

Original Article

EFFECT OF KINESIO TAPING VERSUS ATHLETIC TAPING ON PAIN AND MUSCLE PERFORMANCE IN LATERAL EPICONDYLALGIA

Rashi Goel *¹, Ganesh Balhailaya ², Ravi Shankar Reddy ³.

*¹ Assistant Professor, Department of Physiotherapy, Dr. DY Patil College of Physiotherapy, Pimpri, Pune, Maharashtra, India.

² Assistant Professor, Department of Physiotherapy, School of Allied Health Sciences, Manipal Univeristy, Manipal, Karnataka, India.

³ Assistant Professor, Department of Medical Rehabilitation Sciences, College of Applied Medical Sciences, King Khalid University, Saudi Arabia.

ABSTRACT

Lateral epicondylalgia is a degenerative musculoskeletal pain state characterised by pain over the lateral humeral epicondyle resulting in absenteeism from work and daily living activities. It is most prevalent in jobs requiring repetitive manual activities of the upper extremity. Literature describes different treatment options for lateral Epicondylalgia but there is no consensus about the most efficacious intervention strategy. Taping (athletic/kinesio) has been used successfully in various musculoskeletal conditions with successful results. To date, no study has investigated the effect of kinesio taping in lateral epicondylalgia. The purpose of the study was to investigate and compare the effects of kinesio taping and athletic taping on pain and muscle performance in patients with lateral epicondylalgia. 16 patients (9 males, 7 females) within age group of 18 – 50 years participated in the study. It was a cross over design. VAS, digitalal algometer and Jamar Dynamometer were used to quantify pain, pressure pain threshold and pain free grip strength. These were evaluated pre taping, immediately after taping and after 30 minutes of each taping application selected randomly for two consecutive days. Repeated measures ANOVA and percentage change were used to examine differences in outcome measures. Bonferroni correction was applied to correct for repeated testing. The results showed significant pain reduction and increase in grip strength after both the taping techniques but no statistically significant differences for any outcome measure between the two taping techniques ($p>0.05$). Also the immediate pain reduction was more after athletic taping (21%) than kinesio taping (10%) that corresponded to the immediate increase in pain free grip strength more after athletic taping (14.5%) than kinesio taping (9.7%). 30 minutes later both the outcome measures gave similar percentage changes. The present study concludes with the recommendation of both athletic taping as well as kinesio taping for gaining short term improvements in pain and muscle performance in patients with lateral epicondylalgia.

KEYWORDS: grip strength, muscle performance, pain, pressure pain threshold.

Address for correspondence: Dr. Rashi Goel, Assistant Professor, Department of Physiotherapy, Dr. DY Patil College of Physiotherapy, Pimpri, Pune, Maharashtra- 411018, India.

E-Mail: rashigoelphysio@gmail.com

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INTRODUCTION

Lateral Epicondylalgia (LE), also known as lateral epicondylitis, lateral epicondylosis, tennis

elbow, shooter's elbow, archer's elbow or tendonitis of the affected forearm extensor muscles, is a degenerative tendinopathy

characterised by pain at the lateral epicondyle, aggravated by resisted muscle contraction of the extensor carpi radialis brevis (ECRB) [1]. The syndrome is most prevalent (35–64% of all cases) in jobs requiring repetitive manual tasks resulting in restricted function and absenteeism from work [2]. Its prevalence has been reported to be 3% in the general population, 15% in repetitive hand task occupations, and 50% in tennis players [2, 3].

Different treatment modalities have been described, including orthotics, nonsteroidal anti-inflammatory drugs, steroid injections, topical glyceryl trinitrate, exercise therapy, manual therapy, ultrasound therapy, laser therapy, extracorporeal shockwave therapy, acupuncture, taping, hyaluronan gel injections, botulinum toxin injections, and surgery [2,3,4]. Even then, treatment interventions for LE lack scientific validation.

Mc Connell proposed that taping assists in pain management, affects joint range of motion, decreases the effects of inflammation, off-loads pain producing tissues, and provides protection and support during movement [5]. Diamond taping procedure is one of McConnell's deloading procedures in which soft tissues are drawn in towards the area of pain at the lateral epicondyle so that orange peel effect occurs with puckering of the skin inside the diamond [6]. This taping technique has shown substantial improvements in pain-free grip strength and pressure pain threshold in previous studies [5].

Kinesio-taping (KT) method is being used as both a therapeutic and performance enhancement tool [7]. Kenzo Kase claimed that it helps to: 1) gather fascia to align the tissue in its desired position, 2) lift the skin over areas of inflammation, pain, and oedema, 3) increase stimulation of the mechanoreceptors to either stimulate or limit movement, 4) provide a positional stimulus to the skin, and 5) decrease pressure over the lymphatic channels that provide a path for the removal of exudates [8, 9].

Inspite of a number of treatment options available, evidence to select the best treatment interventions for LE is lacking. The purpose of this study is to compare the effectiveness of

kinesio taping and athletic taping on pain, pressure pain threshold and pain free grip strength in patients with lateral epicondylalgia.

METHODS

The cross over study design was carried for one year. It was done in physiotherapy department Kasturba Hospital Manipal. Male and female participants with lateral epicondylalgia in the age group of 18 – 50 years were screened and recruited for the study. Inclusion criteria were pain over lateral humeral epicondyle and pain over the same while gripping, resisted wrist extension and passive wrist flexion with elbow extension. Subjects were excluded if they had neuromuscular diseases, peripheral nerve entrapment, cervical radiculopathy, known allergies to tape, previous trauma and surgery to elbow and congenital or acquired deformities of the elbow. Taping was selected through block randomization (block of four) so that each patient randomly received one of the taping with the other taping on the subsequent day.

Approval from Institutional Research Committee and Institutional Ethical Committee were sought and prior informed consent was taken. Though the sample size was 14, 16 subjects participated in the study. Each subject was evaluated for pain, pressure pain threshold and pain free grip strength, prior to taping, immediately after and 30 minutes of each taping application. Athletic taping was applied in a diamond box pattern as McConnell's reloading procedure with four strips of non elastic, adhesive -backed sports tape laid distally to proximally in a diamond shape with tractional force on the soft tissues towards lateral epicondyle and perpendicular to the line of the tape [5,6].

Kinesio Taping techniques used in the study is for treatment of muscle and fascia correction. As described by Kenzo Kase, tape was applied from insertion to origin to inhibit ECRB muscle function [8]. For fascia correction the base of the fascia correction was applied in front of the pain point. The fascia was pulled towards the free direction. The tape ends were affixed without tension.

Outcome measures: Pain was assessed on Visual Analogue Scale. Patients were asked to

grade their pain using a Visual Analogue Scale. This scale consisted of a simple horizontal line, 100 mm in length, on a white loose leaf of paper [10]. The following wordings were used: "Show me your pain level on the line, here is no pain, and there is the worst possible pain". The patients were asked to mark on the line the point that they feel represents their perception of pain of their current state.

Pressure Pain Threshold was obtained by applying the 1-cm² rubber probe tip of a digital algometer to the most palpably tender site over the lateral epicondyle with arm in 30° of abduction, elbow in 90° of flexion; and with forearm, wrist, and hand supported. Pressure pain threshold is defined as the pressure at which the participant first felt pain [5]. It was measured 3 times, with 20 sec rest interval between each measurement. For analysis, mean value (in kg/cm²) of the 3 efforts was noted.

Pain free grip strength was measured with Jamar Hand Dynamometer (Chaitillon) as described by American Society for Surgery of Hand [5, 11]. Subjects were seated on a chair, with elbow flexed to 90°, forearm in mid prone. Subjects were asked to smoothly increase their grip force, and stop pressing at the onset of lateral epicondylar pain. PFGS was measured 3 times with 20 second rest interval between each measurement. Mean value (in kg) of three efforts was noted.

Data analysis was done using SPSS software version 16.0 for windows. Normality of data was analysed using Shapiro-Wilk test and by observing normality curve using histogram. Since data was found to be normally distributed, repeated measures Analysis of Variance was performed using Bonferroni test for corrections. Change in each outcome measure for both taping techniques was calculated by percentage changes. The level of significance was set as ≤ 0.05 keeping the power of study at 80%.

RESULTS

A total of 16 patients based on the selection criteria (with mean ages 33.4 years) were enrolled in the study out of which 44% of the subjects were females. Average duration of symptoms was around 2 years 3 months and 71% had dominant right side affection. Demographics

of study participants are shown in Table 1.

Table 2 shows that immediate reduction in pain was more after athletic (21%) than kinesio taping (10%) and 30 minutes later kinesio taping resulted in greater reduction in pain (25% > 20.6%). Immediate increase in grip strength was more after athletic (14.5%) than kinesio taping (9.7%) but similar percentage increase after 30 minutes (23%). Pressure pain threshold showed similar percentage increase in both the taping techniques.

Results are graphically represented in Figures 1 to 3. Figure 1 depicts decrease in pain both immediately and 30 minutes after each taping application. Figure 2 shows increase in Pressure Pain Threshold both immediately and 30 minutes after each taping application. Figure 3 depicts increase in pain free grip strength both immediately and 30 minutes after each taping application.

Repeated measures ANOVA showed no statistically significant difference between the two taping techniques used for any of the outcome measures.

Table 1: Demographic characteristics of the study participants.

Characteristics of subjects	n = 16
Age (Mean ± SD, year)	33.4 ± 6.9
Gender (Male : Female)	9:7
Duration of pain (Mean ± SD, month)	14.8 ± 11.7
Side affected	
Right	10
Left	6
Right dominant	14
Left dominant	2

Abbreviations: SD= Standard Deviation

Table 2: Percentage change for each outcome measures for both interventions.

	Immediate		30 min	
	KT	AT	KT	AT
Reduction in pain	10%	21%	25%	20.60%
Increase in PPT	21%	23%	25.70%	25.70%
Increase in PFGS	9.70%	14.50%	23%	23.70%

Abbreviations: KT= Kinesio Taping, AT= Athletic Taping, PPT= Pressure Pain Threshold, PFGS= Pain Free Grip Strength

Fig. 1: Comparison of Pain on Visual Analogue Scale Score between kinesio and athletic taping. VAS- Visual Analogue Scale, 1-VAS Pre Taping, 2. VAS Immediately after Taping, 3-VAS 30 Minutes after taping application. Taping 1- Kinesio tape, 2- Athletic Tape.

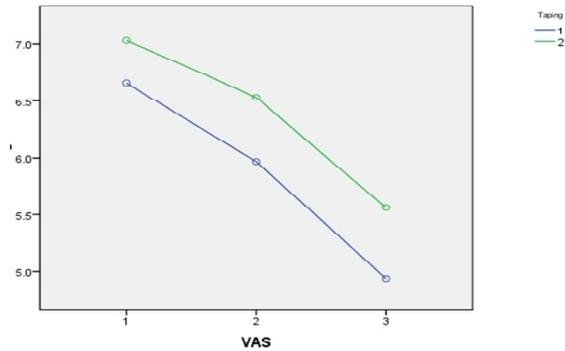


Fig. 2: Comparison of Pressure Pain Threshold between kinesio and sports taping. PPT- Pressure Pain Threshold. 1-PPT-Pressure Pain Threshold, 2- PPT immediately after taping 3- PPT 30 Minutes after taping application. Taping 1 -Kinesio tape, 2- Athletic Tape.

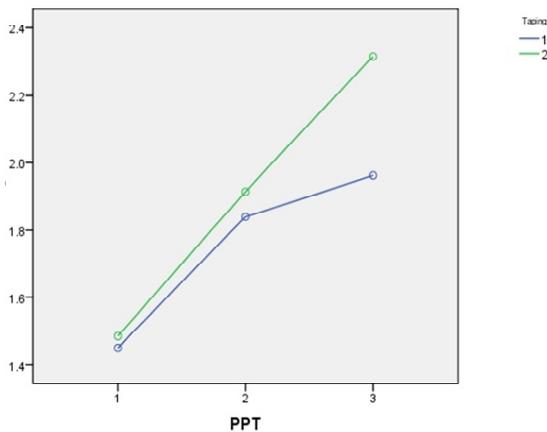
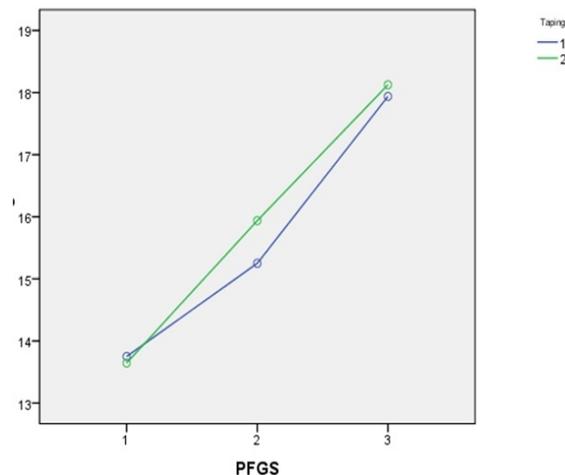


Fig. 3: Comparison of Pressure Pain Free Grip Strength between kinesio and sports taping. PFGS- Pain Free Grip Strength, 1-PFGS Pre Taping, 2- PFGS Immediately after Taping, 3- PFGS 30 Minutes after taping application. Taping 1 -Kinesio tape, 2- Athletic Tape.



DISCUSSION

The present study demonstrated that both kinesio as well as athletic taping decreased pain and improved muscle performance immediately and after 30 minutes of application in participants with lateral epicondylalgia. A possible clinical ramification of this finding is that the kinesio tape could be used to facilitate pain free rehabilitation program for lateral epicondylalgia.

The mean decrease in pain in the present study after diamond taping was 20 % ($p= 0.001$). Mean increase in PPT was 25.7 % ($p= 0.000$). Mean increase in pain free grip strength was 23 % ($p=0.000$). It can be attributed to a direct mechanical effect on the muscles of the forearm similar to that postulated, but not proven, for orthotic braces for this condition [12].

The results are supported by the previous studies involving diamond taping for lateral epicondylalgia done by Bill Vicenzino in 2003 and Alireza Shamsoddini in 2010 [5,13]. Mean increase in PPT was more than 19% reported by Bill Vicenzino in 2003. In their study, participants indicated pain onset by depressing a button held in the untested hand which could have resulted in under or over estimation of the PPT.

The mean increase in pain free grip strength was 23%, which is similar to the 24% reported by Bill Vicenzino in 2003 but greater than 16% as reported by Samsoddinni in 2013 [2,13]. A major difference between studies could be the test position used to measure pain-free grip strength. The current study and that of Bill Vicenzino measured grip strength in 90° of flexion as recommended by American Society of Hand Therapists whereas others with elbow in extension.

Studies on counterforce bracing showed increase in maximum grip strength about 4% to 5% [12]. The counterforce brace used in the other studies wrapped circumferentially about the forearm and applied pressure onto all surfaces of the forearm. Possibly the difference in stimulus provided to the underlying soft tissues by the tape and orthosis accounts for the difference in effect. Present study evaluated the taping technique that was exclusively restricted to lateral aspect of the elbow.

We postulate that the significant increase in pain free grip strength occurred because diamond shaped taping technique dispersed stresses generated by muscle contraction, thereby reduced protective pain- related inhibition and allowed the subject to contract more forcefully.

The mean decrease in pain in this study after kinesio taping was 25% ($p= 0.003$); mean increase in PPT was 25.7% ($p=0.008$). It can be attributed through a reduction in mechanical stress on free nerve endings within the fascia through fascia unloading. The application of kinesio tape created convulsions on the skin which increased the interstitial spaces between the sheets of fascia. This technique has proved to be effective in treating worst pain in patients with non-acute non-specific low back pain [15].

The mean increase in pain free grip strength after kinesio taping was 23% ($p= 0.000$). The inhibition technique applied for ECRB reduced over stretching and over contraction of the muscle, leading to overall increase in muscle performance. Since wrist extensor muscles act synchronously with the finger flexor muscles, reduction in pain also increased pain free grip strength [3].

Similar results with kinesio taping have been found in previous studies done on active rotator cuff tendonitis/ impingement, traumatic patellar dislocation, acute whiplash injury, mechanical neck pain, etc [16, 17]. Since none of the studies provided a definitive mechanism of action, it can be postulated that the cutaneous stretch stimulation provided by KT interferes with the transmission of mechanical and painful stimuli leading to pain reduction.

CONCLUSION

The present study proved athletic tape and kinesio tape to be equally effective in gaining short term benefits in lateral epicondylalgia. The study implies the use of both athletic taping and kinesio taping in future in addition to the conventional therapy in the management of patients with lateral epicondylalgia. Future research could focus on long term effects of kinesio taping in lateral epicondylalgia.

Conflicts of interest: None

REFERENCES

- [1]. James KH, Raymond C, Leung. Lateral epicondylalgia: midlife crisis of a tendon. *Hong Kong Med J* 2014;20(2):1-7.
- [2]. B. Vicenzino. Lateral epicondylalgia: a musculoskeletal physiotherapy perspective Masterclass. *Man Ther.*2003;8(2):66–79.
- [3]. Coombes BK, Bisset L, Vicenzino B. A new integrative model of lateral epicondylalgia. *Br J Sports Med.* 2009;43:252–258.
- [4]. L Bisset, A Paungmali, B Vicenzino et al. A systematic review and meta-analysis of clinical trials on physical interventions for lateral epicondylalgia. *Br J Sports Med.* 2005; 39:411–422.
- [5]. Vicenzino B, Brooksbank J, Joanne M, Sonia O, Aatit P. Initial Effects of Elbow Taping on Pain-Free Grip Strength and Pressure Pain Threshold. *J Orthop Sports Phys Ther.*2003;33:400–407.
- [6]. Rose MacDonald. *Taping Techniques Principles and Practice.* 2nd edition. China: Elsevier; 2004.p. 3-27.
- [7]. Kumbrink K *Taping, An Illustrated Guide Basics Techniques Indications.* K-Taping Academy, Wildbannweg Dortmund. Springer Verlag Publications; 2011.p. 138-139.
- [8]. Kase K, Wallis J, Kase T. *Clinical Therapeutic Applications of the kinesio taping method.* 2nd edition. Albuquerque, NM: Kinesio Taping Association; 2003.p. 12-40.
- [9]. Seda B., Nihan K. Gul B. Effect of Athletic Taping and Kinesiotaping on measurements of functional performance in basketball players with chronic inversion ankle sprains. *The Inter J Sports Phys Ther.*2012;7(2)154-166.
- [10]. Wewers M.E. & Lowe N.K. A critical review of visual analogue scales in the measurement of clinical phenomena. *Research in Nursing and Health* 1990;13, 227-236.
- [11]. Hunter, Mackin, Callahan. *Rehabilitation of the hand and upper extremity.* 5th edition. Mosby Publications; 2002. p. 1796- 1807.
- [12]. Jennifer L, Wouri, Thomas J. Strength and Pain Measured Associated With Lateral Epicondylitis Bracing. *Arch Phys Med Rehabil.* 1998;79:832-7.
- [13]. Alireza S., Mohammad T.Z. Effects of Taping on Pain, Grip Strength and Wrist Extension Force in Patients with Tennis Elbow. *Trauma Monthly*2013;18(2):71-4.
- [14]. Sullivan D, Stephen P. Utilization of Kinesio Taping for Fascia Unloading. *Int J Athl Ther Train.*2011;16(4),21-27.
- [15]. Marco A, Leonardo O, Thiago YF et al. Efficacy of adding the kinesio taping method to guideline-endorsed conventional physiotherapy in patients with chronic nonspecific low back pain: a randomised controlled trial. *BMC Musculoskelet Disord.*2013,14:301:1-8.

- [16]. Bennett, G. Fratocchi, M. Mangone. Kinesio Taping applied to lumbar muscles influences clinical and electromyographic characteristics in chronic low back patients. *Eur J Phys Rehab Med* 2011;47:237-244.
- [17]. D. Morris, D. Jones, H. Ryan et al. The clinical effects of Kinesio Tex taping: A systematic review. *Physiother Theory Pract.* 2013;29(4):259–270.

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