Lep. Rev. (1964), **35**, 67/272

The Problem of Plantar Ulcer

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Ulceration of the feet undoubtedly causes more unpleasantness for patient and medical attendant than any other complication of leprosy. Many papers have been written on the subject, and many types of treatment have been recommended; nevertheless foot ulcer remains a major problem.

The purpose of this symposium is to summarise recent understanding of the condition, and to show that present knowledge makes it possible to cure foot ulcer, to prevent its recurrence, and, better, to recognize the danger before ulceration actually takes place.

Foot ulcers cannot be understood unless it is clearly recognized that there are several types of ulcer due to different causes, and needing different treatment. Much of the frustration that is caused by these lesions is due to confusion about classification. The term also includes ulcers around the edge of the thick plantar skin, that is, on the side of the foot.

CLASSIFICATION

The following types of ulcer occur on the sole of the foot in leprosy:

A. *Infected Wounds and Burns* (Fig. 1)

These are caused by thorns, sharp stones, or projecting nails inside footwear. In all cases, banal pyogenic infection may occur and endanger the

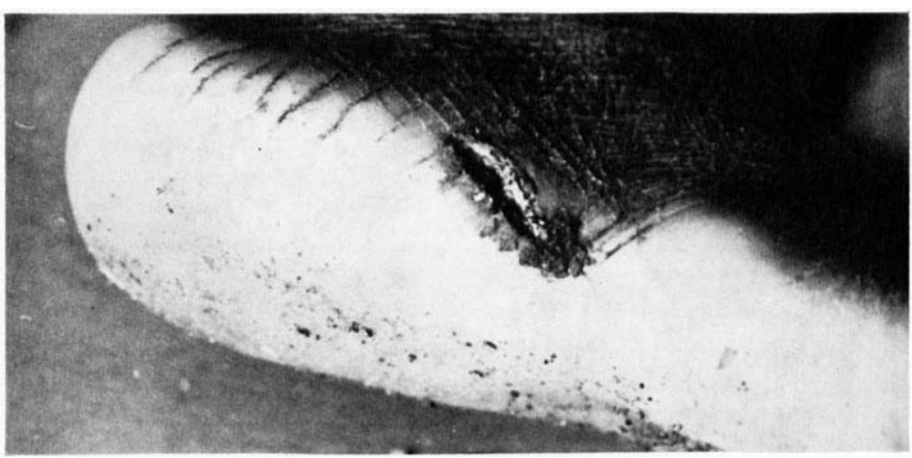

FIG. 1

Foot Ulcer due to Infected Wound

This ulcer is due to infection of a cut. It closely resembles the lesion which occurs when necrotic material from the deep tissues of the sole reach the skin surface at the margin of the thick plantar skin. This ulcer is a bit posterior for a true mid-lateral lesion and too far forward for a true heel lesion.

skin or deep tissues of the foot. These do not differ from similar lesions in non-leprosy patients, but may progress further because of loss of sensation; the patient does not seek early treatment, and will continue to walk on an infected foot.

B. *Plantar Ulcers*

This term is used for a special type of lesion that occurs in any neuropathic foot whatever the cause – diabetic neuritis, tabes, syringomyelia, etc. It is described in detail in the following papers. Sometimes it is called 'neuropathic ulcer', 'trophic ulcer', or 'pressure ulcer' but the above term is commonly used in modern literature. Since the lesion is related to walking it does not occur elsewhere than on sole of the foot, and it does not occur in neuropathic feet where walking is impossible.

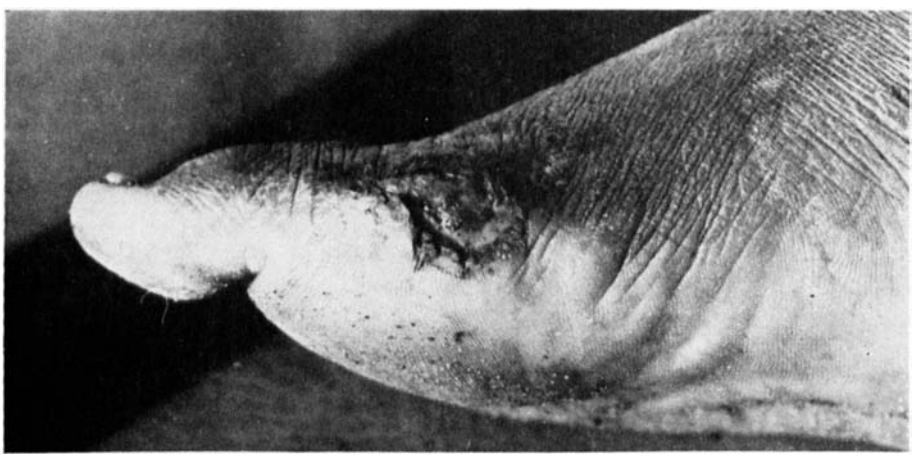

FIG. 2

Friction Ulcers

This ulcer was caused by friction of a sandal strap but it closely ressembles the lesion that occurs when necrotic material from beneath the head of the first metatarsal bone finds its way to the surface at the margin of the thick plantar skin.

C. *Friction Ulcers*

Ulceration is commonly due to friction damage. On the *dorsum of the foot*, and usually over the toes or metatarsal heads, ulcer is commonly due to the rubbing of a sandal strap, or the toe-piece of unsuitable footwear (Fig. 2). On the *sole of the foot*, ulcers occur on the prominent part of the deformed foot and are due to a combination of friction and pressure (see previous paper).

Toe-tip ulcers occur in drop-foot where the toes are scraped along the ground with each step. The sole ulcers due to friction-pressure are described in detail in the section on Complications.

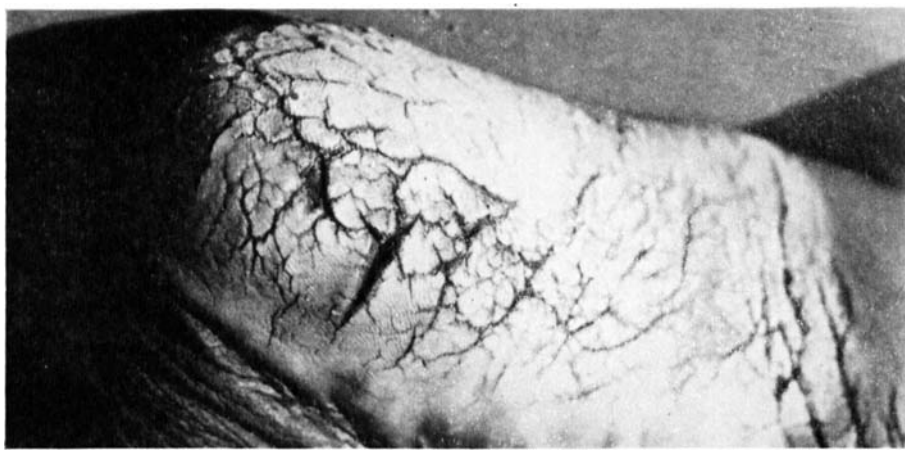

FIG. 3
Cracked Soles
This lesion, of unknown etiology, is common in Africa. It is therefore not infrequent in leprosy patients, and in this case an infected crack at the heel can cause confusion with the ulcer caused by the breakdown of the skin where necrotic material from the deep surface of the calcaneum reaches the surface. When both lesions occur, the necrotic material may make use of the crack to reach the surface.

In addition to the above, ulceration may occur between the toes, due to fungus infection, or in deep cracks round the sides of the heel – this latter of unknown cause (Fig. 3). These ulcers may occur in any patient, leprosy or not, and are not further considered here.

A careful study of the following pages will show that foot ulcer should rapidly become a thing of the past, and the associations of 'ulcer shed', smell, flies, lysol, and large quantities of cotton wool and bandages, be nothing but unpleasant memories. Certainly, few things give more satisfaction to a patient and to the medical attendant, than the permanent healing of a foot ulcer.

SPECIAL DIFFICULTIES

The common occurrence of plantar ulcer in leprosy is responsible for special problems that can be considered under four headings – medical, practical, organizational and psychological.

A. *The Medical Problem*

Why does plantar ulcer occur? Why does it heal by any of at least 40 different methods? Why does it relapse so easily? Can it not be prevented? Happily, we now know the answer to these questions in sufficient detail to make treatment a success. The most important item is the decision as to the type of ulcer; a mistake here will frustrate successful treatment. The problem ulcer is the so-called 'plantar ulcer'. Plantar ulcer will be seen to occur because of the stresses of walking on a foot with reduced nerve

supply; it heals rapidly with any method that reduces walking, intentionally or not; it relapses easily because walking is resumed after the cessation of treatment; its recurrence can be controlled by the use of rigid-soled footwear; and its occurrence can be prevented by regular foot-inspection.

It is not possible to lay down fixed rules for every possible ulcer, so that detailed knowledge of causation, complications and treatment is needed, if failure is to be avoided.

Finally, it is important to know when permanent healing cannot be obtained because of long-standing and severe bone-infection and deformity. Much time can be saved if an inevitable amputation is performed early; on the contrary, it is a serious mistake to amputate a foot that could have been rehabilitated.

B. *Practical Problems*

It is not possible to treat plantar ulcer with satisfaction without some type of rigid-soled footwear. The cheapest is made by local craftsmen, and in most parts of the world wood has proved the best material. In case of difficulty, the wooden soles can be obtained from clog-sole manufacturers. Details of rigid-soled footwear are given later.

An unsolved problem is what to do in areas where there is heavy rainfall and mud, or where the cultivation of rice entails work in water. In these circumstances any type of footwear is a handicap, and it may be that the use of the rigid gait of the bare foot – which can be taught to patients – is the only ultimate solution.

A further practical problem is the provision of adequate below-knee 'legs' for amputation cases. The modern patella-bearing plastic limb is proving a likely solution, but the fitting has to be exact in a patient who is anaesthetic at knee-level, and skill is necessary to achieve this. Nevertheless, the making of such limbs is not beyond the ability of a capable craftsman with sufficient training, and these limbs should be available in every area where a serious attempt is made to solve the 'problem of plantar ulcers'.

C. *The Problem of Organization*

Difficulties of organization arise because of the number of cases that seek treatment in many areas – often a hundred or more a day. The application of systematic treatment with limited staff and material may be well-nigh impossible in these circumstances, and a plan of action must be prepared and followed with diligence to avoid disappointment. In all such situations, the first step is to initiate measures for prevention of new ulcers; otherwise new ulcers appear as fast as the old ones are treated. A suitable plan is outlined here.

(i). Before treatment is begun, *regular foot inspection* must be organized under the direct control of the clinic – monthly at first, but later weekly, of all patients who live nearby. At first inspection is heavy work, but becomes easier as the number of ulcers diminish. The inspector watches particularly for the signs of the pre-ulcerative state, or the necrosis blister,

also for early ulceration which patients tend to neglect, or be unaware of. Absentees must be dealt with firmly.

(ii). At the same time, *a workshop* is organized for rigid-soled footwear. The simple flat sole with rockers may be used at first, but patients will prefer the shaped sole, a pair of which can be made in about three hours by a competent technician.

Many ulcers will heal by the use of footwear alone, and this results in considerable saving in plaster of Paris casts.

(iii). When inspection and sandal-making are begun, *the treatment of ulcers* can be undertaken. To begin with – and when the patients do not yet have confidence in the method – plaster-casts are the best initial treatment; the oedema and pyogenic infection are controlled, and then a plaster-cast will certainly heal the ulcer, if it is maintained for long enough. Later, all uncomplicated ulcers, and many complicated ones, will be treated with footwear alone. Details of treatment are given in a later paper.

If the above scheme is pursued with vigour, it should be possible to close any existing ulcer-shed within three months, and treat new cases in the clinic.

D. *The Psychological Problem*

During effective medical care, there are always a number of cases that do not respond to therapy, or in whom ulcers recur even when the patient says that he wears the footwear all the time. In fact, nothing brings into sharper focus the psychological problems of leprosy than the 'resistant' cases in a foot clinic.

The situation commonly occurs when the patient is aware that the existence of a chronic ulcer will ensure his admission to hospital or a settlement, and that he can rely on food and lodging as long as ulceration continues.

The failure of an uncomplicated ulcer to heal within five weeks, is an indication either that the patient is not wearing his sandals, or that he is walking an inordinate distance daily. In the writer's clinic, patients take advantage of healed feet to walk to a local market three miles away, daily, in order to beg. Newly healed ulcers will not accept this abuse.

Other patients will leave off their footwear to ensure that ulceration continues; one such was found to be sand-papering the healing surface regularly to discourage epithelialization!

It is the writer's practice to discharge from treatment all uncomplicated ulcers that do not heal in six weeks, but a healed ulcer is observed weekly for two months before the final discharge.

Further pyschological problems include the inability to face community life in a village or town, after the protection of a settlement – a condition that has been called 'social atrophy'. An even deeper problem is the aversion that a patient may develop to his own foot when ulceration is prolonged, deformity is considerable and the smell is unpleasant. These

patients will not accept their foot even when it is seen to be healed over a period of months. In such cases, it is surprising how rapidly the mental outlook improves after amputation. This is even more evident, when cheap, but efficient, below-knee limbs are available.

CONCLUSION

Few things improve the morale of patients – and, one might add, of the medical attendant – than the successful treatment of plantar ulcers. This symposium is composed to demonstrate that this is now possible, and that the protection of the anaesthetic foot can be achieved and maintained, with a minimum of equipment and expense, so long as the principles of foot care are practised with determination.