

# Comparative Study of the Effects of Wax Therapy and Foot Soaks on Dry Plantar Skin and Ulcers in Leprosy Patients

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## Abstract

A study to compare the effects of wax therapy and foot soaks on the dry plantar skin was conducted in patients with leprosy. Twenty four patients with varying grades of fissures and callosities were given wax therapy for feet, and 20 similar patients were given foot soaks. Patients given wax therapy felt subjectively much better than those who had foot soaks.

## Key Words

Wax therapy, Foot soaks, Plantar ulcer, Leprosy

## Introduction

Leprosy is a public health problem with a world prevalence of 600,000 cases. Damage to peripheral nerves is a key component of leprosy. The sensory and motor loss that follows is the basis for many of the classical features of this disease, such as skin wounds, cracks, plantar ulcer, clawed hands, foot drop and incomplete closure of the eye (1).

Plantar ulcers are a common feature in leprosy patients. Etiology and pathogenesis of plantar ulcer suggest involvement of nerves (2-4). Nerve damage effects the status of sweat gland function in anaesthetic sole of the feet of leprosy patient (5). Fissure and cracks develop in the dry skin and these get infected over a period of time leading to plantar ulcers. Neoplastic transformation of chronic plantar ulcers in leprosy patients is reported (6). Multiple drug therapy can prevent the onset of plantar ulcers in those

patients who do not have any disability at the time of detection of disease (7).

Foot soaks have been traditionally used for the restoration of the dry skin to its normal level of suppleness (8). Wax therapy for dry feet in leprosy patient has been used in the past and its comparison with foot soaks has also been done (9). We report our experience of superiority of wax therapy over foot soaks in treating fissures and callosities in patients of leprosy.

## Material and Methods

The study was conducted on 44 leprosy patients at Govt. Leprosy Hospital Jammu for six weeks. All patients had anaesthetic feet and were also having fissures and/or callosities. Patients with active planter ulcers and those with infected cracks were not included for the trial. After

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obtaining consent from the patients, they were allocated to either wax therapy or foot soaks therapy. The allocation was performed in random manner with the help of computer generated random numbers. Computer software Epi\_info was used for this purpose. Out of these 44 patients, 24 were given hot wax therapy for feet (paraffin wax with thermostatic machine-temperature below 120° F) once daily for 20 minutes. The technique followed was the same as used before giving wax therapy for hand (9). Another 20 patients were given foot soaks, with 20 minutes of soaking in plain water followed by vaseline application.

The condition of the feet was clinically evaluated at the beginning of the study and the final assessment was done at the end of six weeks. For the purpose of evaluation, the feet were assigned to one of the five grades as described below (8) :

- Grade 0- no fissures or calluses
- Grade 1- few superficial cracks with or without few mild calluses.
- Grade 2- few superficial cracks with or without thick calluses
- Grade 3- many superficial cracks and calluses
- Grade 4- deep cracks and calluses (not infected)

#### Results

The results of the clinical evaluation are shown in table 1.

Table1: Number of feet according to the grade, before and after treatment with wax therapy & foot soaks.

Grade	Wax Therapy		Foot soaks	
	Before	After	Before	After
0	0	16	0	6
1	0	8	0	8
2	12	0	8	2
3	8	0	8	2
4	4	0	4	2

Fisher's Exact Test  $p < 0.027$ . For the purpose of statistical analysis, Grade 0, 1 and Grade 2, 3, 4 are combined together.

Statistical significance in proportion was assessed by the use of Fisher's exact test. A  $p$  value of  $< 0.027$  was considered statistically significant. All the 20 feet with

superficial cracks and thick calluses treated by wax therapy had softening of the calluses and healing of the cracks, where as 12 out of the 16 similar feet treated with foot soaks had similar results. Deep cracks and thick calluses seen in 4 feet treated with wax therapy showed definite healing as against only 2 feet treated with foot soaks.

#### Discussion

Leprosy is the most common condition leading to neuropathic foot problem. Most intractable problem in the rehabilitation of the leprosy patients is the anaesthetic feet and subsequent ulceration with most common site being distal third of foot (10). The patients give following reasons for recurring and chronic ulcer, loss of sensation in that part of part of body (41%), injuries from stones iron nails, glass (31%) and bite by rats (7%) (11). In leprosy patients, the plantar skin gets dry and brittle as a result of damage to the autonomic nerves. It tends to develop cracks, which would admit infection, and form callosities. Hot wax permits sustained heating of the part and relieves pain, thereby making the movements easier. This was experienced by most of the patients. Further, the wax softens the dry skin and makes it supple. Also wax therapy is known to stimulate the sweat glands (especially those which retain their nerve supply) and improve sweat secretion. This leads to resolution and clearing of oedema and may help obliterate superficial as well as deep cracks.

All these effects of wax therapy as a therapeutic modality used in an institution were observed on the plantar skin of leprosy patients in our study and the results were statistically superior compared to those after daily foot soaks for the same period. Wax therapy, though a special technique requiring specific temperature control and other facilities, has definite advantages in treating patients with fissures and callosities. Similar study done in the past has yielded same results (8). Foot soaks method is also a convenient and economical method available in patient's own home. A reduction in ulcer prevalence (60%) by foot soaking at home has been already observed (12).

Recent studies on the comprehensive therapy measures have shown that this is the best way of treating ulcers. In this therapy, the ulcers are first debrided followed by foot soaks or wax therapy and then vaseline is applied to the foot and this is done for 6 weeks and after that the patient is given protective foot wear. The effect of comprehensive therapy measures on patients of leprosy with insensitive feet has been reported in various studies (13-17). In a study, pressure measurements made in patients depicted that peak pressures are significantly lower while walking in all footwear including micro cellular rubber as compared to bare foot walking (18).

It is concluded that wax therapy remains an institutional method of therapy, but recent advances in treatment modalities have extended horizons of treatment for plantar ulcers with techniques like silicone oil implant and exposure to pulsed magnetic fields (19, 20).

#### References

1. Stump PR, Baccarelli R, Mascrow LH et al. Neuropathic pain in leprosy. *Int J Lepr Mycobact Dis* 2004; 72(2): 134-38.
2. Ross WF. Etiology and treatment of plantar ulcer. *Lepr Rev* 1962; 33: 25-40.
3. Anderson JG. Plantar ulcers in leprosy, their pathogenesis, natural history, therapy and prevention. *Lepr Rev* 1961; 32: 16-27.
4. Price EW. Study of plantar ulcers in leprosy, etiology of plantar ulcer. *Lepr Rev* 1959; 30: 242-48.
5. Rao KS, Balakrishna S, Oommen PK, Swami DK, Durai L. Restoration of plantar ulcer secretion in the feet of leprosy patients. *Ind J Lepr* 1987; 59(4): 442-49.
6. Karthikayan K, Thapa DM. Squamous cell carcinoma in plantar ulcer in leprosy, a study of 11 cases. *Ind J Lepr* 2003; 75(3) : 219-24.
7. Mane I, Gravwin MY, Cartal JL. The frequency of the appearance of perforating foot ulcers in patients with Hansen's disease as a function of treatment with polychemotherapy. *Acta Leprol* 1995; 9(3): 127-31.
8. Premkumar R, Paniker VK, Fritschi EP. Foot soaks for callosities and fissures. *Ind J Lepr* 1990 ; 62 : 478-82.
9. Mahajan PM, Kulkarni VN, Jadhav VH, Mehta JM. Wax therapy for dry feet in leprosy. *Ind J Lepr* 1995; 67(4): 383-88.
10. Anita VM. Anaesthetic feet and subsequent ulceration. Abstracts of the 15th International Leprosy congress, Beijing. 1998.
11. Kunaraval S. Neoplastic transformation of chronic ulcers in leprosy patients. *Ind J Lepr* 1998 ; 70 : 179-87.
12. Mathew J, Anthony P, Elheraj T, Krishna Murthy: Can selfcare at home bring down the prevalence of ulcer. Abstracts of 15th International Leprosy Congress. Beijing. 1998.
13. Kalhe VJ, Naik SS. Leprosy patients attitude towards their chronic ulcers and recurring ulcers. *Ind J Lep* 1998 ; 70 : 326.
14. Xu S. Effects of a comprehensive protection measures on the feet with plantar ulcers and numbness. *China Lepr J* 1995 ; 11 : 139- 43.
15. Tan WP. Effects of overall therapy on leprosy plantar ulcer. *China Lepr J* 1994 ; 10 : 164-66.
16. Premkumar R, Solomon Samuel. Correspondence. *Ind J Lepr* 1996 ; 68 : 399.
17. Udaiya Kiran, Beine K, Augul, Elsama V. Standard MCR footwear for management of foot ulcer. Abstracts of 15th International Leprosy Congress, Beijing. 1998.
18. Birki JA, Foto JG, Deepak S, Watson J. Measure of pressure walking in footwear used in leprosy. *Lepr Rev* 1994; 65 : 262-71.
19. Balkin SW, Kaplan, Leo Tom Reed: Silicone oil prevention of insensitive feet. Abstracts of 15th International Leprosy Congress, Beijing. 1998.
20. Raghupati. Exposure of pulsed magnetic fields in the treatment of plantar ulcers in leprosy patients. *Ind J Lepr* 1997 ; 69 : 241-50.