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Effect of Taping and Night Splint on Flexible Hallux Valgus- A Comparative Study

[1]Lovekiranpreet Kaur, [2]Paramjeet Kaur, [3]Kavita Kaushal

Abstract: **This study was commenced to evaluate the effect of taping with strengthening exercises and night splint with strengthening exercises on hallux valgus in Adesh University. Methodology: the study sample included 30 subjects of age group 20-30 years. Subjects were then asked to sign the Consent form and give their will regarding being enrolled in the study. During the assessment, subjects were assessed by Goniometer. Assessments were done as per the assessment form. All the subjects were received total intervention for 3 weeks. The patients were assessed at the baseline and after weeks. Results: after statistically analysis, a significant improvement was found in both taping and night splint. But the night splint was more significant than taping. The level of improvement ($p<0.0005$) was significantly high with night splint in flexible hallux valgus.**

Keywords: **taping and night splint.**

1. INTRODUCTION

Hallux valgus is defined as an abnormal increase in the lateral deviation angle of metatarsophalengeal joint of the big toe toward the second toe. [(1)] Hallux valgus is the complex progressive deformity manifested with lateral deviation of the great toe and medial deviation of the first metatarsal bone. [(2)]

Mann Coughlin classification [(3)]

Deformity	Hallux valgus angle
Mild	<20 degree
Moderate	21-40 degree
Severe	Over 40 degree

Development of Hallux Valgus: It is generally accepted that hallux valgus occurs in steps, frequently on a background of several predisposing factors. These steps do not necessarily occur in series but may transpire in parallel. These steps are as follows:

1. As the only medial supporting structures of the first metacarpophalangeal joint are the medial sesamoid and medial collateral ligaments, their failure is the ‘‘early and essential lesion.’’

2. The metatarsal head can then drift medially, slipping off the sesamoid apparatus. An oblique or an unstable tarsometatarsal joint may encourage this movement.

3. The proximal phalanx moves into a valgus position as it is tethered at its base to the sesamoid, the deep transverse ligament (via the plantar plate), and the adductor hallucis tendon.

4. The metatarsal head sits on the medial sesamoid and can erode the cartilage and the crista. The lateral sesamoid can appear to sit in the intermetatarsal space although it does not actually move.

5. The bursa overlying the medial eminence can thicken because of the pressure effect of footwear on a prominent medial eminence. [(4)]

The different factors can be divided into extrinsic and intrinsic risks. Extrinsic factors include footwear; excessive loading and intrinsic factors include genetic and sexual dimorphism. [(4)]

Surgery is found to be the most common form of management for bunions, as very little alternative methods of treatment exists. Even under well-planned conditions, surgery of the forefoot can lead to many complications. The Scarf osteotomy procedure can lead to multiple complications such as troughing of the metatarsal with loss of height, delayed union, rotational malunion, proximal fracture, infection and early recurrence of the deformity. [5] Drug treatment: Cortisone injections are commonly used as part of symptomatic conservative treatment. Only twenty five percent of patients treated using cortisone injections for painful HAV, were completely satisfied. Non-steroidal anti-inflammatory drugs (NSAID's) can also be used to relieve pain and stiffness, but it does not alter the course of the disease. The margin between toxic and effective doses of NSAID's is small.[6] Orthoses: the use of orthotics decreases the intensity of pain caused by a HAV deformity, but that only short-term symptomatic relief can be provided via orthotics alone. The use of a HAV night splint will hasten the correction process or reduce the progression of the deformity. [7, 8] Chiropractic treatment: manipulation of the metatarsophalengeal joint could relieve pain. Fifty percent of patients treated with manipulation alone were more comfortable with regards to pain. [9, 10]

2. METOHDS

SAMPLING CRITERIA:

Inclusion criteria: Age group = 20– 30 years, both Males and Females**,** Subjects with unilateral or Bilateral Hallux Valgus, Mild - moderate hallux valgus

Exclusion criteria: Traumatic injury of foot and leg (eg. fractures), Soft tissue injury of lower limb (eg. Strains & Sprains), Subjects received any medical or conservative treatment, History of any lower limb surgery, Lower Limb Pathology, Any Neurological Condition of Lower Limb.

Procedure:

30 Subjects were included in this study after the approval from Institutional Research Committee and Ethical Committee of Adesh University on the basis of selection criteria procedure was then explained to the subjects and then Consent form was taken. Subjects were divided into two groups i.e. group A and B having 15 subjects in each group.

Group A received taping with strengthening exercises.

Group B received night splint with strengthening exercises.

Assessments were taken at the baseline and after 3 weeks. All the patients received total intervention for 3 week. Subjects were assessed by the Goniometer for Range of Motion.

INTERVENTION:

1. **Taping**- A non allergic and non- elastic white tape was used. An anchor strip 2cm was attached around the distal toe at the base of the toenail, and a 3.8 cm wide strip were attached parallel to the midline of the medial aspect of the foot, from the distal to the proximal anchor, sustaining the hallux in midline position. The taping was completed with light circumferential strips covering the sites of the original anchors with 2cm and 3.8cm tape. Taping was changed after 24 hours and will be applied for 3 weeks. [11]

2. **Splint**- The night splint consisted of a polyfoam soft part and a rigid polyethylene bar on then medial side of the hallux.[2]

Advice: Patients in both groups were advised to purchase shoes 1 size larger than their normal shoe size so that the total contact insole with toe-separator would fit inside the shoe. [2]

3. **Strengthening exercises**: (1) Short-foot exercises: shorten your foot while keeping your heel and the front of your foot on ground. Do not curl your toes.

(2) Toe-spread out exercise: lift and spread toes while keeping heel and front on the ground. While toes are spread out, push your little toe down and out to the floor. Then, push big toe down toward the inside of the toe.

(3) Raise exercise: stand with knee bent. Elevate arch while keeping heel turned in. then, raise heel off the floor while keeping pressure on big toe.

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Perform each exercise on bare foot. Hold each repetition (10 repetitions) for 5 seconds. Repeat each exercise until one feel the muscle becoming tried. Exercises are progressed from sitting, to standing on both feet, to performing the exercises standing on just one leg. Perform exercise daily. [12]

3. RESULT

Mean of pre and post values of taping and night splint, t-value and p- value (value of significance)

Goniometer	Pre- value	Post- value	t -value	p– value*
Mean(taping)	15.13	12.26	-11.52	0.0005

*p > 0.0005 is not significant

*p < 0.0005 is significant

Mean of Pre and Post value of taping is 15.13 and 12.26 respectively. The t- value is -11.52 at p- value 0.0005. The result shows that it is significant in nature

Mean of pre and post values of night splint, t-value and p- value (value of significance)

Goniometer	Pre- value	Post- value	t -value	p– value*
Mean(night splint)	15.86	14.26	-9.80	0.0005

*p > 0.0005 is not significant

*p < 0.0005 is significant

Mean of Pre and Post value of night splint is 15.86 and 14.26 respectively. The t- value is -9.80 at p- value 0.0005. The result shows that it is significant in nature.

So, by comparing the values of Taping and Night splint, night splint is more significant in nature than taping

4. DISCUSSION

The aim of this study was to find the effect of taping and night splint on flexible hallux valgus. The effect has been studied by the means of clinical evaluation. As there were limited studies in the literature which showed the effect of taping and night splint on flexible hallux valgus. Therefore, present study was focused on it.

The results of the present study indicated that the taping and night splint were effective in decreasing the hallux valgus angle. There was statistically significant difference found in between the pre and post treatment of taping and night splint applied to the subjects with flexible hallux valgus.

The effect of the night splint is statistically more significant than taping in flexible hallux valgus and it helps to decrease the hallux valgus angle.

5. CONCLUSION

The present study has concluded that taping and night splint is effective in the management of flexible hallux valgus. However, it was statistically found in this study that night splint is more effective than taping in the management of flexible hallux valgus.

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