



EFFECTIVENESS OF TOTAL CONTACT CASTING IN LEPROTIC Vs DIABETIC PLANTER FOOT ULCER: A COMPARATIVE STUDY

Dr Ishita Dey	Senior Resident, Department of Physical Medicine and Rehabilitation, R.G. Kar Medical College and Hospital, West-Bengal, India.
Dr Saumen Kumar De*	Assistant Professor and HOD, Department of Physical Medicine and Rehabilitation, Calcutta National Medical College & Hospital, Kolkata, West-Bengal, India. *Corresponding Author
Dr Ambar Konar	Senior Resident, Barasat District Hospital, 24 PGS (South), West-Bengal, India.
Dr Md. Anwar Sadat Haldar	Assistant Professor and HOD, Department of Physical Medicine and Rehabilitation, College of Medicine and Sagore Dutta Hospital, West-Bengal, India.

ABSTRACT Total Contact Casting (TCC) has been identified as 'Gold Standard' treatment approach by offloading in neuropathic foot ulceration, a very common but notorious complication of Leprosy & Diabetes. Here we tried to compare its efficacy in diabetic & leprotic foot ulcer.

AIMS & OBJECTIVES:

1. To observe the outcomes of TCC in Leprotic & Diabetic planter ulcer.
2. To compare the effectiveness of TCC in these two conditions.

STUDY DESIGN: Prospective analytical study

SAMPLE SIZE: n= 24 (12 diabetic & 12 Hansen's)

STUDY DURATION: 12 months.

STUDY PLACE: Dept of PMR; IPGMR & SSKMH, Kolkata

INCLUSION CRITERIA:

1. Unilateral solitary Grade 1 & 2 planter ulcerations (Wagner classification).
2. Age: 20-60 years.
3. Ambulatory patients.

EXCLUSION CRITERIA:

1. Grade-3/4/5 planter ulcerations
2. Excessive leg or foot swelling.

METHODS & MATERIALS: At first, ulcers were debrided of all necrotic-tissue to create a smooth surface. Then after proper positioning, over a small amount of cotton padding, the cast was applied covering the toes up to 2 cm distal to fibular head with a rocker sole for offloading.

ASSESSMENT: Assessment was done in consecutive 3 visits at the end of 1st/3rd/6th week comparing the size, depth, downgrading of Wagner classification & time taken for complete ulcer healing.

CONCLUSION: Overall healing in both groups was very good with TCC with no statistically significant improvement difference.

KEYWORDS : Total Contact Casting, Neuropathic foot ulcer, Wagner classification

INTRODUCTION

Planter foot ulceration is a very common but notorious complication of neuropathic foot as in Diabetes or Hansen's Diseases. Only way to heal a planter ulcer is by relieving the pressure, through offloading. Total contact cast (TCC) does this by distributing the weight along the entire plantar aspect of foot. Since mid '60s TCC is being used as gold standard for treatment of diabetic planter ulcer. But there is lack of data concerning Leprotic foot ulcer worldwide. Interestingly, Dr Paul Brand et al. 1st started TCC in treatment of Leprotic ulcer. There is also lack of data in India regarding TCC in diabetic planter ulcers.

So here, we tried to compare whether TCC has same effectiveness on leprotic foot ulcer as in diabetic foot ulcer.

REVIEW OF LITERATURE

Lazarus et al. foot ulcers as, cutaneous erosion characterized by loss of epithelium that extends through dermis to deeper tissue. Diabetes and leprosy along with other neuropathic conditions give rise to chronic planter ulcer. Lifetime risk for foot ulcers in a diabetic is about 25%.^{1,2} Wagner et al classified the ulcers according to severity in 6 grades (from 0 to 5).³ According to Coleman WC et al., TCC was designed to equalize loading of planter Surface.⁴ Baker RE described TCC as gold standard for neuropathic foot ulcer.⁵ TCC was first described by Dr Kahn in India for leprosy then modified by Paul Brand.⁶

AIMS & OBJECTIVES

- To observe the outcomes of TCC in Leprotic & Diabetic planter ulcer.
- To compare the effectiveness of TCC in these two conditions.

MATERIALS AND METHOD

Study Design: This study is prospective analytical study.

Study Area: Department of Physical Medicine and Rehabilitation, Institute of Post Graduate Medical Education and Research, Seth Sukhlal Karnani Memorial Hospital, (IPGMR;SSKMH), Kolkata was chosen as the study area.

Study Population: This study recruited the patients attending the outpatient services of Department of Physical Medicine and Rehabilitation, Institute of Post Graduate Medical Education and Research, Kolkata with non-healing diabetic and leprotic planter foot ulcer who also fulfilled the study inclusion criteria.

Study Period:

12 months (July 2015 to June 2016)

Sample size:

Sample size was calculated to be 24 (n= 24); 12 patients in each group

INCLUSION CRITERIA:

1. Unilateral solitary Grade 1 & 2 planter ulcerations (Wagner classification).
2. Age: 20-60 years.
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EXCLUSION CRITERIA:

1. Grade-3/4/5 planter ulcerations (Wagner classification).
2. Excessive leg or foot swelling.
3. Unwilling patients

MATERIALS FOR DEBRIDEMENT

- Sterile gloves
- Normal saline
- Sterile gauze
- Surgical blade

FOR MEASUREMENT

- Measuring tape
- Transparent sheet
- Marker pen
- Sterile probe (blunt tip)

FOR CASTING

- Pop cast (15cm, 10cm)
- Soft roller cotton
- Plaster cutting machine



Figure 1: Materials used in the study

METHODOLOGY:

Written consents from patients were obtained. All the subjects recruited in our study underwent some baseline routine blood & urine investigation along with culture and sensitivity tests of ulcer swabs. A weight bearing x-ray of involved foot was done. Detailed history was taken with reference to plantar ulcer. A complete clinical examination was done including examination of sensory deficits (ball point test) and measurement and grading of planer ulcer. After proper debridement, TCC was done at baseline, 1st & 3rd week. Outcomes were measured at baseline and after 1, 3 & 6 weeks; according to surface area, depth, Wagner grading & time taken for complete ulcer healing. At the end of the study, all the demographic and other numerical data were collected and tabulated. The data were analysed by standard statistical tools.



Figure 2: Improvement in Diabetic Forefoot Ulcer in 3 Weeks after TCC



Figure 3: Improvement in Leprotic Forefoot Ulcer in 3 Weeks after TCC

RESULT AND ANALYSIS

Data were summarized by routine descriptive statistics. Software used were Statistica version 6 [Tulsa, Oklahoma: StatSoft Inc., 2001], MedCalc version 11.6 [Mariakerke, Belgium: MedCalc Software 2011] and GraphPad Prism version 5 [San Diego, California: GraphPad Software Inc., 2007]. Data were compared between baseline and follow-up assessments by repeated measures ANOVA followed by Tukey's test for post hoc comparisons. Analysis was two-tailed and p<0.001 was considered statistically significant.

All numerical variables were found to be normally distributed by Kolmogorov-Smirnoff goodness-of-fit. Out of 24 patients included in the study, 15 were males and 9 were females. Majority of Hansen's patients belonged to the 30-50 years age band, whereas in Diabetic group they belonged to 40-60 years age band, mean age of the study population being 46.79. Ulcer site distribution showed forefoot ulcer preponderance (75% forefoot ulcers in DM and 83% forefoot ulcers in

Hansen's group). Similar distribution of Wagner grading in both groups was also seen in DM and Hansen's group.

Comparison of changes over time within respective groups was done by Repeated measures Analysis of Variance (ANOVA). It shows progressive improvement in all the parameters (VAS for Pain and WOMAC) in both the Hansen's and DM groups. Tukey's Multiple Comparison Test also shows significant improvement in every follow up. In both the groups by 6 weeks, 90% patient's ulcers were healed.

As shown in Table 1A & 1B, comparison of the depth change with time in both DM & Hansen's group were statistically significant with a p<0.001.

Table 1A: Comparison of Depth Change With Time In DM Group

Tukey's Multiple Comparison Test: DM	Mean Diff.(mm)	P Value
UlcDep1 vs UlcDep2	2.09	<0.01
UlcDep2 vs UlcDep3	2.72	<0.001
UlcDep3 vs UlcDep4	2.50	<0.01

Table 1B: Comparison of Depth Change with Time in Hansen's Group

Tukey's Multiple Comparison Test: Hansen's	Mean Diff.(mm)	P Value
UlcDep1 vs UlcDep2	2.08	<0.05
UlcDep2 vs UlcDep3	2.75	<0.001
UlcDep3 vs UlcDep4	2.33	<0.01

As shown in Chart 1A & Chart 1 B, comparison of the surface area change with time in both DM & Hansen's group were statistically significant with a p<0.001.

Chart 1A: Surface Area Change With Time In DM Group By Repeated Measures ANOVA On Left Side Below

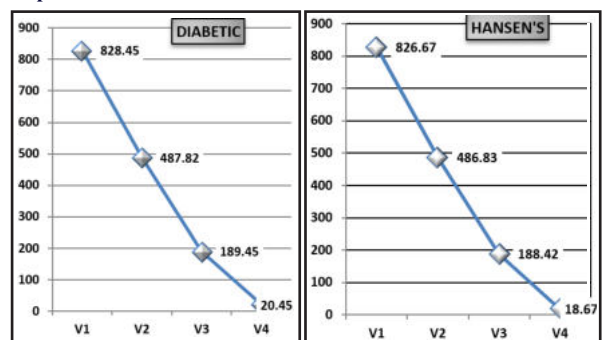
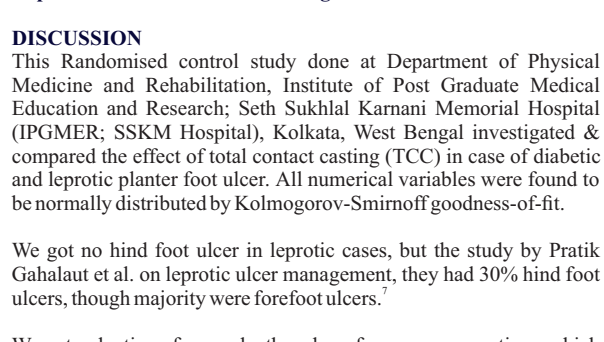


Chart 1B: Surface Area Change With Time In Hansen's Group By Repeated Measures ANOVA On Right Side Above



We got reduction of mean depth and surface area over time which don't differ from study by Ezio Fagila et al.⁸

Etiology did not affect healing of ulcer in our study.

However, like other studies, our study has some limitations. Sample size was small. Long term follow up could not be done.

CONCLUSION

Overall healing in both groups was quite statistically effective by TCC with a p value <0.001 in improvement in study parameters like-

- Depth

- Surface area

But there was no statistically significant improvement difference in Diabetes or Hansen's.

So we can conclude that, TCC is as effective in treatment of leprotic ulcers as in for diabetic ulcers.

REFERENCES

1. Borssen Bet al. The epidemiology of foot lesion in Diabetic patients aged 15-50. Diabetic Med. 7:438.
2. Singh N et al. Preventing foot ulcer in Diabet. JAMA.2005;293:P217.
3. Wagner FJ. The diabetic foot and amputations of foot. Surgery of the foot. St. Louis. Mosby year book. 1986; pp 421-455.
4. Coleman WC, Brand PW. The total contact :A therapy for planter ulceration on insensitive foot. J Am Podiatr Association. 1984;74:548.
5. Baker RE, Total contact casting. J Am Podiatr Med Association. 1995;85:172-176.
6. Kahn Js, Treatment of leprosy foot ulcer, Lepr India 11:19.
7. Pratik Gahalaut et al. A novel treatment for plantar ulcers in leprosy: local superficial flaps. Lepr Rev (2005) 76, 220-231.
8. Ezio Fagila et al. The total contact cast for the management of neuropathic planter ulceration of foot. The journal of joint and bone surgery 1992;74:No 2.