



Research Article

EFFECTIVENESS OF VOODOO FLOSS BAND VERSUS CREPE BANDAGE IN SUBJECTS WITH POST-OPERATIVE LOWER LIMB PEDAL EDEMA: A RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Aim: To study and compare the effect of Voodoo floss band and Crepe bandage on subjects with post-operative lower limb pedal edema in terms of ankle circumference and figure of eight measuring method.

Methods: 28 post-operative lower limb pedal edema subjects were randomized in group A (Crepe bandage) and group B (Voodoo floss band), band was applied for 24 hours. Ankle circumference, figure of eight measurement method and pitting edema grading scale were measured pre intervention and post intervention. Data was evaluated using independent t-test and Mann Whitney U test.

Results: Demographic characteristics showed normal distribution in both the groups and significant reduction in edema (p value =0.0001*) in terms of ankle circumference and figure of eight measurement method, but pitting edema reduced significantly in voodoo band group than crepe bandage group with p value of 0.0277*. The percentage of change in ankle circumference was 3.63%, 2.15% and 2.07% and 1.14% in figure of eight measurement method in voodoo floss band and crepe bandage groups respectively.

Conclusion: Crepe bandage and voodoo floss band both can be used in treatment of post-operative pedal edema, whereas voodoo floss band showed better reduction in edema than the application of crepe bandage.

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INTRODUCTION

Edema is defined as palpable swelling caused by increase in interstitial fluid volume¹. Trauma to the lower extremity affects various structures like muscles, veins, bones and lymphatic system, a common complication of injury to the soft tissue structures and fractures is post trauma pedal edema, the reason behind it is still not that clear².

Lymphedema is conventionally treated with various methods, namely cold, elevation, active range of motion movements, kinesio taping, compression bandage and others. The use of crepe bandage improves lymphatic flow, it works on phenomenon in which an externally applied compression, opposes the pressure applied by the contracting muscles and it also corrects the inadequate elasticity of edematous tissues³. Low compressive forces applied by the crepe bandage while extremity is at rest, guides the lymphatic fluid to drain into the collateral channels⁴.

The voodoo floss band was invented by Kelly Starrett for the weight lifters, in which weight lifters are supposed to wrap the

voodoo floss band around the targeted joint pre training session and perform exercises and stretching, so as to enhance range of motion and strength. Voodoo floss band helps in rehabilitation by facilitating breakdown of adhesions in post injury phase, as well as serves to improve joint mechanics and enhance joint range of motion⁵. The material used in voodoo floss band is latex rubber and its length is 213 cm (7') and width is 5 cm (2"). Studies have also stated, the significance of compression therapy using crepe bandage in patients with edema⁶.

As per Driller *et al.*, floss band applied to ankle, increases dorsiflexion and plantar flexion range of motion and improve single leg jump performance in recreational athletes⁷.

The Voodoo floss band is a new tool and gaining popularity among medical professionals and athletes, but there is limited literature supporting the effect of voodoo band. Previous literature suggested improvement in ankle range of motion, its importance in injury prevention and also to find further application of voodoo floss band in various other aspects.

As there is paucity of literature available about the effect of voodoo floss band to reduce lower limb pedal edema when compared with conventional methods viz., compression using crepe bandage, which in previous literature has already been

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proven to be an effective tool in treatment of edema. Hence, the purpose of this study is to compare the effect of Voodoo floss band and crepe bandage in subjects with post-operative lower limb pedal edema.

MATERIALS AND METHOD

A randomized clinical trial was conducted on 28 subjects through non-probability sampling design in two groups, group A (Crepe bandage group) and group B (voodoo floss band group). Duration of the study was 4 months; the inclusion criteria was, both genders with age group between 20 to 50 years, diagnosed with post-operative day 2 of lower limb pedal edema, pitting edema. Exclusion criteria was subjects with any associated neurological symptoms, fragile skin, deep vein thrombosis, varicose veins, open wound and cellulitis. The study was conducted in Tertiary health care center, Belagavi city, Karnataka, India.

Procedure

Ethical clearance from the institutional ethical committee was obtained. After meeting the inclusion and exclusion criteria, written informed consent was obtained from the participants. The study protocol was explained to subjects in their vernacular language. A brief demographic data was taken i.e. age, height, weight and body mass index. The subjects were randomly allocated into 2 groups namely Group A and Group B by using the envelope method. In the envelope, alphabets A and B were written and the envelope was enclosed in a cover. Baseline outcome measure was taken pre-application of band, on the 1st day of enrollment and post-application after 24 hours.

In the group A, crepe bandage was applied to the ankle joint. The rolled end of the crepe bandage was in one hand facing in upward direction, the free end of the crepe band was placed below the ball of foot that was under the 1st metatarsal head. To have a better grip the crepe band was wrapped in figure of eight method, which was from foot to ankle and the same is repeated. While wrapping, the toes were kept free and heel was covered by the crepe bandage. A constant pull was maintained so as to have equal tension while wrapping. The crepe bandage was over lapped one-half the width of the crepe bandage in spiral method or spiral reverses method, till just below the knee and the ends of the crepe bandage were secured using adhesive tape. A continuous feedback of the subject was taken regarding any discomfort, and post wrapping assessment of distal blood circulation was done⁸.



Fig 1 Application of crepe bandage

In the group B, voodoo floss band was applied to the ankle. The band was wrapped twice across the transverse of the foot aligning to metatarsal heads and following 3 wraps in figure of

eight method, starting from the lateral malleolus then around the achilles tendon and to medial malleolus following in direction towards the end of 5th metatarsal head, the band was then wrapped around the bottom of the foot and back to origin. Any discomfort was asked to subject during the whole procedure of application. The width of each wrap was covered 50% by another layer of the band. The end of the band was secured under the last wrap of the voodoo floss band⁷.

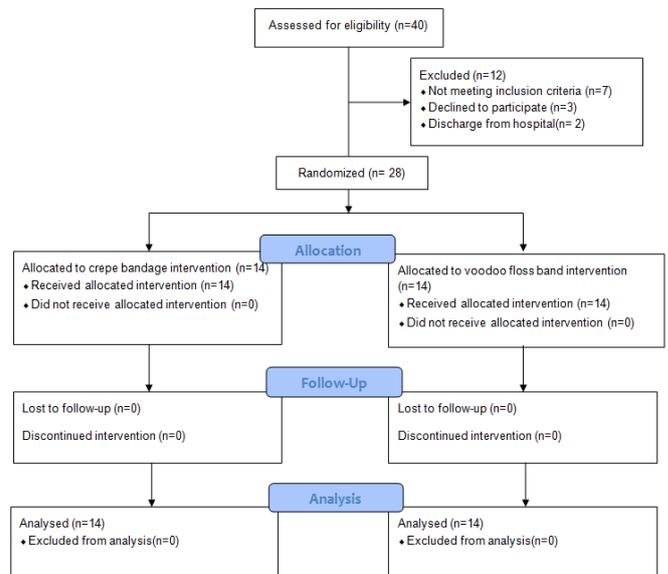


Fig 2 Application of voodoo floss band

Outcome measures

1. Ankle circumference: Ankle circumference is measuring method in which ankle measurement is taken at single location, to avoid any error in the pre and post application of the band, Ankle circumference has high reliability, the reported interclass correlation coefficient (ICC) is over 0.90 and also a better inter-examiner rate with confidence interval of 95%⁹.
2. Figure of eight measurement method: This method is invented by Esterson in which the measurement in centimeters is taken by tension controlled measuring tape at 8 different ankle and foot locations⁹. The intrarater and interrater reliability of this method is reported excellent with an of 0.99¹⁰.
3. Pitting edema grading scale: The pitting edema is commonly assessed using grades, which are based on time for which impression of a fingertip remains and 1+, 2+, 3+, 4+ are the grades of the same¹¹.

Consort Flow Diagram



RESULTS

Table 1 Showing distribution of age and gender in Group A and Group B

Variable	Group A	Group B
Gender	M-9 F-5	M-6 F-8
Average age(in years) (±Standard deviation)	39.43 ± 10.10	37.14 ± 9.32

M=male, F=female

Table 2 Comparison of descriptive statistics of Group A and Group B with respect to pretest and post-test Ankle circumference, figure of eight measurement method by independent t test and pitting edema grading system scores by Mann Whitney U test.

Measures/Group	Pre-intervention	Post-intervention	Difference within the group	p value	Percentage (%) of Change
Ankle circumference (cm) Group A	25.96 ± 2.17	25.40 ± 2.15	0.56 ± 0.19	<0.0001*	#2.15%
Group B	25.57 ± 1.74	25.61 ± 1.80	0.96 ± 0.15	<0.0001*	#3.63%
Figure of eight method (cm) Group A	53.30 ± 4.30	52.69 ± 4.27	0.61 ± 0.26	<0.0001*	#1.24%
Group B	51.13 ± 2.78	50.01 ± 2.94	1.06 ± 0.31	<0.0001*	#2.07%
Pitting edema Group A	2.2 ± 0.7	2.0 ± 0.8	0.2 ± 0.4	0.1088	##9.68%
Group B	2.9 ± 0.6	2.5 ± 0.7	0.4 ± 0.5	0.0277*	###14.63%

cm=centimeters, #applied paired t test, ##applied Wilcoxon matched pairs test

The group treated with voodoo floss band showed significant improvement in ankle circumference ($p<0.0001^*$) and figure of eight measurement method ($p<0.0001^*$) as compared to crepe bandage treatment group.

Results also demonstrate significant difference within the groups post-intervention.

DISCUSSION

The present study compared effectiveness of voodoo floss band and crepe bandage on post-operative lower limb pedal edema; the results of the same demonstrated that application of both voodoo floss and crepe are effective treatment for pedal edema.

Both the groups showed improvement in ankle circumference and figure of eight measurement method. The results showed reduction in edema using ankle circumference and figure of eight measuring method but there was significant improvement only in voodoo floss band group (p value of 0.0277^*) than the crepe bandage group (p value of 0.1088) in case of pitting edema grading system. As per our knowledge this was the first study which compared the crepe bandage and voodoo floss bandage application on post-operative lower limb pedal edema, Sterrett and Cordoza proposed the possible action mechanisms and associated physiological changes of voodoo floss band as shearing of fascia and reinforcement of blood to the targeted area. This effect of voodoo floss band lacks literature support stating the same. Voodoo floss band has been used in fewer studies, Kiefer BN *et al* stated that effect of voodoo band on glenohumeral (GH) joint flexion causes psychological increase in GH flexion, but not a physical increase¹². Literature also has evidence for floss band application to ankle; increases dorsiflexion and plantar flexion range of motion and improve single leg jump performance in recreational athletes⁷.

A conference proceeding by Bohem *et al* in 2014 on effect of 14 days of tissue flossing along with joint mobilization and resistive exercises on ankle range of motion and blood flow to the calf muscle had an increase in dorsiflexion peak torque by 22% and there was no significant change in the blood flow¹³.

Literature supports the application of crepe bandage for edema⁴, Mathews S *et al* stated that application of the bandage causes reduction in formation of edema⁶ thus crepe bandage application is in accordance with the present study.

Author suggest the possible mechanism of compressive therapy, which is the external force applied by the band opposes the pressure applied by contracting muscle and also corrects inadequate elasticity of the edematous tissue. The force applied due to wrapping of band guides the edematous fluid to collateral channels and lymph nodes, the force generated by the voodoo floss band seems to be more than the crepe bandage, thus correcting the edematous tissues more efficiently. Hence this study states that crepe bandage and voodoo floss band are effective intreatment of post-operative lower limb pedal edema, but in comparison voodoo floss band proved to be more effective than crepe bandage.

CONCLUSION

Crepe bandage and voodoo floss band both can be used in treatment of post-operative pedal edema, whereas voodoo floss band showed better reduction in edema than the application of crepe bandage.

Conflict of interest

The author declares no conflict of interest.

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