

# PODIATRIC SPORTS DERMATOLOGY: Cold Weather Sports

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## INTRODUCTION

At least one-fourth of the podiatric clinical examination typically involves dermatologic evaluation. However, sports medicine topics tend to focus on musculoskeletal and biomechanical deficiencies. Because of the large volume of dermatologic disorders related to athletes, this update chapter will focus only on cold weather sports. In general, winter sports have the advantage of largely being noncontact and thus, are at less risk for bacterial and viral infections compared with contact sports. More common injuries include friction and thermal complications. I will highlight a few of these conditions as they relate to winter sport athletes.

## FRICITION INJURIES

### **Athlete's Nodules**

In general, the term athlete's nodules refer to any reactive benign hyperplastic growth composed of excessive collagen within the dermis, that occurs secondary to sports-related repeated trauma.<sup>1</sup> The most typical areas in the lower extremity are the knees, anterior tibia, and dorsal aspect of the foot. They present as typically nonpainful, skin-colored nodules at areas of chronic pressure.<sup>2,3</sup> They may be difficult to distinguish from elastomas, foreign body reactions, subcutaneous cysts, gouty tophi, granuloma annulare, keloid, rheumatoid nodule, and bursitis depending on the location of the nodule when seen in the feet.<sup>1</sup> Therefore, a punch or excisional biopsy is recommended for definitive diagnosis and will demonstrate a collagenoma.<sup>1</sup> Keratolytics such as urea-based medications will only decrease the hyperkeratotic portion of the lesion, thus an intralesional steroid injection or topical steroids should be considered and will often improve the lesions's size or irritability. The more definitive treatment for full resolution is surgical excision of the nodule.<sup>1,3</sup> The key to prevention is properly fitted shoe gear, and any ill-fitting shoe should be modified or discarded. Any athlete can acquire this lesion, however it has been most commonly associated with football, surfing, canoeing, and cycling.<sup>1</sup>

### **Pseudonodules**

Pseudonodules (know as "skate bite" in hockey) are formed by chronic pressure and friction in tight skates or shoe gear, particularly at the dorsal aspect of the feet. They appear as a pseudobursa that occurs at the area of greatest friction and quickly resolves upon discontinuation of the ill-fitting shoe or skate.<sup>1</sup> In contrast, athlete's nodules do not resolve spontaneously, despite discontinuation of the shoe gear.<sup>1</sup> Theoretically, any athlete requiring shoe gear can develop pseudonodules, called "skate bite" by hockey players or "Nike nodules" by runners.<sup>1</sup> Prevention focuses on being properly fitted for skates or other shoe gear based on foot-type and shape and shoe-lace techniques to avoid prominent bony areas on the foot.

### **Abrasions**

Abrasions occur from the skin rubbing against a surface causing damage to the superficial dermal papillae and pinpoint bleeding.<sup>1</sup> Skiers are prone to skin abrasions over the mid-tibia due to leaning into rigid ski boots. Skiers can prevent anterior shin abrasions by placing additional padding to the area, and being properly fitted with their boots. The abrasion should be cleansed with lukewarm water and antibacterial soap. Hydrogen peroxide and scrubbing the wound should be avoided as these can cause increased damage.<sup>1</sup> Local wound care to the abrasion should focus on keeping the wound moist such as with petroleum jelly or a hydrogel. As a side note, Neosporin may cause an allergic contact dermatitis in some people causing an itchy geographically-defined rash in the area of topical application.<sup>1</sup> Thus, Neosporin use is generally avoided in uncomplicated abrasions.

## THERMAL INJURIES

### **Cold Urticaria**

Cold urticaria presents as pruritic, small, erythematous, and edematous papules approximately 1- to 5-mm in dimension in an area exposed to the cold environment.<sup>1</sup> Systemically, loss of consciousness has been reported. Any athlete exposed to cold water or cold weather conditions

may experience cold urticaria, although it is typically discovered in childhood. Confirmation is by ice cube placement on the skin for 5 minutes. A hive develops in this area once the area rewarms. Treatment includes antihistamines orally.<sup>1</sup> Prevention includes protective clothing, and if skin exposure is unavoidable, oral cypromethadine hydrochloride is the antihistamine of choice.<sup>1</sup>

### **Frostbite and Frost Nip**

Any winter sport athlete is at risk for frostbite, but particularly high speed sports like skiers, ski jumpers, lugers, speed skaters, and snowmobilers are affected. Developing frostbite has as much to do with wind, sweat, time period outdoors, and the host person as it does the outside temperature. Certain medications, alcohol, and too frequent showering also can predispose one to frostbite. Nearly 60% of frostbite cases involve the lower limbs, particularly the foot and hallux.<sup>1</sup> Skiers especially can experience constriction at the dorsal boot crease, this coupled with boots that often lack insulation, can lead to frostbite or frost nip. Other ways of obtaining superficial frostbite include over-application of cold packs or ethyl chloride spray.<sup>1</sup>

Frostbite is the severest form of hypothermal injury leading sometimes to loss of toes from cold-induced necrosis. Frost nip is the more common cutaneous injury resulting from hyperemia, and is essentially superficial frostbite presenting as blue or white discoloration, numbness that can last hours or days, swelling at the tips of the toes, and pain.<sup>2</sup> Loss of pain and skin pliability can indicate deep frostbite.<sup>1</sup> Vascular damage can be assessed by Doppler exam or bone scan.<sup>1</sup> Prevention involves layering of clothing, because air is trapped between the layers providing further insulation.<sup>4</sup> The outer layer is often of a wind resistant material and the inner layers should include moisture wicking socks and clothes. In addition, over excessive falling and wearing jewelry should be avoided. Warming packs can be used in boots, but should be used sparingly to avoid a burn.<sup>1</sup> Face washing should be avoided till after cold-exposure as the washing removes the body's sebum, which acts as an insulator for the skin. In addition, lotion, oils, or heavy make-up should be avoided. Cream-based sunblock however protects the skin from both the cold and sunburn.<sup>2</sup>

Treatment involves avoiding more trauma, rubbing, or freeze/thaw cycles. Wet clothing should be removed. Frost Nip or superficial frostbite may simply necessitate rapid indoor warming.<sup>2</sup> For more severe cases of frostbite, the skin should be placed in 104 to 108 degree water for 15 to 30 minutes which is often painful requiring narcotic

analgesics.<sup>1</sup> Erythema, hypersensitivity, and blistering is typical post-immersion. Clear bullae may be debrided, but avoid debridement of hemorrhagic bullae. Tetanus prophylaxis, nonsteroidal antiinflammatory drugs, and intravenous penicillin G 500,000 U every 6 hours for 3 days are essential for severe cases.<sup>1</sup>

### **Trench Foot**

Trench foot or immersion foot is essentially frostbite caused by a wet foot exposed to a cold environment for a prolonged time. If complicated by fungal infection, it is called jungle rot. Prevention, treatment, and clinical evaluation are similar to frostbite.<sup>1</sup>

### **Skier's Cold Purpura**

There has been a rare reported case of a cross-country skier with purpura at the shins after being exposed to extremely cold temperatures (-25 degrees C). Cross-country skiers are particularly susceptible due to periods of prolonged cold exposure.<sup>1</sup> Trauma and cryoglobulins or cryofibrinogen skin disorders must be ruled out with serologic tests.<sup>1</sup> No treatment is performed, and prevention is key. Biopsy of the area is diagnostic.

### **Chilblains or Pernio**

Pernio (also known as chilblains) is a type of cold-induced injury that is most prevalent in young female athletes participating in winter sports. In the lower extremity, this will present as severely painful purple to red cyanotic, well-defined papules, plaques, nodules, bulla, or ulcers at the dorsal or plantar distal toes indicative of a chronic vasculitis with a flaring after prolonged cold and wet exposure.<sup>1,2</sup> The lesions can persist for days or weeks.<sup>4</sup> Less commonly, it can be found at the ears, nose, and dorsal fingers. It is common in sports such as in skiing, tobogganing, mountain climbing, ice fishing, or any other high-altitude sport.<sup>4</sup> Biopsy shows papillary dermal edema and superficial and deep lymphocytic vasculitis.

Treatment involves rewarming the toes or other affected area. Topical nitroglycerin can reduce the time to healing and reduce pain and systemic pentoxifylline is sometimes used for severe cases. Prevention focuses on appropriate clothing that limits exposure to cold and keeps the toes dry. Overly constrictive clothing or boots should be avoided. Wicking socks are important as the inner layer of layered socks.<sup>1</sup> Warm woolen socks should be worn while indoors and overnight to allow the toes to recover and rewarm.

## RELATED DISORDERS

### Hot Tub Folliculitis

Hot tub folliculitis (*Pseudomonas folliculitis*) is the most common gram-negative bacterial infection in athletes.<sup>3</sup> However, any athlete or nonathlete is equally at risk for *Pseudomonas folliculitis*, particularly if they have an abrasion or laceration allowing for bacterial entry and utilize whirlpool physical therapy or a frequently used hot tub or warm swimming pool. Chlorine levels lower due to high temperatures, turbulence, and heavy use thereby allowing *Pseudomonas* proliferation. The high temperature of the tub dilates the follicles. Of note, pustular wound cultures may or may not grow *Pseudomonas*, therefore diagnosis should rely more heavily on the history and physical examination.<sup>3</sup> The athlete will present 1-5 days post-hot tub or whirlpool exposure complaining of a itchy rash with red or green papules or pustules at the submerged body part with sparing of the palms and soles, typically

lasting for a week with or without systemic symptoms.<sup>1,3</sup> The folliculitis resolves spontaneously in a week provided use of the hot tub is discontinued and antihistamines may be utilized as needed for the pruritus.<sup>1</sup> Oral antibiotic treatment is reserved for the immunocompromised patient. Topical antibiotics should be avoided as they may be related to recurrence.<sup>3</sup> Prevention is focused on maintaining adequate chlorination and limiting the number of people in the hot tub or whirlpool.

## REFERENCES

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