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MOUNTAINEERING & TREKKING TRAINING

The Essential Blister Guide for *Mountaineers and Trekkers*

By Kate Sielmann

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P.S. If you're new here... Hey, I'm Kate Sielmann

I'm a Sport Scientist, author, coach, mountaineer, proud mum to twin girls, and en route to my Masters in Performance Psychology. Welcome to my little slice of PDF goodness - you're gonna absolutely love this one!

PART ONE

Understanding How Blisters Actually Form

You might be tempted to skip right to PART TWO "The Prevention" section, but trust me—understanding how blisters form is key to preventing them, so here we go:

Blisters are caused by shear trauma to your skin

"Shear" is what happens when pressure forces the layers of your skin to slide in opposite directions. It's not just plain old rubbing; it's your skin stretching and moving in ways it's not meant to.

Try this: put your finger on the back of your hand and press down. Now, while holding it there, try to move your skin back and forth. See how it stretches?

That's shear—your skin shifting against the layers underneath, similar to what happens when you're in your boots, trekking up (or down) uneven terrain for hours.

As your bones move with each step, the skin stays put, and that internal movement causes shear stress. After a while, those skin layers separate, and fluid rushes in to fill the gap—*aaaaand*, there's your blister.

If you keep going (and let's be honest, we usually don't stop in the middle of a climb or trek), the blister will likely just get worse. If the trauma goes deep enough, blood might even mix with the fluid. That's when blisters get ugly, painful, and much more likely to tear open, exposing raw, sensitive skin that's highly prone to infection.

As if blisters couldn't get any worse, then comes along the "deroofing" part. I'm sure you've experienced it, but in case you're not sure what I mean: it's when the top layer of skin detaches, leaving the tissue underneath raw and at its most painful.

And that, my friend, is deroofing—the final stage of a blister and something we *reallllllly* want to avoid.

The 6 Primary Causes of Shear Trauma

Now that you understand shear trauma as the primary culprit behind blister formation, the next question is: *what exactly triggers shear trauma?*

This is where these six primary causes come into play, as they directly contribute to the onset of shear trauma and the subsequent blisters that inevitably follow:

1. Skin *Softness*

Our feet, especially in the soft and tender spots, are naturally prone to blistering. The skin on your feet isn't as tough as other parts of your body because it's softer and more vulnerable.

But over time, you can train your skin to toughen up by gradually exposing it to more friction. That's why in Phase Two of The Peak Performance Program, I always have my clients gradually start using their boots in specific training sessions.

2. Moving *Bones*

Believe it or not, your foot bones shift with every step, and when they move too much, that's prime blister territory. Take your heel bone, for example. When it slides up and down in your boot, those layers of skin are stretched and stressed, leading to a blister. Your boots play a huge role in controlling bone movement.

A well-fitting pair will keep that heel locked in place. Not only that, but tweaking your biomechanics—like how you walk and climb—can help too.

Bottom line: the less your bones move, the less likely you are to blister up.

3. Repetition

It's all about the numbers here. The more steps you take, the more chances there are for blisters to form. In multi-day treks or big expeditions, you might notice you're more blister-prone as the days go on.

This is because each step wears down your skin's defences and increases the accumulated amount of shear trauma, especially on longer hikes or expeditions.

4. Friction and *Pressure*

Friction and pressure are like the dynamic duo of blister-causing forces. When your boot pushes down on your foot, the pressure and friction build up as your foot rolls from heel to toe.

Every step grinds the layers of skin beneath, creating shear stress.

To fight this, your boots need to fit right—snug but not too tight—and adding insoles, cushioning, or even adjusting how your boots are laced can make a huge difference.

5. Moisture

Increased moisture leads to heightened friction, but it's important to note that moisture alone doesn't directly cause blisters…

Our feet contain around **250,000** sweat glands *(yes, you read that right—two hundred and fifty thousand)* that continuously produce moisture, along with the extra sweat generated by rising body temperature during your trek or climb.

To complicate matters, most trekking and mountaineering boots are made with highly effective Gore-Tex materials, which excel at keeping moisture out but struggle to let it escape. This means our feet tend to sweat even more inside our boots.

Prolonged exposure to moisture from sweating causes the cells in the outer layer of the skin (the stratum corneum) and the epidermis to swell, becoming disorganised, fragile, and waterlogged. This makes your skin more susceptible to breakdown, significantly increasing the risk of friction, shear, and ultimately, blister formation.

6. Shear *Absorption*

Not all boots absorb shear the same way. The less shear absorption your boots have, the more work your skin has to do.

That means more pressure, more friction, and, yep, more blisters.

The Four Types of Blisters

Blisters come in all shapes and sizes, and some spots are more prone to them than others. Here's what you need to know:

1. Toe Blisters

Boots with a cramped toe box are your worst enemy here. If your toes are constantly rubbing up against the front of your boot, or each other, blisters are inevitable. Add improperly trimmed toenails into the mix, and you've got a recipe for disaster.

Socks can also catch on toenails, pushing them into your cuticles and causing blisters under the nail (ouch). Toe socks or proper-fitting boots can make a big difference here.

2. Ball-of-the-Foot Blisters *(the worst ones for me!)*

These happen when the metatarsal bones in your foot (basically the balls of your feet) are sliding back and forth inside your boot. Tight tendons on the top of your foot can press the balls of your feet into the boot, making it worse.

Try stretching your feet or using metatarsal pads to reduce the pressure.

3. Heel Blisters

Probably the most common blister spot—and for good reason. Your heel moves a lot inside your boot, and that back-and-forth motion leads to constant friction. Sometimes, it's the material inside the boot that's rubbing wrong. Check for seams or rough edges.

And steep descents? Prime time for heel blisters.

4. Calluses and Blisters

You'd think having calluses would protect you from blisters, but here's the kicker—blisters under calluses are THE WORST. They tend to be deeper and more painful because it's hard to pinpoint exactly where the fluid is.

Best solution? Don't let calluses get out of hand. Keep them in check so you don't end up with a big, painful blister hiding underneath.

PART TWO

The 4 Elements to Reduce Shear Trauma and Prevent Blisters

I'll admit… Part ONE might have felt a bit doom and gloom. But now that you've got a handle on how blisters form, what triggers them, and the different types we encounter, let's shift gears and dive into the really good stuff—how to prevent the buggers from popping up!

> The key to blister prevention is all about minimising shear trauma by reducing the six primary causes as much as possible

Remember, those six primary causes are skin softness, bone movement, friction and pressure, moisture and shear absorption.

The following four elements are some of the most powerful strategies to address the six primary causes of blister formation by minimising shear trauma.

While these are essential, ***there are five additional elements*** I share exclusively with my one-on-one Peak Performance clients. They also gain access to the *"Peak Performance Library,"* packed with specialised insights like this and much more—covering physical, mental, emotional aspects, and even gear optimisation—to improve their trekking or expedition experience.

> If you're curious about what *The Peak Performance Program* is *(and those five extra elements)* and what it can do for you, check out what my clients have to say about how it made *all the difference* on their treks and expeditions: www.kate-sielmann.com/success-stories

Even with just these four of the nine elements, you'll find that adjusting even one will make a difference—or you might need to use a combination.

The key is to experiment and discover what works best for you and your feet.

1. Boot Fit

Fit comes first. Properly fitting boots are the foundation. It doesn't matter how well you tape, what lacing technique you use, how good your socks are, or how solid your other strategies are—if your boots don't fit right, you're headed for blister trouble.

Just keep in mind that even the best-fitting boots won't ensure a blister-free experience.

2. Socks

Socks come in both single- and double-layer constructions. Single-layer socks, particularly those lacking moisture-wicking properties, can create friction between your feet and the sock, leading to blisters. This is exactly why cotton socks are a hard pass for your trek or expedition. Instead, opt for synthetic fabrics like Drymax, Coolmax, Olefin, Thermax, or Capilene. Double-layer moisture-wicking socks are particularly effective, as the layers can slide against each other, significantly reducing friction between the sock and your foot. Less friction means a lower chance of blisters—simple as that!

Potential Recommendation: ArmaSkin Anti-Blister Socks

I haven't had the chance to test these yet, which is why it's a "potential" recommendation. From what I've learned, ArmaSkin socks offer a unique dermal protective layer thanks to their inner Si Fusion coating that adheres to your skin, effectively preventing friction. The outer fabric is smooth, minimising friction between the sock layers. These socks are designed to be worn as a liner beneath a merino wool or moisture-wicking synthetic sock, making them a solid choice for blister prevention.

3. Hydration

You might be wondering what on earth hydration has to do with blisters, but let me explain:

When you're well-hydrated but low on sodium (for example, drinking plenty of water but not replacing lost electrolytes), your blood sodium levels drop (a condition known as hyponatremia) and extra fluid begins to collect in the tissues of your feet. As the tissues swell inside your boots, the extra pressure increases friction, and...

> Ding ding—you guessed it—a blister is born.

And all because you weren't keeping an eye on your hydration and electrolyte balance.

On the flip side, if you're dehydrated, your skin loses its normal water content and turgor, making it more prone to rubbing and folding. This, too, sets the stage for blisters. It's a delicate balance, and without proper attention to both hydration and electrolyte intake, you could be dealing with blisters simply from neglecting these basic needs. By paying attention to both hydration and sodium levels, you're not only looking after your overall health but also keeping your feet (and sanity) in prime condition.

Electrolyte Recommendations:

- Salt Sticks Capsules *(my favourite)*
- S!Caps (best for hot and humid conditions)

4. Lacing *Techniques*

A while back, I shared a series of lacing techniques on Instagram to help people fine-tune their lacing to solve specific issues. Most of the posts were warmly received, but I did get some pushback from those who thought I was suggesting that lacing could somehow replace the importance of a proper boot fit.

Let me be clear—fit is *everything*

That's why it's the first point I'm covering here, because nothing trumps having the right fit. However, adjusting your lacing technique can definitely help alleviate friction and pressure, making your boots even more comfortable and reducing the risk of blisters.

Recommendations:

The 5 best lacing techniques that every trekker and mountaineer needs to know?

Click here and I'll send them to you: https://tinyurl.com/y2vktx5k

Everyone needs to discover their own blister-prevention formula—maybe it involves just one of these elements, or perhaps it incorporates all of them. But no matter your approach, the goal remains the same: cut down on shear trauma from bone movement, pressure, friction, and moisture; toughen up your skin's resilience; and absorb shear.

Tip:

Keep an eye on your inbox—in a couple of days, I'll be sending you a quick tutorial video on this technique, including all the dos and don'ts.

PART THREE

Additional Blister Tips

Calf muscles and heel blisters: Tight calves can increase heel movement inside your boot, which leads to blisters.

Toenails: Keep them trimmed and smooth to avoid snagging your socks.

Tape adherent: This helps tapes and blister products stick better. After application, dust the area lightly with powder to prevent socks from sticking.

Kinesiology Tape: Always round the corners to prevent the edges from peeling. Apply it at night and wear tight socks to activate the adhesive with your body heat.

Pro Tip: If you have a blister, after cleaning and draining it, dab on a bit of Anbesol, Cankaid, or Orajel (gum numbing ointment) to numb the area before patching it.

The TWO Times When You Should NOT Drain a Blister

1. **Blood-filled blisters**

   Draining these creates a risk of infection, allowing bacteria to enter the blood.

2. **Cloudy or hazy fluid filled blisters**

   This usually indicates infection—get professional help instead of draining it.

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