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A comparative study on semi rigid taping vs. K-taping on functional performance in ankle instable athletes

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Abstract---Background: A taping is often used to prevent giving-ways in the joint with ankle instability. However, it remains unknown whether the application of a taping modifies abnormal kinematics in ankle instability joints. Ankle Instability is characterized by recurrent giving way and often develops after repeated lateral ankle sprains. Basically, athletes are more prone to ankle instability in order to prevent reoccurrence of injury especially ankle instability. Aim: To evaluate the effectiveness of semi rigid taping vs. k-taping on functional performance in ankle instable athletes. Method: 40 Participants was randomly assigned to two groups. Volunteers with functional ankle instability following ankle inversion sprain were recruited from among students of the Annamalai University. Prior to participation in the study, all participants provided written informed consent. Results: The semi rigid taping group scored a CAIT rating scale means value of 21.07 ±5.37 and Kinesio taping group shows a

mean value of 23.02 ± 5.20 with a “t” value of 8.58 and a significant of “p” value 0.00001. This shows that the kinesio taping was highly effective in improving in ankle instability athletes. Conclusion: CAIT analysis clearly showed the stabilizing effect of both kinesio taping and semi rigid taping on the athletes with ankle instability. Kinesio taping had a statistically significantly highly effect on improved on the athletes in ankle instability compared than semi rigid taping. However, semi rigid taping also significantly improved in ankle instability.

Keywords---ankle instability, performance, semi rigid tape, K-tape.

Introduction

Taping is routinely used after ankle sprain, to support the joint and prevent re-injury⁽¹⁾. But despite its widespread use during functional and sporting activities, the effect of taping on functional performance in participants after ankle sprain has received little attention. Yet this knowledge is important because it has been suggested that the constriction to movement conferred by rigid tape may disadvantage performance⁽²⁾. Most research has focused on healthy participants and with inconsistent findings^(3,4,5,6,7,8,9). Up to 70% of people have persisting symptoms of pain and instability after a simple ankle sprain^(10,11,12). Chronic ankle instability, among the most common symptoms, is debilitating and can lead to a wide spectrum of disability. Chronic ankle instability can include recurrent sprain, mechanical instability in which a primary mechanical restraint is lost, and functional ankle instability⁽¹³⁾. Although mechanical instability can be measured, functional ankle instability has been difficult to measure. The term functional ankle instability is used to describe the perception that the ankle gives way, is weaker, more painful, or less functional than before injury^(14,15,16). Speed is either unaffected^(7,9) or decreased⁽⁵⁾ with tape; and positive⁽⁶⁾, negative⁽⁵⁾ or no effects have been found with tape during jump tests⁽⁹⁾. Agility^(6,9) and balance tests^(3,4,9) were unaffected by tape application. In those studies investigating functional performance outcomes in participants with ankle instability, most have used ankle braces^(18,19,20,21,6,22,23). Of these, most found that the brace did not reduce functional performance as tested by dynamic stability, figure-8 run time, vertical jump height, sprint time and agility course time^(19,20,22,23). In contrast, three studies found that wearing a brace improved balance^(18,21,6). When using tape found improved performance in jump⁽⁶⁾, and another study found tape to improve performance⁽²⁴⁾, whereas another study found no improvement in postural stability.^(24,26) One element that may contribute to any effect taping might have on performance for those with a history of ankle sprain or functional instability, is the perception of confidence and reassurance that may come with the ankle being taped. Previously, found that participants perceived ankle taping, even a small strip of “placebo” tape, to be reassuring and to afford some confidence in their performance of challenging tasks.⁽²⁷⁾ Therefore it is possible that by imparting some confidence, ankle taping might reduce apprehension and improve performance. Considering the relative lack of information on the effect of rigid tape and K-tape on functional performance in ankle instability.

Materials and Method

To conduct this study, the researchers presented oneself to the patients who were being investigated, and the purpose of the study was described to them prior to their involvement to acquire their cooperation and written permission. All participants were guaranteed that their information would be kept private.

Design

The comparative study design was used for this investigation. Participants were 40 Participants was randomly assigned to two groups. Volunteers with functional ankle instability following ankle inversion sprain were recruited from among students of the Department of Sports sciences, Annamalai University, Chidambaram, Tamilnadu. Prior to participation in the study, all participants provided written informed consent. The outcome measurements were given Ankle Instability were tested before and after training in both the groups by using, Cumberland Ankle Instability Test (CAIT). Total duration of study three Months.

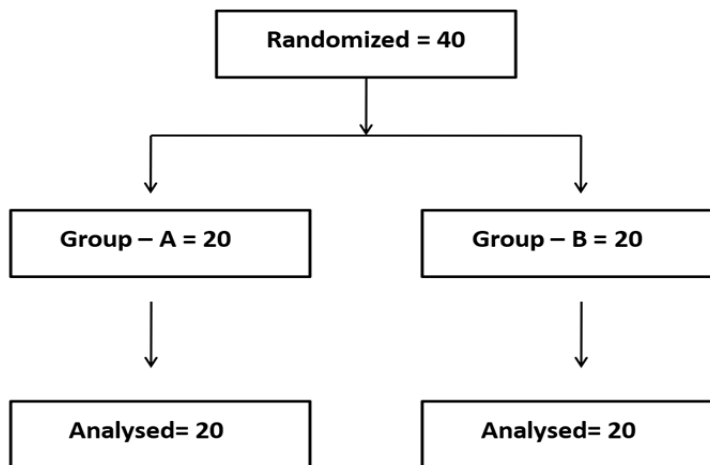


Figure-1. The randomization technique is depicted as a flow diagram.

Selection Criteria

Randomly selected in 40 participants

- A. Age between 18-25 years
- B. At least one month prior, inversion trauma
- C. Moderate functional ankle instability
- D. A score of <27 on the Cumberland Ankle Instability Tool (CAIT)
- E. Anterior drawer test: negative
- F. Talar tilt test: negative

Procedure

Group – A

Group A undergo, the subject's foot was placed in relaxed position initially with the foot up. Firstly, a strip of tape was placed from the anterior mid-foot to immediately inferior to tibial tuberosity, over the tibialis anterior muscle, whilst being stretched at 120% of its length. The second strip was applied from the medial malleolus, round the heel, and split just below the lateral malleolus. The first branch was applied anteriorly, the second posteriorly, to the lateral malleolus and from there onwards both ran to attach laterally to the end of the first tape. The third strip was stretched to 140% and was applied across the ankle, just covering the medial and lateral malleoli. Finally, the fourth strip was applied from the arch and stretched to six inches above both malleoli. Kinesio tape was applied by the same researcher (Figure-2). Semi rigid tape was done by the same procedure as Kinesio tape.



Figure-2. Ankle Kinesio Taping in Ankle Instability

Group-B

Group B undergo semi rigid taping, a semi rigid taping technique was developed to stabilize the medial and lateral sides of the talocrural and subtalar joints using the elastic tape while allowing dorsi flexion / plantar flexion. (Figure-3)



Figure-3. Semi Rigid Taping in Ankle Instability

Data analysis

Descriptive statistics (mean and standard deviation) were computed for all data. The mean differences of the outcome measures of the Cumberland Ankle

Instability Tool (CAIT) in occasions; with semi rigid taping and with kinesio taping. Least Significant Difference (LSD) test was used to determine the significant difference between the 2 occasions of measurement.

Table 1: Kinesio taping paired 't' test Results

Groups	N	Mean	SD
Pre test	20	18.85	±3.81
Post test	20	27.2	±2.09

Table 1. Shows the pre- and post-test comparison

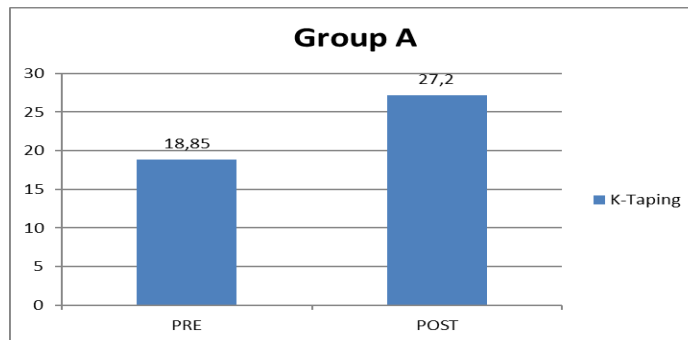


Figure-4. The above table shows CAIT Tool rating pre test mean value of 18.85 ± 3.81 and post test mean value of 27.2 ± 2.09 . This shows the kinesio taping used was effective in reducing pain and ankle instability in athletes.

Table 2: Semi rigid taping Paired 't' test Results

Groups	N	Mean	SD
Pre test	20	16.75	±3.69
Post test	20	25.4	±2.50

Table 2. Shows the pre- and post-test comparison

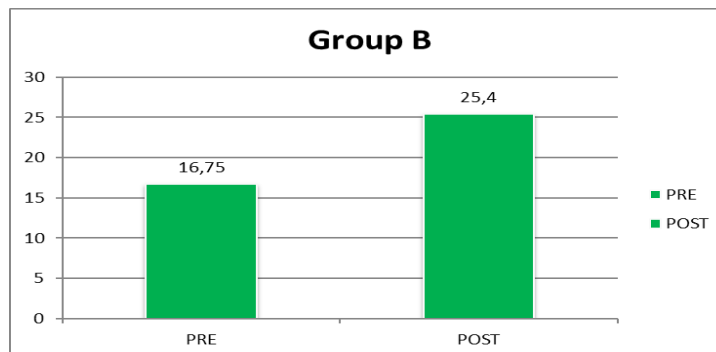


Figure-5. Group B showed a pre test value CAIT rating scale mean of 16.75 ± 3.69 and post test value of mean 25.4 ± 2.50 . This shows the Semi rigid taping was effective in improving athletes with ankle instability.

Table 3: independent sample 't' test semi rigid and K-taping

Groups	N	Mean	SD	t- value	P- value
K-Taping	20	23.025	5.205		
Semi rigid Taping	20	21.075	5.375	8.5817	<.00001

Table 3. Shows the K-Taping and Semi rigid Taping comparison

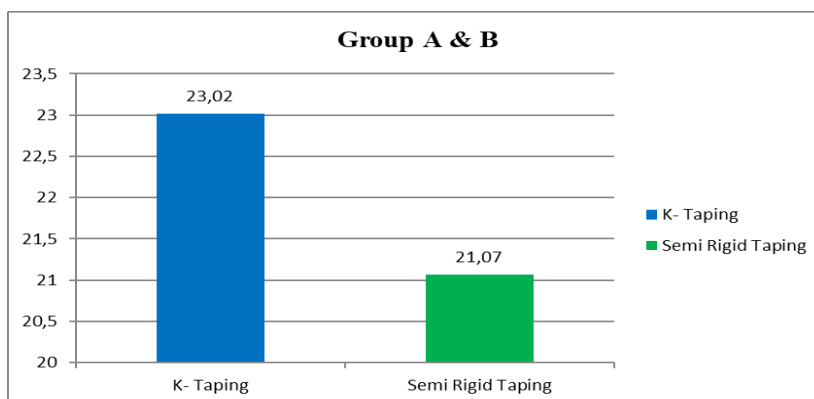


Figure-6. In the above table, group A shows a CAIT rating scale mean value of 23.02 ± 5.20 and group B training shows a mean value of 21.075 ± 5.375 with a t value of 8.5817 and a significant of p value 0.00001. This shows the Kinesio taping was highly effective than the Semi rigid taping used in improving athletes with ankle instability

Discussion

The primary purpose of the study was to investigate the effects of kinesio taping versus semi rigid tape, compared to athletes with ankle instability. Numerous researchers have reported the effect of kinesio tape (KT) for function, pain and ROM in the past. However, the results are mixed and further investigation is warranted. The purpose of this study was to investigate the effect of kinesiotaping and semi rigid taping on ankle joint stability. The main findings of the current study showed that the outcome measures in the occasions (kinesio taping and semi rigid taping) by the CAIT test revealed statistically significant differences between K-taping and semi rigid taping. The significant effect of KT on ankle stability in patients with first degree ankle sprain found in this current study may be attributed to number of hypotheses. First, the presence of impaired proprioception following a lateral ankle sprain, it is biologically plausible that KT may increase afferent input and hence improve measures of proprioception. Further research is necessary to fully elucidate the exact mechanisms by which kinesio tape improve dynamic stability of the ankle and subsequently reduce the incidence of repeated injury in subjects with chronic ankle instability. Limitations of the present study include the small sample size ($n=40$) and muscle fatigue.

Limitations of the study

A limitation found within the study was the small subject size. Due to the fact that the study only had 40 participants, it is hard to make a concise conclusion when one is talking about the effectiveness of KT tape at improving sports performance on everyone.

Conclusion

CAIT analysis clearly showed the stabilizing effect of both kinesio taping and semi rigid taping on the athletes with ankle instability. Kinesio taping had a statistically significantly higher effect on improved ankle instability compared than semi rigid taping. However, semi rigid taping also significantly improved ankle instability. This study offers information that may stimulate new design of ankle taping methods by using different materials and further research may help to reduce uncertainty of the effects of various types of ankle taping on functional performance.

Conflict of interest

The authors confirm that they have no conflicts of interest and no funding to declare.

References

1. Handoll HH, Rowe BH, Quinn KM, de Bie R. Interventions for preventing ankle ligament injuries. *Cochrane Database of Systematic Reviews*. 2006;6:
2. Cordova ML. Efficacy of Prophylactic Ankle Support: An Experimental Perspective. *J Athl Train*. 2002;37:446-457.
3. Abian-Vicen J, Alegre LM, Fernandez-Rodriguez JM, Aguado X. Prophylactic ankle taping: elastic versus inelastic taping. *Foot Ankle Int*. 2009 30:218-225.
4. Broglio SP, Monk A, Sopiarsz K, Cooper ER. The influence of ankle support on postural control. *J Sci Med Sport*. 2009 12:388-392.
5. Burks RT, Bean BG, Marcus R, Barker HB. Analysis of athletic performance with prophylactic ankle devices. *Am J Sports Med*. 1991;19:104-106.
6. Jerosch J, Thorwesten L, Frebel T, Linnenbecker S. Influence of external stabilizing devices of the ankle on sport-specific capabilities. *Knee Surg SportsTraumatolArthrosc*. 1997;5:50-57.
7. MacKean LC, Bell G, Burnham RS. Prophylactic ankle bracing vs. taping: effects on functional performance in female basketball players. *J Orthop SportsPhysTher*. 1995;22:77-81.
8. Meana M, Alegre LM, Elvira JLL, Aguado X. Kinematics of ankle taping after a training session. *Int J Sports Med*. 2007;28:1-7.
9. Paris DL. The Effects of the Swede-O, New Cross, and McDavid Ankle Braces and Adhesive Ankle Taping on Speed, Balance, Agility, and Vertical Jump. *J Athl Train*. 1992;27:253-256.
10. McKay GD, Goldie PA, Payne WR, Oakes BW. Ankle injuries in basketball: injury rate and risk factors. *Br J Sports Med* 2001;35: 103-8.

11. Braun BL. Effects of ankle sprain in a general clinical population 6 to 18 months after medical evaluation. *Arch Fam Med* 1999;8: 143-8.
12. Gerber JP, Williams GN, Scoville CR, Arciero RA, Taylor DC. Persistent disability associated with ankle sprains: a prospective examination of an athletic population. *Foot Ankle Int* 1998;19: 653-60.
13. Hertel J. Functional anatomy, pathomechanics, and pathophysiology of lateral ankle instability. *J Athl Train* 2002;37:364-75.
14. Lentell G, Katzman LL, Walters MR. The relationship between muscle function and ankle stability. *J Orthop Sports PhysTher*1990;11:605-11.
15. Freeman MA. Instability of the foot after injuries to the lateral ligament of the ankle. *J Bone Joint Surg Br* 1965;47:669-77.
16. Tropp H. Commentary: functional ankle instability revisited. *J Athl Train* 2002;37:512-5.
17. Hiller CE, Refshauge KM, Bundy AC, Herbert RD, Kilbreath SL. The Cumberland ankle instability tool: a report of validity and reliability testing. *ArchPhys Med Rehabil.* 2006;87:1235-1241.
18. Friden T, Zatterstrom R, Lindstrand A, Moritz U. A stabilometric technique for evaluation of lower limb instabilities. *Am J Sports Med.* 1989;17:118-122.
19. Gribble PA, Taylor BL, Shinohara J. Bracing does not improve dynamic stability in chronic ankle instability subjects. *PhysTher Sport.* 2010;11:3-7.
20. Gross MT, Clemence LM, Cox BD, et al. Effect of ankle orthoses on functional performance for individuals with recurrent lateral ankle sprains. *J Orthop SportsPhysTher.* 1997;25:245-252.
21. Hals TM, Sitler MR, Mattacola CG. Effect of a semi-rigid ankle stabilizer on performance in persons with functional ankle instability. *J Orthop Sports PhysTher.* 2000;30:552-556.
22. Rosenbaum D, Kamps N, Bosch K, Thorwesten L, Volker K, Eils E. The influence of external ankle braces on subjective and objective parameters of performance in a sports-related agility course. *Knee Surg Sports TraumatolArthrosc.* 2005;13:419-425.
23. Wiley JP, Nigg BM. The effect of an ankle orthosis on ankle range of motion and performance. *J Orthop Sports PhysTher.* 1996;23:362-369.
24. Bicici S, Karatas N, Baltaci G. Effect of athletic taping and kinesiotaping on measurements of functional performance in basketball players with chronic inversion ankle sprains. *Int J Sports PhysTher.*2012 7:154-166.
25. Verbrugge JD. The effects of semirigid Air-Stirrup bracing vs. adhesive ankle taping on motor performance. *J Orthop Sports PhysTher.* 1996;23:320-325.
26. Delahunt E, McGrath A, Doran M, Coughlan GF. Effect of taping on actual and perceived dynamic postural stability in persons with chronic ankle instability. *Arch Phys Med Rehabil.* 2010;91:1383-1389.
27. Sawkins K, Refshauge K, Kilbreath S, Raymond J. The placebo effect of ankle taping in ankle instability. *Med Sci Sports Exerc.* 2007;39:781-787.
28. Kumar, S. (2022). A quest for sustainium (sustainability Premium): review of sustainable bonds. *Academy of Accounting and Financial Studies Journal*, Vol. 26, no.2, pp. 1-18
29. Allugunti V.R (2022). A machine learning model for skin disease classification using convolution neural network. *International Journal of Computing, Programming and Database Management* 3(1), 141-147

30. Allugunti V.R (2022). Breast cancer detection based on thermographic images using machine learning and deep learning algorithms. *International Journal of Engineering in Computer Science* 4(1), 49-56
31. Chanana, M. (2018). Empirical study: relationship between self efficacy and academic performance. *International Journal of Health & Medical Sciences*, 1(1), 28-34. <https://doi.org/10.31295/ijhms.v1n1.36>
32. Rinarta, K., & Suryasa, W. (2017). Comparative study for better result on query suggestion of article searching with MySQL pattern matching and Jaccard similarity. In *2017 5th International Conference on Cyber and IT Service Management (CITSM)* (pp. 1-4). IEEE.
33. Rinarta, K., Suryasa, W., & Kartika, L. G. S. (2018). Comparative Analysis of String Similarity on Dynamic Query Suggestions. In *2018 Electrical Power, Electronics, Communications, Controls and Informatics Seminar (EECCIS)* (pp. 399-404). IEEE.