 3M's Medipore -thin, soft knit-like tape which nicely conforms to foot contour
 - d. 3M's Microfoam –1/32 inch thick soft foam tape
 - e. Band-Aid Blister Relief strips

Taping Tips:

1. Tape before running or to fix hot spots and blisters.
2. Start by cleaning feet and drying thoroughly. Alcohol works well.
3. Use tape adherent (Tuf-Skin, benzoin). Use powder to counteract adhesive not covered with tape.
4. Keep the tape smooth. If overlapped, the overlapping edge should be in the same direction as the force of motion (keeps the tape from catching on the sock and peeling up).
5. Cover any hot spots.
6. Apply a thin layer of lubricant over the tape and around the edges.
7. Remove duct tape carefully; massage with baby oil.
8. Practice taping so that you don't irritate the skin on race day

A Word of Caution When Using Duct Tape

1. Don't apply tape where it is not needed.
2. Use good quality duct tape (visible fabric core).
3. Use single thickness (additional layers are too hard and unyielding).
4. When tape is applied, that part of the foot should be in maximal extension.
5. Cut tape ends so that they are rounded.
6. Shave any hair in area being taped.

Taping 101:

1. Taping the ball of the foot -cut forward edge so it does not contact or cut into the crease at the base of the toes or the toes themselves.
2. Taping the toes -cover the tip with a longitudinal strip if this is a problem area. Circumferential layer should never extend so far that it digs into the skin between toes.
3. Taping against toenail friction -tape the receiving toe rather than the offending nail.

4. Taping the heel -large patch of tape to cover the entire heel; apply with the ankle and toes dorsiflexed (foot pulled toward you). Use 1 inch circumferential strip to cover edges.
5. Taping with Elastikon: Do not stretch the tape, simply form it to the foot and press firmly. Areas where the tape folds or is pinched should be folded like a flap and cut flush with the skin.
6. Hot Spots: clean; apply tape/felt/moleskin; modify shoes to alleviate pressure points
7. "Downhill blisters" -on toes and forefoot.
8. "Uphill blisters" -on heels and over Achilles tendon.
9. Blisters on the heel may suggest that the heel cup is too wide.
10. Blisters on the dorsal (top) surface or tips of the toes or on the outer borders of the first or fifth toe suggests a problem with friction in the toe box.

Treatment

The goals of treatment are to avoid infection, minimize pain and discomfort, stop further blister enlargement, and maximize recovery. **Always consider seeking advice from a medical doctor or podiatrist if there are continued problems, any signs of infection, or significant pain. If you are a diabetic patient see your doctor or podiatrist immediately, do not attempt treatment on your own.**

An intact blister:

1. Apply a piece of moleskin, adhesive felt, or tape 1 ½" – 3 ¼" larger than the blister, with a central hole slightly larger than the blister.
2. Apply antibiotic ointment
3. Place a piece of gauze over the moleskin, felt or tape and add a piece of adhesive knit or tape to hold the gauze in place.

If you are going to continue running:

1. Drain the blisters which are in weightbearing areas and are >.8 inch diameter.
2. With an alcohol wipe or hydrogen peroxide, clean the site.
3. Use a flame sterilized needle to lance 2-4 holes in the side of the blister.
4. Apply pressure to push out the fluid.
5. Clean and dry the skin.
6. Apply benzoin around the blister.
7. Apply a thin layer of antibiotic ointment at the puncture sites.
8. The outer layer of dead skin should not be removed.
9. Apply a blister care product.
10. Check site daily.

If fluid is hazy or cloudy, drain the blister. Apply antibiotic ointment and a protective covering. Check site frequently.

Ruptured Blister:

1. A simple blister where the skin is generally intact, treatment consists of antibiotic ointment over the blister and the blister care method of choice.
2. If the outer layer is torn off or only a flap is left, carefully cut off the loose skin, clean the area and cover the new skin with antibiotic ointment. Blister care method of choice.
3. If infection is present, clean the site frequently, apply antibiotic ointment, soak in warm water daily. Stay off of the foot and elevate it. If worsening infection, systemic treatment may be necessary.

Blister Care Products

1. Moleskin: Is a soft cotton padding which protects against friction; also available as moleskin foam.
2. Adhesive felt: 1/8 and 1/4 inch padding.

3. Spenco pressure pads: Made from closed cell polyethylene foam which is soft, thin and flexible.
4. Blister Relief (previously called Compeed): Elastic polyurethane film over a moisture absorbing and adhering layer. Functions as a second layer of skin; cushions and protects. Use without cutting film. Cover with tape or adhesive knit.
5. Mueller's More Skin: Pads have consistency and feel of human skin; decrease friction.
6. Spenco Second Skin Dressing: Skin-like hydrogel pad which can be applied over open and intact blisters. Reduces friction and discomfort. Can also be used on abrasions, etc. Apply tape or adhesive knit.
7. Spenco Adhesive Knit: Highly breathable woven fiber with the ability to stretch and conform. Does not sweat off.
8. Spyroflex: Adhesive sterile wound dressing. It protects the skin from external moisture and bacteria, while speeding healing. Cut the pad to size and cover with an adhesive knit. May remain on for up to 7 days.
9. Coban -self-adherent wrap. Elasticity and flexibility allows movement of joints. Avoid applying too tightly.

NOTE: Adding moleskin and gauze changes the way that the foot fits inside the shoe. Extra thickness changes the pressure and angle of the foot inside the shoe.

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