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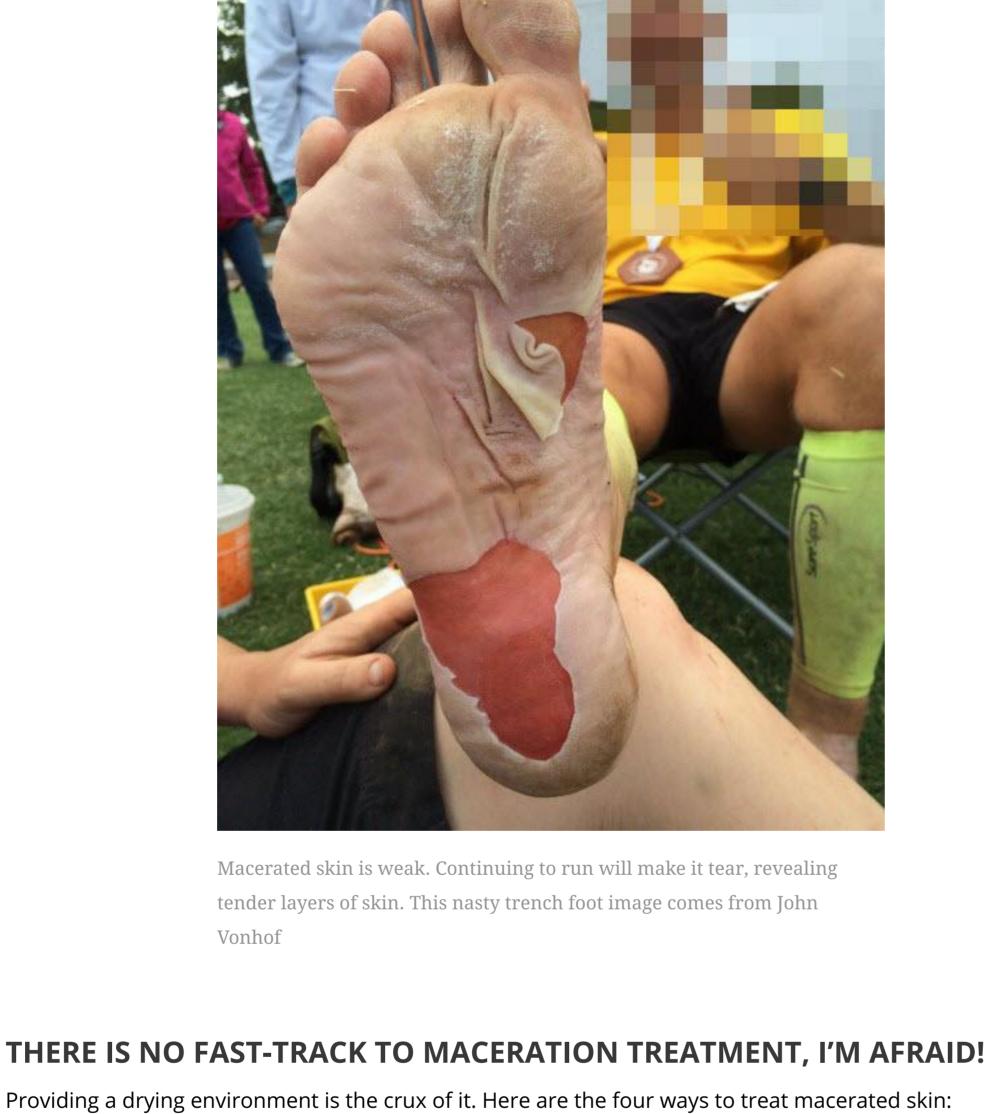
MACERATION PART 2: MACERATION TREATMENT

• 4. Dry dressings This post follows on from my previous article on the damage of maceration on a microscopic level. We defined the issue with the help of electron microscopic images. You can read it here. Now we need to look at what successful maceration treatment looks like. My particular interest is in multiday ultramarathon runners who, on day one, two or three, still have days of running ahead of them. Maceration threatens to bring their



this issue. Not so much as a treatment, but in preventing tearing. If not, you can end up with a bigger problem than necessary, like this (below).

Not subjecting the feet to the shear forces of running and walking while the skin is weak is key to resolving



3. **Topical applications** – to soothe the damaged skin or draw water out 4. **Dry dressings** – to absorb moisture from the skin

1. Expose your feet to the air

This is critical. And at the end of your race, it's probably all you need to do. But during a race, it's not possible to take your shoes off and let them air for several hours. I'm thinking of 6 day ultramarathons that I've volunteered at. Runners barely stop for more than a few hours for a sleep and to take care of other essentials. Sometimes they don't even take their shoes off – it's a time saving thing, and an "I won't be able to

reach my feet when I wake up" thing.

1. **Exposing the feet to the air** – for a long enough period to get the skin to dry

2. Change to dry shoes and socks – so the maceration doesn't continue to get worse

depend on the severity of the maceration to start with. For significant resolution, getting the shear strength of the skin back to somewhere even near full strength, I would suggest 24 hours would be a minimum. Remember, the damage of maceration can go all the way through the epidermis (Minematsu et al, 2011). And it takes around 39 days for skin cells to move from the deepest to the most superficial epidermal layer (Weinstein et al, 1984). Full recovery probably can't be

expected for over a month if you're treating a good case of trench foot (when I say good, I mean bad;)).

How long do you need to expose your feet to the air, for it to make a difference to a nasty case of trench foot?

specifics of dry-down have not been investigated at all, let alone to a point where we can make assumptions

This isn't known. Researchers call the process "dry-down" (Warner et al, 1999; Warner et al, 2003). But the

on time-frames in the wilderness or athletic arenas. Let's face it, an hour is better than nothing. And it will

with you (think of self-supported races like Marathon des Sables; or a few days of hiking where minimising carried weight and bulk is a priority). This simple treatment is not always possible.

If you are going to keep going, moisture-wicking socks will be a step in the right direction. But what if it's still

raining? Or the terrain you're running on remains wet? And what if you can't carry changes of shoes and socks

This is important. Changing to dry shoes and socks isn't a maceration treatment per se, but it will stop the

maceration from getting much worse. However, it probably won't reverse the damage until you can stop

exercising (ie: stop sweat excretion), get your shoes and socks off altogether and let the air get to them.

Exposing your feet to the air is your first and most basic treatment for trench foot. Image credit: ©Iancorless.com – All

3. Topical applications 3a. Liquids a) Astringent solutions

• Rubbing alcohol/surgical spirit

• Tincture of benzoin

White vinegar

Silver nitrate

Alum

2. Dry shoes and socks

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Astringent solutions can have a drying effect on the skin. They cause biological tissue to contract or draw together, effectively shrinking (Wisegeek). Noxon (2008) describes how astringents "precipitate protein, reduce permeability of the cell membrane and reduce transcapillary movement of plasma proteins." Wikipedia lists the following as astringents: Witch hazel • Calamine lotion • The tannins in tea and wine (what a waste of good wine)

b) Evaporative solutions Evaporative solutions dry the skin as they evaporate. Ethanol (commonly known as alcohol) is a common component. Examples include industrial methylated spirits (IMS), alcohol wipes and rubbing alcohol/surgical

at Foot Talk reminded me of:

Cameron Kippen

3b. Powders

"... the potential to cause painful reactions. Whilst alcohol has an antiseptic property (at 70%) it is probably safer to recommend surgical spirit rather than IMS. Potential complication with

sensitivities (no matter how unlikely)."

mechanism is exploited by many topical medications. So depending on your sensitivities, the frequency and volume of solution you apply to the skin, there is the potential for an adverse reaction. By the way, did you know industrial methylated spirits contains poisonous additives to make it taste bad so people don't drink it? In podiatry, we recommend both types of topical solutions (astringent and evaporative) for people who experience ongoing macerated skin between the toes. Yet surprisingly, neither are in popular use in skin maceration treatment in the athletic arena. I'd love to hear from anyone who has tried them - leave a comment, or contact me by email.

And he's right. Increasing hydration levels leads to enhanced penetration of compunds through the skin. This

spirit. These can sting (a lot) if you expose even small cuts or abrasions to the alcohol. My learned colleague

evaporating lotions is crystal deposits on the skin and other

idea. Elaborating on this, one of my colleagues explains further: Use surgical spirit, or witch hazel, as an astringent. Never use powder - even medicated - because powder restricts pores, leading to an increased likelihood of blockage and infection. Also, whilst the powder may absorb some moisture, it does have a saturation point where the moisture is released back on to the skin, along with the natural skin flora ie: fungus.

Once the running is over, one might be tempted to apply an ointment or cream to the wrinkly skin. But think

about it: would an ointment help the skin dry out? Or will it prevent the further evaporation of water from

within the skin? And what if you've got three days of running left? More than likely, it will make the prolong

Powders soak up moisture. The problem is, it doesn't take much moisture, only 13-17% for the two to

combine and form a paste (Comaish and Bottoms, 1971). A paste will neither keep things dry nor soak up any

more moisture. In fact, it becomes abrasive and damaging to the skin. So powders are often not the best

In the next article, Part 3: Prevention, I'll be detailing different topical applications one might use for maceration. I'll show you what they look like, what they are made of and how they work. You can make up your own mind then as to their potential use as a treatment.

the issue?

Belinda Longhurst

3c. Ointments

Dry and absorbent dressings could go some way to cushioning the blow and protecting the tender damaged

skin to the rigours of further walking and running. More importantly, it will absorb some water from the skin

dressing every, I don't know, hour or so, you're keeping a damp dressing touching your skin – damp from the

water it absorbs and damp from sweat. And what if your shoes get wet again? You won't be able to change

the dressing often enough to be of any use. Besides, having something covering the macerated skin is

Disappointingly, maceration treatment is as basic as it is inadequate for many endurance and multiday

activities. This highlights the need for a real focus on prevention. However, the use of astringent and

essentially preventing evaporation. Maceration treatment is certainly a tricky endeavour.

evaporative solutions may represent an opportunity. Recapping

surface. It might even help to draw some water out. But think about it – unless you're able to change the

Topical applications for maceration? Ointments, creams, solutions and powders

4. Dry dressings

Conclusion

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by Rebecca Rushton BSc(Pod)

NO COMMENTS

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