

Zinc: the benefits to venous eczema and ulceration

KEY WORDS

- ▶ Compression therapy
- ▶ Gravitational eczema
- ▶ Topical zinc
- ▶ Venous eczema

Zinc is the second most abundant trace metal in the human body and is present in all living cells and body secretions. Topical zinc has been used for over 3,000 years in the treatment of skin conditions and wounds (Lansdown et al, 2007). It is reported as having a number of beneficial effects on wound healing, including antiseptic, astringent, anti-inflammatory and anti-microbial (Maher, 2015). This article will discuss the benefits of topical zinc in the management of venous eczema and ulceration and explore the use of Andoflex UBZ in the management of venous disease.

Zinc is a metallic element that is found in water, air and food and is the second most abundant trace element in the human body, the first being iron (Maher, 2015). Zinc plays a part in many biological functions including immune response regulation, modulation of keratogenesis and wound healing (Lim et al, 2004). The body's systematic requirement for zinc are minute, nevertheless any slight deficiencies can affect cellular health. However, in the skin requirement for zinc is greatly increased, due to the highly proliferative nature of the skin, up to 20% of the body's zinc is found in the epidermis (Schwartz et al, 2005).

The benefits of topical zinc to improve skin conditions and wound healing have been reported historically. Over 60 years ago clinical research looking at the benefits of topical zinc was commenced. Early animal studies into zinc oxide found it to be beneficial in reduction of wound debris and advancement of epithelisation (Argen, 1993; Lansdown, 1993). Human trials also reported advantages of topical zinc, in a double blind randomised control trial the application of topical zinc oxide showed to promote healing of leg ulcers (Strömberg and Agren, 1984). More recent studies have identified the benefits of zinc in the advancement of enzymatic breakdown, cross linking of collagen, collagen synthesis and regulation of metalloproteinases (Schwartz et al, 2005; Lansdown et al, 2007; Agren et al, 2006).

Zinc oxide paste bandages have an array of properties that can enhance healing of wounds (Parboteeah and Brown, 2008). The topical application of zinc oxide through bandages ensures zinc ions are in contact with the wound and the surrounding skin. The constant local zinc levels results in a number of benefits to wound healing these include increased degradation of collagen in necrotic tissues, promotion of epithelisation, improved collagen and protein synthesis, increased expression of growth factors, which are essential for production of granulation tissue and it also inhibits bacterial growth (Agren et al, 2006; Lansdown et al, 2007; Parboteeah and Brown, 2008).

VENOUS ECZEMA/ULCERATION

Venous eczema is a non-infective inflammatory skin condition that affects the lower limbs and is a direct result of venous insufficiency — it can also be referred to as venous dermatitis, varicose eczema, stasis eczema and gravitational eczema. Venous eczema, like venous ulceration, is a manifestation of venous disease (Nazarko, 2009) and is commonly seen in patients with venous ulceration. Patel et al (2001) noted that between 37% and 44% of patients with leg ulceration also had a diagnosis of venous eczema.

Venous disease occurs due to an incompetent venous system that allows backflow and

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increased pressure within the superficial venous system, referred to as venous hypertension. The high pressure within the veins causes dilation of the vessels leading to increased permeability, allowing blood contents to leak into the tissues, this is most common around the ankle/gaiter region. The presence of blood content in the tissues initiates an inflammatory response, and due to the chronic nature of venous hypertension this inflammatory response is often prolonged resulting in a complex pathological response that leads to a number of clinical conditions, the most severe being venous ulceration.

Venous eczema is part of the continuum of venous disease; there is a linear relationship between the severity of venous disease and

clinical symptoms. To aid clinicians in the assessment of severity of venous disease an internationally recognised classification system was developed in 1994; the Clinical Etiology Anatomy Pathophysiology (CEAP) classification system (Eklöf et al, 2004). The CEAP classification is recognised and accepted worldwide (Padberg, 2005), the purpose of the classification system is to provide standardised definitions which provides continuity from practitioner to practitioner and from practice to practice (Padberg, 2005).

BENEFITS OF ZINC

Zinc paste bandages have been reported as having positive affects in the treatment of varicose eczema (Enoch et al, 2006; Lansdown et al, 2007; Mosti et

Clinical Case Study

A 58-year old man who suffered from irritated and weeping venous eczema for the past 4 months (Figure 1a & b). He had been in contact with his GP on a number of occasions and was advised to apply mild topical steroids and class 2 stockings. However, the area of eczema was increasingly weeping, so he was finding that the stocking was sticking to the skin and causing trauma on removal. He described terrible pain and a feeling like his skin was being torn apart with each step he took, this pain was having huge impacts on his quality of life and affecting his ability to work. Holistic assessment was undertaken including ABPI, which showed there was no evidence of peripheral arterial disease. The skin and limb had signs of venous insufficiency and he had evidence of varicosities around his short saphenous vein, a diagnosis of venous eczema was established. The patient was placed into the Andoflex UBX, with the zinc layer being placed in direct contact of the irritated and weeping skin, due to the volumes of exudate an absorbent pad was placed over the zinc layer prior to the application of the second compressive layer. As soon as the bandage was applied the patient reported how comfortable the bandage felt and the cool nature of the zinc contact layer provided instant relief to the irritation and pain he had been suffering from – he described the bandages as ‘heavenly’.

The patient was reviewed a week later after the system had been in place for a full 7 days. The area of irritation had improved and the exudate levels had reduced substantially (Figure 2a & b). The patient reported that in the last 7 days he had been able to walk without any pain, and been able to return to work. There was still some evidence of eczema so the bandage was reapplied for a further 7 days, this time without the requirement of application of absorbent pad.

The following week the patient was reviewed, and after having Andoflex UBX for only 2 weeks the eczema was completely settled and the skin healthy (Figure 3a & b). The patient was obviously very pleased with the outcomes and he reported Andoflex UBZ as a miracle treatment, which he wished he had been offered months ago. The patient was advised about the need of continual compression to prevent recurrence of symptoms and was referred for venous imaging to assess for need for venous intervention to reduce overall risk of recurrence.



Figures 1a and b. At initial assessment



Figures 2a and b. After 1 week of treatment



Figures 3a and b. After 2 weeks of treatment

Table 1. CEAP Classification of chronic venous disease

Classification	Description
C, Clinical (subdivided into A for asymptomatic, S for Symptomatic)	
x	
0	No venous disease
1	Telangiectases
2	Varicose veins
3	Edema
4	Lipodermatosclerosis or hyperpigmentation
5	Healed ulcer
6	Active ulcer
E, Etiologic	
Congenital	Present since birth
Primary	Undetermined etiology
Secondary	Associated with post-thrombotic, traumatic
A, Anatomic distribution (alone or in combination)	
Superficial	Great and short saphenous
Deep	Cava, iliac, gonadal, femoral, profunda, popliteal, tibial and muscular veins
Performer	Thigh and leg perforating veins
P, Pathophysiological	
Reflux	Axial and perforating veins
Obstruction	Acute and chronic
Combination of both	Valvular dysfunction and thrombus
<i>Source: Eklöf et al (2004)</i>	

al, 2011). There have been many patient reported benefits of using topical zinc these include soothing of irritated skin, pain reduction and a cooling sensation when the impregnated bandages are applied to the limb (Simon and McDermott, 2013; Smith et al, 2014).

VEHICLE OF ZINC

The delivery vehicle through which the zinc is applied can have a profound effect on the amount and rate at which zinc is absorbed, which will impact on the influence it can have on the wound microenvironment. Bandages impregnated with zinc have been used since 1854 (Maher, 2015) and these were the main component of the Unna boot which was first described by Dr Paul Gerson Unna, a 19th century dermatologist and remains a popular choice for the treatment of venous ulceration in Europe and America, but are not widely used in the UK.

Traditionally, to make paste bandages, zinc was applied to cotton layer. These paste bandages were once widely used in the UK to treat skin conditions related to venous disease but have become unpopular in recent years. This is thought to be as a result of problems with application (Stephen-Haynes and Callaghan, 2015). Practitioners have reported disadvantages in using paste bandages including the messy application and the unusual herringbone application (Smith et al, 2014). Paste bandages are applied in a herringbone, overlapping pleating application, this is required to prevent reduction of blood supply due to the bandages constricting as they dry out. Once the zinc bandages dry out, there can be problems with the bandages adhering to the fragile skin, which can cause trauma on removal.

ANDOFLEX UBX

Andoflex UBZ bandages are very different to the

traditional zinc paste bandages, as the zinc oxide is incorporated in the first layer of the bandage, eliminating the need for additional application layers. It is the first and only compression bandage system that has been designed for patients with skin irritation from venous hypertension, eczema, and contact dermatitis.

Andoflex is a low-profile 2 component compression bandage system, the main component is a foam bandage which is impregnated with zinc, this foam layer replaces the usual wool layer which can shed fibers and irritate the skin, additionally it eliminates the use of cotton stockingette liners, which can be an additional cost in the patients treatment plan. The foam layer has the ability to absorb approximately 200g of exudate (Lullove and Newton, 2013). The second layer provides the compression required to reverse the venous hypertension and reduce oedema that aids venous leg ulcer healing. Andoflex UBZ has been shown to clinically improve venous eczema. Stephen-Haynes and Callaghan (2015) undertook a series of clinical evaluations and reported that 28 out of 30 patients' skin improved as a result of using Andoflex UBZ.

CONCLUSION

Skin conditions are common in people with venous ulceration and the topical application of zinc can provide symptomatic relief from skin discomfort and itching, whilst simultaneously improving the condition of irritated areas of skin. Andoflex UBZ offers a unique method of topical zinc application and delivers distinct advantages over other zinc paste bandages as it combines the topical zinc with compression therapy. This allows for the application of topical zinc without the requirement for additional products, which reduces costs and nursing time required. Andoflex UBZ is an effective and reliable option for the treatment of venous eczema.

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