

FOCUS ON NAIL AND SKIN HEALTH

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I've come to learn through the years that, just as the healthcare community had historically neglected the surgical needs of the feet, modern medicine has at times banalized the biomechanical nuances of foot health, healthcare professionals have also over-simplified, and in some instances totally overlooked the appropriate management of lower extremity skin disease. It's been my experience that there are "traditional" conditions of the foot, which are addressed by podiatric medical professionals, to wit, verrucae, tylomata, nail unit dystrophy, etc., but more mainstream dermatological conditions are often dismissed.

Though the integument is but one organ, the acral surfaces boast structural and physiologic properties that are largely unique as compared to alternate sites. Volar surfaces have a markedly thickened epidermis relative to other anatomic locations. In addition, they disclose a thick and compact stratum corneum, an extremely deep and dense reticular dermis, and an entirely different compliment of adnexal structures. These distinguishing features play a significant role in the bizarre presentations exhibited by various diseases when arising on the skin of the volar surfaces, and its predilection for dermatitides and forms of neoplasia that are unlike alternate anatomic sites. These properties also play a role in the need for customized therapeutic approaches when managing such disease processes.

Inflammatory dermatological conditions

The wide range of inflammatory, or non-neoplastic, skin diseases that affect the volar surfaces are often insufficiently studied and under-appreciated. In the United States, students of podiatric medicine are often led to believe that dermatitis involving the skin of the foot is by default tinea pedis. Many physicians maintain this mindset for day after day, and year after year, without ever coming to the realization that up to 2/3s of the clinically suspected tinea pedis is in actuality something else. Acral eczematous dermatitis, allergic contact dermatitis, dyshidrotic eczema, id reaction, pitted keratolysis, psoriasis, and lichen planus, can all have features that resemble tinea pedis. In the webspaces, tinea may be indistinguishable from Candida intertrigo, erythrasma, and spongiotic dermatitis (eczematous and allergic contact dermatitis).

All four of the traditional spongiotic dermatitides may be found on acral surfaces (eczematous/nummular dermatitis, allergic contact dermatitis, dyshidrotic eczema, Id reaction). Acral Eczematous Dermatitis may begin with erythema and vesicle formation, but by presentation, much more chronic findings are usually seen, with lichenification and fissure formation. Acral eczema is far more likely to affect the weight bearing surfaces, and a classic patten is that of a horseshoe around the periphery of the heel. This condition worsens during the winter and may be recalcitrant to non-aggressive therapy. Dyshidrotic eczema has features in common with acral eczematous dermatitis though it tends to affect the digits and forefeet, and exhibits a far more cyclic course. Allergic contact dermatitis is a delayed type hypersensitivity reaction. In most instances, this eruption correlates well with the pattern of allergen exposure; however, because of the use of barriers such as socks, and the influence of pressure and sweating patterns, affected sites may not appear to correlate with a particular allergen. Identification and removal of the allergen is the key patient management. Patch testing may be invaluable in this context. Id reaction occurs as the result of a tinea pedis infection. Reactants liberated by leukocytes at the site of the superficial fungal infection are picked up by the lymphatics and deposited in the skin at an alternate location, resulting in an inflammatory response. This condition is cured upon theeradication of the primary infection.

Acral Psoriasis is possibly the most under-appreciated inflammatory skin condition faced by podiatric clinicians. Though from a pathogenesis vantage point, psoriasis on volar surfaces is similar to that elsewhere, in many ways acral psoriasis is its own animal. Its presentation may range from that

of an acute pustular reaction, to a chronic plaque form. Unlike psoriasis arising on other skin surfaces, acral psoriasis is confined to the volar surfaces in the vast majority of cases. In addition, plaques on volar surfaces may be less distinct. In some instances, the primary morphology is not that of a plaque at all, but rather, a scaly erythematous patch, often preferentially affecting the medial arch. Because the clinical features vary widely, and the histopathologic findings may not be entirely characteristic of psoriasis, this diagnosis is often delayed for extended periods of time. Acral psoriasis may be both extremely disabling, and recalcitrant to conventional psoriatic therapy.

In keeping with the theme of conditions that are underappreciated and often misdiagnosed, acral lichen planus should be mentioned. When involving volar surfaces, lichen planus is usually of the hypertrophic subtype. This is significant in that this subtype tends to be more severe and progressive than conventional lichen planus. Acral lichen planus may present as nodules, bullae, or plaques. It may be limited to the digits, or may produce a diffuse keratoderma. Unlike acral psoriasis, acral lichen planus is usually not limited to the volar surfaces, though it may be most pronounced in those locations. As is typical of acral dermatoses, this condition may be challenging to manage, often requiring a combination of topical therapies and/or strong immunosuppressive agents.

Tinea pedis does occur, but this is far from the only superficial skin infection of the foot. Infections such as pitted keratolysis (caused by *Corynebacterium* sp., *Kytococcus sedentarius*, *Actinomyces keratolytica*, or *Dermatophilus congolensis*), Erythrasma (caused by *Corynebacterium minutissimum*), and cutaneous candidiasis (most commonly caused by *Candida albicans*) are also limited to the stratum corneum, and are all common to the skin of the feet. The latter two have a distinct predilection for the skin of the webspaces, where they may present as nonspecific maceration.

Neoplastic Dermatologic Conditions

As aforementioned, the acral skin is affected by a largely unique compliment of neoplastic processes. This is particularly true of its involvement by malignant neoplasms, related to both the inherent properties of acral skin, and the lack of sun-exposure secondary to ambulation and the use of shoe gear. Whereas most forms of skin cancer arise as the result of persistent sun exposure, this is not necessarily true of the skin of the foot. Rather, skin cancers in the foot may be related to the effects of oncogenic viruses, exposure to chemical carcinogens, chronic inflammation, or a genetic predisposition.

Malignancies of the pedal skin have several features in common, for instance, most are painless, and in many instances, a history of recurrent cracking, bleeding, or ulceration may be elicited from affected persons. It is not uncommon for patients to discover a neoplastic process as the result of unrelated trauma near the affected site, particularly true amongst geriatric patients. However, in many instances, patients remain unsuspecting, leaving the neoplasm in question to be identified by a perceptive physician. Some of the most common cancers of the lower extremity are:

Squamous Cell Carcinoma

Squamous cell carcinoma is the most common form of cancer on the skin of the feet. Most subtypes are locally destructive, without significant metastatic potential; however, when advanced, these neoplasms may eventuate in metastasis. This form of cancer often begins as a small scaly bump or plaque, which may appear inflamed. Initially, many are misdiagnosed clinically as superficial palmoplantar warts, particularly those tumors that are better differentiated. Sometimes there is a history of recurrent cracking, bleeding, or ulceration. Like most malignancies, squamous cell carcinoma is painless, though it may be intermittently itchy. Squamous cell carcinoma in-situ may create a plaque that extends over large areas, resembling tinea pedis, psoriasis, or a spongiotic dermatitis. Local excision with 3-4mm margins is the standard of care for neoplasms <2cm.

Basal Cell Carcinoma

Basal cell carcinoma is the most common malignancy on sun-exposed skin surfaces; however, its incidence in the feet is significantly lower. This form of cancer is amongst the least aggressive malignancies in the body, causing local destruction, but almost never metastasizing. Basal cell carcinomas may present themselves as pearly bumps or patches, which might exhibit a central surface ulceration. Telangiectatic vessels are classically described coursing over their pearly surfaces, however, such is far less common on the skin of the lower extremity. In our experience, the most commonly seen variant of basal cell carcinoma in the skin of the lower extremity is the superficial (multicentric) subtype. Rather than forming the "textbook" nodules attributed to basal cell carcinoma, this subtype forms shallow erythematous plaques. On the skin of the lower extremity, basal cell carcinoma may resemble various benign tumors or non-neoplastic ulcerations. The standard of care is complete excision with 3mm margins.

Malignant Melanoma

Malignant melanoma is one of the most deadly malignancies known to man. Because there is no effective medical treatment, this neoplasm must be detected early to ensure patient survival. Melanomas are not uncommon on the skin of the feet; in fact, they are actually over-represented on the palms and soles relative to most other locations of the skin. This is particularly true of dark-skinned individuals.

Malignant melanoma has a wide array of potential appearances, leading to its nickname "The Great Masquerader". These malignancies commonly begin as a brown-black plaque or patch. They may resemble a common mole; however, close inspection will usually demonstrate asymmetry, irregular borders, alterations in color, or a diameter of greater than 6mm. Melanomas arising on acral surfaces may exhibit a protracted radial growth phase giving many a large diameter at diagnosis. Though roughly 2/3s of the melanomas that arise on the volar surface are tan-dark brown, the remaining cases lack pigment entirely (amelanotic). Such nonpigmented tumors are characteristically pink or red, often resembling granulation tissue, or a pyogenic.

The Role of Physicians of the Lower Extremity in the Detection and Management of Skin Disease

Dermatology, as it applies to the distal lower extremity, can stand alone as its own subspecialty. Because many mainstream clinicians, even some with dermatological subspecialty training, fail to appreciate the nuances of skin disease as it presents in the foot, it is imperative that lower extremity clinicians exert their expertise in this arena. This is a responsibility that cannot be overlooked, and should not be underemphasized.