

Based on the talk on "Tropical diseases of the foot" In the Course on Tropical diseases held in Tokyo at the XVI International Conference of Dermatology.

GLAXO ORATION

V. R. MEHTA

A brief knowledge of some habits of the Indian people is a *sine qua non* for proper evaluation of disorders that affect their feet.

A large section of the population does not wear shoes. Both men and women either walk with bare feet, or wear sandals made of leather, rubber or plastic. Usually a thong separates the great from the other toes.

Many married women indicate this status by wearing rings on their toes. These rings are made of silver, nickel or an amalgam of several metals.

Sitting cross legged on the ground or a wooden plank while eating, praying or during transcendental meditation is common amongst Hindus, and subjects the skin over the lateral malleoli and base of the fifth metatarsal bone to enormous pressure. The Muslim posture for praying being different, the dorsal surface of the foot and the anterolateral aspect of the leg are thus affected.

It is easy to see that anatomical changes in this exposed skin are inevitable, and diseases occur because of these influences.

XI Annual Conference of I.A.D.V.L.,
Mangalore. The Foot - An Exotic site of
Dermatologic Romance
Department of Dermatology, Venereology,
Leprosy, LTMM College & LTMG
Hospital, Bombay, India.

Bare-foot walking causes irregular hyperkeratosis of the soles, fissuring on the heels and wherever natural creases exist. Should such stratum corneum be subjected to intermittent hydration and exposure to detergents (occupation in homes and working in rice fields), maceration and deepening of fissures is usual. Being painful, weight bearing is altered and corns as well as callosities complicate the hyperkeratosis. The depth of fissuring also increases with desiccation, as in winter due to lower humidity, and neuropathies causing reduced sweating. Deep and wide persistent fissures may thus be the earliest manifestation of leprosy. Secondary infection is an important common cause of ileo-femoral thrombophlebitis leading to secondary varicose veins and their consequences. Sometimes an underlying diabetes mellitus may be thus unmasked.

Splinter injuries are very frequent and cause a variety of disorders.

- (A) Infections important from our view point are discussed below:
- (i) Tuberculosis: Tuberculosis may occur on any part of the foot and lower 3rd of the leg. When presenting with a discoid appearance on the sole it is easily mistaken for a plaque of psoriasis or an eczematous process, because of scaling and mild oozing. Contrary to its expected indolent behaviour

it may spread rapidly and cause bone destruction. A combination of clinical suspicion, tuberculin test and histologic examination is adequate for diagnosis. It is important to remember that the histopathology of verrucous tuberculosis may lack classical tubercles of lupus vulgaris.

- (ii) Mycetoma: The classical picture needs no description. It is pertinent only to point out that a single foot may harbour *A. boydii*, a *Streptomyces* species and staphylococci, as happened with a patient we studied. Tuberculosis of bones of the feet may masquerade mycetoma and cause diagnostic difficulty.
- (B) Foreign-body granulomas and pseudo-cancerous lesions: The heel and dorsum of the foot seem to be favourite sites for these disorders. In both, epidermal invaginations into the dermis continue to form keratin and thus, large cysts may rupture to perpetuate the "foreign body reaction". Though surgical excision and skin grafting are the only answers, the foot and lower 3rd of the leg are bad sites for grafts as discussed below:

Bare foot walking tends to cause splaying of the toes with better aeration of the webs, thus reducing the incidence of malodorous intertriginous dermatitis (persistent edema as in treated or untreated lepromatous leprosy and foot deformities are obvious exceptions). This, however does not prevent development of verrucae, tuberculosis and keratoacanthomas. Occasionally an interdigital lesion may be found to extend to the dorsal surface of the foot as a well defined scaly or edematous plaque with diminished sensation. This would normally be diagnosed as representing a lesion of ringworm or psoriasis but in

tropical countries it may prove to be that of tuberculoid leprosy. A biopsy is the only answer as the foot may exhibit sensory impairment for reasons discussed below.

At this point it is worthwhile to say that trophic ulcers beneath the head of the 1st metatarsal bone do not always heal with excision of the latter.

The environmental hyperkeratosis described above is quite different from the heredofamilial keratodermas. We found Ainhum complicating a Vohwinkel variation in an elderly subject. Ainhum due to fibrous bands may respond to triamcinolone infiltration, but that associated with hyperkeratosis does not. Diffuse plantar keratoderma with compact hyperkeratosis becomes grossly aggravated by barefoot walking and bony deformities develop early in life. In one such patient typical pes cavus, without neurologic disease, was observed. It is of interest to note that these disorders do not respond to modulators of keratinisation in the gel preparations² recently described.

Rings on the toes of women cause contact dermatitis and pigmentation of the dorsal surface of the toes. Because these changes are common, malignant melanomas tend to be neglected until they reach a large size. Paronychia arising in such dermatitis, if neglected, may end up with osteomyelitis of the underlying bone.

Footwear causing disease is well known and the transverse strap of the sandal which covers the dorsum of the foot often leads to dermatitis and leucoderma. Of greater significance is that it modifies a variety of skin disorders affecting this region. When vitiligo of the dorsum of the foot is being treated with oral psoralens the area covered by the strap retains its constitutive pigment, whereas the rest of the foot becomes tanned. Should the vitiligo not respond to this treatment

a trichrome form is simulated. We have on record cases of tuberculoid leprosy spreading under the strap from the dorsal to the plantar aspects and mimicking contact dermatitis or psoriasis.

Pressure over the lateral malleolus because of the sitting posture (ref. above) leads to hyperkeratosis, underlying bursa formation, secondary infection of this space and sometimes calcification. (A motley of tumors, xanthomata and calcified guinea worm constitute the mistakes in diagnosis). The surrounding skin becomes pigmented and shows sensory impairment. Similar alteration may be noticed on the foot, and to a lesser extent on the lower 3rd of the leg (ref. above). It is for this reason that many dermatoses in this region exhibit sensory impairment (ref. above). It is also for this very reason that a very rare form of leprosy, "the primarily pigmented tuberculoid leprosy," studied by the author has escaped attention. Instead of hypopigmentation this disorder is characterised by progressive pigmentation, sensory loss and atrophy of the skin. The pigmentation is due to abnormal behaviour of melanocytes at the epidermo-dermal junction. With treatment hypopigmentation replaces the hypermelanosis. Healed lesions of vasculitis, cutaneous diphtheria, herpes zoster and scars of deep burns are other common causes of sensory loss on the feet and legs.

It is of interest to note that grafted skin exhibits sensory loss for long periods and total sensory recovery is an exception rather than the rule. The author believes that two factors are involved in breaking down of skin grafts of the legs and feet, (a) sensory loss causing unnoticed injuries and (b) loss of vasomotor influences in the graft leading to edema and thus compromising its blood supply. Large broken-down grafts can be made to heal under simple dermatologic care,

and kept healed with external pressure applied with pads and elastocrepe bandages. The earliest change when these are discontinued is edema under papyraceous skin; breakdown occurs later at points of instability.

A peculiar variation of seabather's dermatitis is occasionally seen on the legs of (usually) women because they walk fully clothed in shallow sea water during summer in Bombay. The rash which occurs a few hours later, is heralded by a burning sensation followed by streaks of erythema, edema and vesicles around the legs wherever clothes stick to them. Histologically it resembles an acute eczema. Apart from this bizarre presentation, a variety of insect bites giving prurigo nodularis type reactions, cockroach bites causing periungual jagged ulcers and those producing a Koebner effect are not unusual. It seems that "nonspecific recrudescences" of scabies may occur with bites of other sarcoptic mites indicating an antigenic similarity between them³.

In conclusion, the bare-foot state, sitting habits and footwear produce anatomic and physiologic changes on the feet and legs. They lead to pathological processes or modify those that pre- or coexist. Finally, sensory evaluation of a dermatosis of the foot must be made with a knowledge of normal variation in the region of the world from which the foot comes.

References

1. Mehta VR: Keratoacanthoma with osteolysis, *Ind J Dermatol Venereol Leprol*, 1980; 46: 360-63.
2. Baden HP: The Management of Hyperkeratosis in Recent Advances in Dermato-Pharmacology, Ed Frost P, Gomez EC and Zaias N, Spectrum Publications Inc, New York; 1978; 210: 242.
3. Mehta VR: Cutaneous reactions to insect bites-sarcoptes scabiei not excused, *Ind J Dermatol Venereol Leprol*, 1980; 46: 255-259.