



Blisters under the big toe are a common occurrence for runners.

BLISTERS AND

CHAFING

WRITTEN BY GEOFF RYNJA & ANGELA BEETHAM

Most runners have experienced blisters and chafing at some point. What starts off as a minor irritation can often evolve into a major discomfort if not properly treated. Nothing can dampen the joy of a run like an inappropriately placed blister but the good news is that blisters and chafing are treatable and preventable. R4YL has sourced two experts in the area of blisters and chafing. This article addresses the causes and warning signs of blisters and chafing, and how to treat and prevent their occurrence.

CHAFING

Causes of Chafing

Chafing can be caused by any physical activity involving the continuous rubbing of skin. It involves skin rubbing against skin, or against a material such as that in sporting attire. The friction generated as a result of the rubbing process damages the top layers of skin and exposes the raw and more sensitive skin below. The result is the familiar redness and soreness on the surface of the skin.

Ideally, the activity should be terminated as soon as the problem becomes apparent, but this is not always possible. If the activity cannot

be stopped when the soreness first becomes apparent, then the inflamed skin surface may begin to ooze, or, in some cases, even bleed.

Other parts of the body, such as the lips, may chafe as a result of exposure to the elements.

Factors influencing Chafing

As chafing results from the continuous rubbing of the skin, then the degree of chafing is influenced by the level of the frictional force and the number of times that the skin comes into contact with the other skin or the material involved in the rubbing process. The level of frictional force may depend on the physical build/charac-

teristics of the person, and/or on the clothing material and fit. It will also depend on the intensity of the activity, with longer and more intense levels of activity usually resulting in a higher level and frequency of rubbing as well as increased sweat production.

Moisture and sweat can cause the amount of friction and chafing to increase with skin to skin contact. At the same time, the fibres of the clothing fabric may absorb sweat making the fabric both heavier and bulkier. A fabric made heavier and bulkier by sweat may cause the garment to change its original shape and further contribute to rubbing in some uncomfortable places.

Warning Signs

The areas prone to chafing include the inner thighs, groin, underarms, nipples, under breasts and buttocks. Often, the first time that the chafing problem reveals itself is when a stinging or burning sensation is noticed in the affected area.

Prevention

It's important for an individual to be aware of those areas on their person that have chafed on previous occasions, or are likely to chafe with a change in activity, so that appropriate preventative measures can be taken. Chafing has the potential of impacting significantly on performance. Apart from the discomfort, there is the associated mental distraction, and the possibility of a need to change technique to get to the end point of the activity. Technique changes may also have other physical consequences. Therefore, it is important that steps are taken to eliminate both the discomfort and the distraction. The best strategy is to adopt a two-pronged approach to reduce frictional influences, namely, the use of a lubricant and the use of technical fabrics.

One of the traditional approaches to reduce friction is to use a petroleum jelly or petrolatum based lubricant. However, petroleum jelly based

Chafing can result in an inflamed skin surface, and in some cases, may even bleed.



Bra chafe.



Striderm's Anti Chafe Extreme, Skin Survival Cream and Chafe No More.

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lubricant products tend to sit on the surface of the skin holding water in the skin and blocking evaporation. This ingredient characteristic is called 'occlusive'.

The occlusive function is acceptable in some circumstances, e.g., for skin moisturising, and there are many examples of these products in the market. However, petroleum jelly is less effective than other products for preventing chafing during activity, i.e., they are not good skin lubricants. The alternative to an occlusive product is a non-occlusive product. These include products that are based on silicones, vegetable/nut oils, butters and waxes.

Silicones, in addition to being non occlusive, have the following characteristics: they are clear, have a low odour, have high spreadability, and are water repellent. Vegetable/nut oils are also non-occlusive, and have good spreadability, and tend to be less water repellent, but may have an odour, particularly as they age. Non-petrolatum-based waxes tend to be non-occlusive and water repellent, but have lower levels of spreadability.

Striderm has developed a range of non-occlusive products which take into account that different people have different anti-chafing needs. Some are more prone to chafing by

virtue of their physical build or gait characteristics, while others participate in longer events at greater or lesser intensity than others. Products range from a vegetable-based skin cream for everyday use, to an extreme silicone anti-chafe product designed for longer endurance events. An SP15 lip balm is also available to provide protection from the elements.

The other identified contributor to chafing is clothing. The recommendation is to wear 'technical' fabrics. Garments made from these fabrics help to wick moisture away from the skin and tend to maintain their shape better than cotton-based fabrics. The combination of your preferred lubricant with technical garments should help in the comfortable completion of your chosen activity.

In order to minimise problems there is an overarching need to look after your skin in those areas that are prone to chafing. This means that it is important to use your preferred anti-chafing product every time that you exercise so as to minimise damage to the surface of the skin. This is particularly important for those persons who exercise on several days each week. At other times there are benefits in keeping those areas moisturised with Striderm's Skin Survival Cream or Chafe No More.

Striderm
www.striderm.com.au



THE NAME STRIDERM IS DERIVED FROM THE combination of 'Stride' meaning 'to take long steps'; and 'Derm' meaning 'the skin'. Consistent with its name, the Striderm focus is on the design and production of skin care products for active persons of all fitness levels, i.e., for the skin of active bodies. The company is Australian owned, and the products are designed and manufactured in Australia.

Striderm Directors: Geoff Rynja was a competitive age grouper in athletics in Queensland when he retired from running. Until he returned to running, he was always involved in some form of competitive and non-competitive sporting activity, e.g., squash, bushwalking, sailing, and touch football. He always maintained a keen interest in athletics, and with Cheryl's encouragement, he returned to running after a gap of over 30 years. He has now completed many road races ranging from 10km to the marathon, as well as trail runs and walks, including the 96km Kokoda Challenge 2009 on the Gold Coast. Cheryl Rynja is a qualified cosmetic scientist with nearly 30 years experience in formulating cosmetic products for the Australian and international cosmetic markets. Her experience has given her significant knowledge about the use and function of ingredients in skincare products. With Geoff's sporting experience-based input, Cheryl designed Striderm's range of skincare products to perform effectively for the intended purpose.



Striderm directors Geoff and Cheryl Rynja

Treatment

On some occasions, despite your best intentions, chafing will occur. The application of moisture to the affected area will usually cause some level of discomfort, and it is difficult to avoid wetting the area, e.g., by showering following exercise. However, it is best to wash the affected area, and to apply a product that will assist in soothing and moisturising the skin. Many skin moisturisers contain water and their application could cause some short term discomfort, but, when the discomfort subsides they will soothe and moisturise the skin and provide lubrication to minimise the ongoing discomfort due to further rubbing. Striderm Skin Survival Cream and Chafe No More are both suitable for this use.

An alternative to using a moisturiser is using a powder. These do not contain additional moisture and should minimise the short term discomfort. A product, such as Striderm Anti Blister Foot Powder, would provide additional lubrication to minimise the ongoing discomfort due to rubbing.

If discomfort persists and the chafe persists, then consult with a medical professional.

BLISTERS

Blisters are one of the most common athletic injuries and can form quite easily during vigorous athletic activities. They can be debilitating and often result in the athlete having to persevere with extreme pain or cease activity to gain treatment.

Care must be taken to attend to these quickly as there is a risk of cellulitis or sepsis if they are left untreated.

Although blisters are frustrating they are one of the simplest injuries to prevent. This article will take you through all you need to know from how they form at a cellular level to tips on prevention and treatment advice.

Causes of Blisters

Blisters form when the skin is in contact with a surface and an attempt is made to move across the skin with an external force. In response to this a frictional force will oppose this movement. Repeated friction on the skin causes a slight exfoliation of the Stratum Corneum (top layer of epidermis) and a reddened area forms around the rubbing, this is called a

“Hot Spot”. With continued rubbing the person will feel a sting or burning sensation with a pale narrow area forming around the hot spot. This pale area then enlarges to encompass the reddened area. The area is then elevated over the underlying skin as it fills with fluid.

Friction forces then mechanically separate epidermal cells at level of the Stratum Spinosum (deepest layer). Hydrostatic pressure causes the area of the separation to fill with a fluid that is similar in composition to plasma but with a lower protein level. About six hours after formation of the blister recovery starts and cells in the blister base begin to take amino acids and nucleosides. After 24 hours, there is high mitotic activity in the basal cells and at between 48 and 120 hours, a new granular layer is present.

Factors influencing Blister Formation

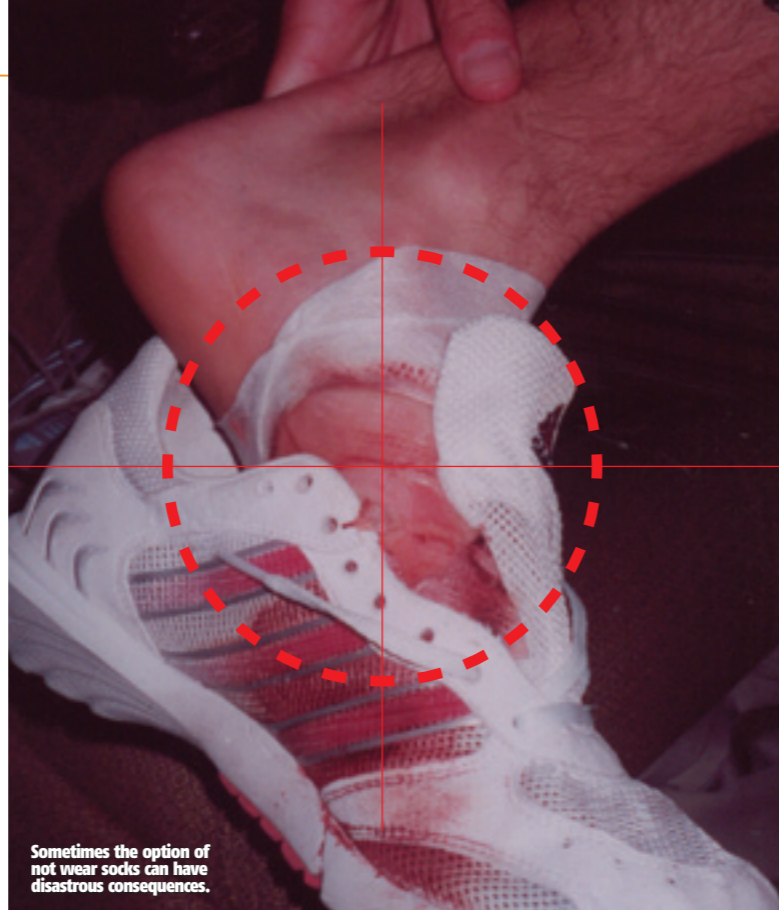
The major indicators for blister formation are the magnitude of frictional forces and the number of times an object cycles across the skin. These will determine the probability of blister development - the higher the frictional forces, the fewer cycles necessary to produce a blister. Moist skin (think clammy skin) is also a factor as it increases the frictional forces and thus is a factor in blister formation. Interestingly it seems that very dry or very wet skin actually decreases

frictional forces and thus decreases the probability of blister development.

The most common areas to get blisters are on the soles of feet and palms of hand where skin is thickest. Of note and contrary to many beliefs, blisters are more likely to form in areas that have thick skin or callous, because a callous forms for the same reason blisters do, i.e. friction.

Higher exercise intensity can increase frictional forces and longer exercise duration results in more shear cycles. Both increase sweat production and create a moist skin environment.

In some people the way they run or walk places a significant load on certain areas of their feet. For example a person with tight calves may walk/



Sometimes the option of not wearing socks can have disastrous consequences.

run with an abducted (turned out) gait, this will increase loading through the big toe during propulsion, which can cause callous build up and ultimately blister formation. By improving calf flexibility this can reduce abduction and medial loading. If someone over-pronates (rolls inwards) irritation

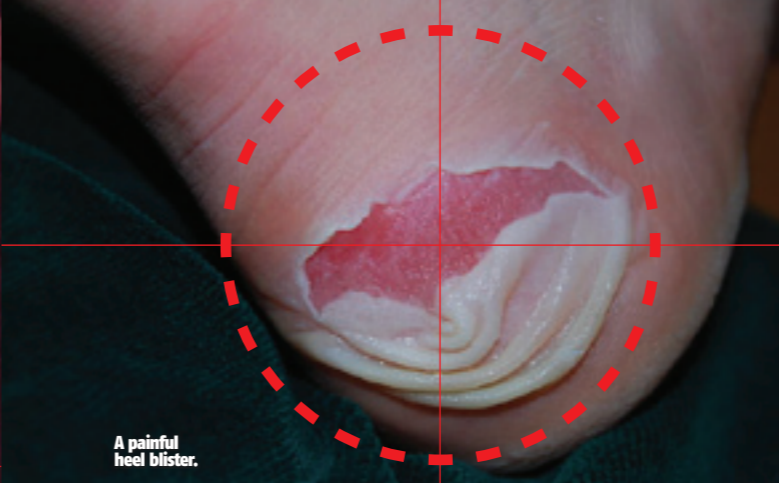
Prevention

It has been found that anti-perpirants with emollients and drying powders applied to the feet do not appear to decrease the chance of friction blisters. While dry powder on dry skin will reduce frictional forces, when the skin becomes wet or moist (as you sweat), the frictional forces increase. It has also been documented that when alkaline sweat combines with foot powder it clumps and creates an abrasive surface.

The use of petroleum based lubricant products has long been challenged and I personally recommend strongly against their use. It has been shown that they simply sit on the surface of the skin holding water in the skin and blocking evaporation. The skin therefore becomes a “holding tank” for water. This causes surface tension to increase and extra water is available to flow into any open spaces which form in the skin. This suggests that petroleum based products can actually increase the chance of blistering - something to ponder for avid Vaseline users.

LOOK AFTER YOUR SKIN

I cannot stress enough the importance of moisturising your skin to prevent blisters and chafing. With regular use of a natural intensive moisturiser the more nourished and elastic



A painful heel blister.

your skin is, therefore the less the frictional forces and the less chance of blisters. Using a completely natural product is the only way to go.

Healed Sole Foot has been developed with the active person in mind and gives your skin all the nutrients it requires to improve its condition and regenerative qualities to repair damaged skin. In addition to this,

want to make sure that the shoe is not too loose (increased movement will increase friction). It is also important to lace up the shoe correctly (there are many specific lacing techniques to allow your foot to sit firmly in the shoe and reduce lifting at the heel - see figure 1 for how to tie a ‘Heel Lock’).

TAPING

Taping often helps the prevention

Clinical experience suggests that draining intact painful blisters while maintaining the roof/hood of the blister tends to reduce discomfort, as well as reducing the chance of secondary infection while also promoting healing.

the antimicrobial qualities of Sole Food help with fungal and bacterial infections common in the active population. You should ideally moisturize twice daily for 2-3 weeks to get them in good condition and then maintain your feet with daily applications.

SOCKS

I recommend only using good quality technical socks. Look for socks with a synthetic blend and Coolmax which allows moisture to be ‘wicked’ to the outer of the sock rather than it retaining moisture. Do not wear pure cotton socks for long or vigorous activity as cotton is a water loving material, which can result in increased friction whilst also being a compacting material which can result in reduced comfort. Thick socks have been found to reduce friction and I prefer not to “double sock”, to reduce any bunching in the socks and ensure good “feel” while reducing bulk in the shoe and cost.

FOOTWEAR

In my opinion the order of importance for factors contributing to a correct shoe choice are fit, function and then feel. It is very important to remember that the correct fit is the most important feature of a shoe. This is followed by its function and in particular, a function that it is right for your foot type. Finally, the feel of the shoe is also a contributing factor, because if a shoe “feels” comfortable, it has more chance of functioning well.

TIPS ON SHOE FIT: Not too tight (any rubbing will cause friction), no seams on areas of prominence (bony/tendon), and enough width in forefoot to wiggle your toes. Try shoes on at the end of the day when your feet are the most swollen and with the socks you plan to run/walk in. However you also

of blisters. The most important thing you need to know is that hypoallergenic tape is best and Fixomull or Hypafix brands are best as they are gentle on your skin and stretch to allow movement. Avoid putting moleskin*

Healed

ANNA BEETHAM IS A PODIATRIST with over eight years of experience in the sports medicine industry and has a passion for all things active and sports related. She is the consultant podiatrist for the Melbourne Victory Soccer team, Podiatry Coordinator for the Oxfam Trailwalker and was part of the medical team at the 2006 Commonwealth Games. She has vast experience in treating any and every kind of blister and had made it her mission to give athletes the best advice regarding their prevention and treatment. In addition to this Anna has recently developed Healed; a range of completely natural skin products with foot care, blister and chafing prevention in mind.



For more information or to contact Anna, log onto www.healedonline.com



advice. Petroleum and silicone based products have been shown to increase the frictional forces after long periods of activity. Healed Skin Protect is an example of an anti-chafing balm made from all natural products.

Anna's Top Tips for Blister Prevention

- ✓ No Vaseline or petroleum based products
- ✓ No duct tape or sports tape directly applied to the skin.
- ✓ Soaking feet in tea prior to an event can improve skins strength (tannins)
- ✓ Moisturise your feet every day. Use pumice or foot files to keep callous down
- ✓ See a podiatrist to get your feet looked at if you have continued trouble
- ✓ Apply a hypoallergenic tape to areas of repeated friction or if you have new shoes you need to wear in (remember to round edges of tape)
- ✓ Have your shoes fitted by a professional. Ask about lacing techniques to secure your foot
- ✓ Buy and wear the best socks you can afford and change them regularly
- ✓ Attend to hot spots immediately
- ✓ Use a natural anti-chafing balm to assist in reduction of friction and to soothe areas of irritation after activity
- ✓ NEVER wear a new pair of shoes on race day (same for new socks and clothing, always test drive them first in training)



Hypoallergenic tape such as Fixomull can be used to secure a non-stick dressing over a blister.

Treatment

Despite all attempts at prevention, blisters may still occur and treatment will be necessary. The main goals are to prevent expansion of the lesion, reduce discomfort, promote healing and prevent infection. Clinical experience suggests that draining intact painful blisters while maintaining the roof/hood of the blister tends to

reduce discomfort, as well as reducing the chance of secondary infection while also promoting healing.

Clean the area and needle prior to doing this with alcohol wipes. Once clean, lance the blister at the lowest point so fluid can drain, flush the area with a saline solution and apply a simple wound gel such as Solosite and cover with a nonstick dressing such as Melolin and hypoallergenic tape such as Fixomull to secure. This dressing can be changed daily to monitor the healing, while also checking for infection, swelling or inflammation. If you are concerned the area is not healing, or at the appearance of a red line tracking from the area up your leg (sign of infection), seek medical advice immediately. Antibiotic use is not required unless obvious infection and antiseptic use can actually reduce healing rates in non-infected wounds.

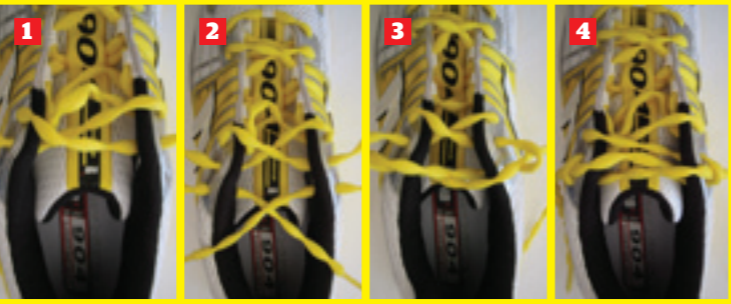
To treat blisters that have de-roofed or which are very large painful blisters I suggest using a hydrocolloid type dressing. Duoderm is my dressing of choice. This is the most effective way to increase comfort and facilitate healing. These can be directly applied to the area of concern (after flushing clean with saline and drying with sterile gauze) and secured using Fixomull.

If you require addition padding a donut pad surrounding the blistered area will reduce pressure and pain. This can be made with orthopaedic foam or moleskin.

If you have a simple blister but need to continue activity a hydrocolloid type dressing will enable you to be more comfortable. You can keep these on for 2-4 days at a time.

Figure 1 – How to tie a ‘Heel Lock’ which can assist to prevent heel slippage and blisters.

- 1 Lace the shoe as normal until the second last lace hole available.
- 2 Rather than crossing the lace over the shoe, feed it back through on the same side as the last hole, but don't pull it down too tight just yet.
- 3 Now feed the lace from the opposite side through the loop you have made in Step 2.
- 4 Now pull the laces tight and secure as normally.



BLISTER & CHAFING PRODUCT REVIEW

Written by **Lennon Wicks**

BLISTERS

While all of the anti-chafe products can be used to prevent blisters as well as chafing, there are also some targeted products which have been designed specifically to prevent the formation and/or treatment of blisters.

Body Glide Liquefied Powder

RRP: \$25 – for 9 individual pouches
Website: www.bodyglide.com

Body Glide Liquefied Powder is easy to carry around as well as very simple to apply. Hypoallergenic and non-petroleum based, it is a technically advanced cream that transforms into an evenly disbursed, effective, yet dry and protective skin lubricant. Liquefied Powder helps maintain optimal skin comfort by creating a silky smooth barrier against friction and moisture, while permitting skin to breathe; feels 'dry' to the touch.

Striderm Anti Blister Foot Powder with Deodorant

RRP: \$13.50
Website: www.striderm.com.au

Simply throw it directly onto your feet, or into your socks before fitting and Striderm Anti Blister Foot Powder is ready to work. Made from a unique blend of synthetic waxes, talc and deodorant, it is designed specifically to protect your feet. The ingredients work together to reduce friction, to repel moisture and to deodorise the feet.

Band Aid Advanced Healing Blister Block

RRP: \$9.95 – 4 strips (4.2cm x 6.8cm)
Website: www.jnjust.com.au

Band Aids are simple and easy to use and now come with superior adhesion. They can be used to prevent blisters in known trouble spots, or to assist in healing. Band Aids have been clinically tested, and proven to allow for faster healing. Designed to stay on for several days (acting like an instant scab) to seal in your body's own natural healing fluids, they seal off the wound to dirt and germs which can cause infection. Band Aids are hypoallergenic and sterile unless individual wrapper is opened or damaged. Also available in regular and large packs

Spenco 2nd Skin Blister Kit

RRP: \$19.95
Website: www.spenco.com

2nd Skin Blister Pads are ideal for the treatment of blisters, especially if you are seeking to continue competition of training following blister formation. The pads promote a scab free, naturally healed blister and consist of a soft hydrocolloid pad and ultrathin adhesive film which stays in place for up to five days to protect the area as the blister heals. The unique effective antiseptic barrier in the structure of 2nd Skin has been shown to protect the dressing against microbes and microbial contamination. A 2nd Skin Blister Kit contains six 2nd Skin Moist Pads, seven Adhesive Knit strips and a Pressure Pad. You can also purchase 2nd Skin Squares as a pack of two hundred 2.5cm squares.



CHAFING

Body Glide Anti-Chafe

RRP: 12.8g – \$25.00, 36.9g – \$29.00
Website: www.bodyglide.com

Hypoallergenic, non-petroleum based product which is easy to apply without mess. Body Glide penetrates the skin and creates an invisible, comfortable barrier against friction and moisture, without clogging pores or trapping perspiration. Once applied it feels 'dry' to the touch. Good for use from head to toe, before, during and after activity. Now also available with SPF25 Balm for added protection from the sun

Vaseline

RRP: 50g – \$2.59; 100g – \$3.89
Website: www.vaseline.com.au

A runners 'Old Faithful' anti-chafing product. Vaseline is cheap and reliable and has been passed on from generation to generation for nearly 140 years. It can be found in over 60 countries world wide. Not only is it easy to use, but easy on the pocket. Vaseline is a mixture of mineral oils (petroleum based), paraffin and microcrystalline waxes and when blended together creates a smooth jelly with a melting point just above body temperature. The result, it literally melts onto the skin creating a protective film, however more recently has been criticised for potentially trapping moisture.

Sport Shield

RRP: 42.5g – \$24.00
Website: www.2toms.com

The roll-ons container makes Sport Shield extremely easy to apply without mess. It is non-straining, non-toxic, non-greasy and long lasting. Sport Shield is made from a compound of dimethicone, aloe vera extract, and Vitamin E giving it a very light consistency and you will find that a little really does go a long way. Sport Shield is a Silicone based product and is now also available in single use sachets

Striderm Anti-Chafe Extreme Roll On

RRP: 50g – \$19.95
Website: www.striderm.com.au

Striderm Anti-Chafe Extreme is made from a blend of silicones and aloe-vera extract and is designed to be long lasting and effective in extreme of events and environments. It is non-occlusive (spreads well and water repellent) and works immediately upon application. It provides a smooth, colourless, and non-greasy coating which is fragrant free. Best of all it washes off easily post run and is now also available in single use sachets.

Striderm Chafe No More Roll On

RRP: 50g – \$12.95
Website: www.striderm.com.au

Striderm Chafe No More is a less expensive version of Anti-Chafe Extreme, but with many of the benefits. Similar to Anti-Chafe Extreme, Chafe No More provides a smooth, colourless, non-greasy coating which is fragrance free and also contains a blend of silicones and aloe-vera extract, but with the addition of shea butter and vitamin E. Chafe No More is great for all of your standard training runs of up to 2 hours.

Healed Skin Protect

RRP: \$17.95
Website: www.healedonline.com

Healed Skin Protect is the only totally natural anti-chafing product we could find and includes key ingredients of beantree emollient (a natural lubricant), silica, calendula, and vitamin E. But two substances you definitely won't find in this 'balm', are petroleum or silicone. The Healed Skin Protect comes in a small stick, which makes it extremely handy to travel with, or to carry with you while you are running. Skin protect has an initial waxy feel, but really does work a treat.

