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THE IMMEDIATE EFFECTS OF DYNAMIC TAPING ON ENDURANCE, PAIN, DISABILITY AND MOBILITY IN SPORTS PERSON WITH NON-SPECIFIC LOW BACK PAIN

Dr. Piyush Jain* Ph.D. Scholar, Galena health care Delhi. *Corresponding Author

Dr. Anand Misra Ph.D., Professor, Sri Aurobindo Institute of Allied Health & Paramedical Sciences, Indore.

Dr. Akshay Pal Assistant Professor, Sri Aurobindo Institute of Allied Health & Paramedical Sciences, Indore.

ABSTRACT Evidence suggests that the application of Kinesiology Tape (KT) on sports person with chronic non-specific low back pain is inconclusive. Dynamic tape (DT) is a comparatively new technique, which is gradually being used as an adjunctive technique to treat musculoskeletal problems. To our knowledge, no study has investigated the application of DT in sports person with chronic non-specific low back pain.

To compare the immediate effects of Dynamic taping versus Kinesiology Tape (KT) on endurance, pain, disability and mobility in sports person with chronic non-specific low back pain. 30 subjecs with CNLBP were randomly assigned in two groups. Outcomes were measured at pre examine, immediately, and on the third day post-application of tapes. The primary 3 outcomes measurement by of pain, endurance, and disability were check the visual analog scale (VAS), Biering–Sorensen test, and Oswestry disability index (ODI), correspondingly. Secondary outcome measures of mobility were measured by the modified–modified Schober test, respectively. No significant immediate differences were found between DT and KT in pain, disability, mobility, Enhanced back extensor endurance was observed for the DT group than KT ($p = 0.023$) and control group ($p = 0.006$). The DT may result in increases only in spinal extensor endurance among sports person with CNLBP. This result advises that DT controls the processes that lead to back muscle fatigue.

KEYWORDS : Exercise, kinesiology taping, low back pain, ODI, CNLBP, Dynamic taping

INTRODUCTION:

Low back pain (LBP) is a critical public health condition that is associated with a high rate of absenteeism from work, disability, and the frequent use of health services [1]. The most type of LBP is non-specific LBP, which affects persons of all ages and is a significant contributor to illness burden worldwide [2]. Chronic non-specific low back pain (CNLBP) shows as pain, stiffness, muscular tension, restriction on mobility and disability among the costal margin and inferior gluteal folds long-lasting for 12 weeks or more [3], and is reflected one of the important causes of disability through an entire life-span [4].

The present works supports numerous options for the treatment of LBP that vary according to the period of symptoms [5] and the sorting of this condition [6]. These treatment choices take in educational programs [7], behavioral therapy [8], cognitive therapy [9], medication [10], electrophysical agents [11], manual therapy [12], kinesiology taping [13], exercises [14], and specific spinal stabilization exercises [15]. While the managements above have been commonly used, at best, they prove a limited result, with recurrences normally noted [16]. Consequently, more in effect therapeutic involvements are critically essential to manage the LBP.

Taping is one of the therapeutic involvements practiced by physiotherapist and members of the rehabilitation team. Sports injuries, different kind of clinical disorders and conditions in the spine are prevented or cured by taping techniques [17]. Frequent types of tape and their related application approaches are obtainable, with different underlying philosophies about their types of action. Kinesiology tape (KT), Dynamic tape (DT), rigid tape, micro-pore tape, athletic tape, and many other types are available to manage or rehabilitate injuries.

DT is new treatment technique that is progressively becoming an adjunctive method to treat musculoskeletal conditions. In 2009, Ryan Kendrick created DT, which contains visco-elastic nylon and lycra blend material and can elasticity in four ways, has solid elastic resistance and recoil, as well as a great degree of stretch (more than 200%) with not at all rigid end and visco-elastic material goods. The mode of act of DT is mechanical (decrease of eccentric work, decrease load absorption, and support of movement), while other mode of operation is neurophysiological [18].

In 1973, KT was developed by Kenzo Kase and is applied in an elastic taping technique to the patients' skin under tension. It can be extended up to 140% of its length, generating a lesser mechanical restraint and less mobility restriction than straight tape. KT has been described to correct joint malalignment, provide support for muscles, activate the endogenous analgesic system, and eradicate congestion fluids [19].

Thus, we assumed that the immediate effects of DT are better than KT in terms of the fall of pain and the progress of endurance, disability, mobility Though, some few researches has appraised the influence of DT on LBP, and thus, the current study aims to decide the effect of DT on the treatment of sports person with CNLBP.

MATERIALS AND METHODS

Design and setting: A randomized controlled trial was conducted at the out-patient physical therapy clinic.

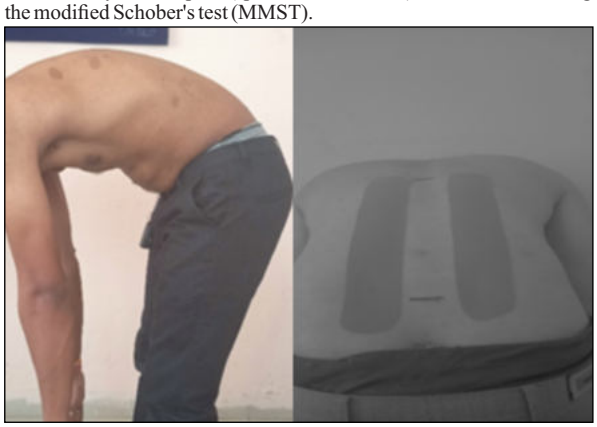
PARTICIPANT:

Over 2-months, male and female patients referred from an orthopedic surgeon to physical therapy in the out-patient physical therapy department were screened for eligibility. **Inclusion criteria** were as follows: sports person age between 18 to 40 years of age, referred to physical therapy with a diagnosis of Non-Specific Low Back Pain, with a least duration of symptoms of more than 12 weeks, lowest pain intensity score of 3 and on a 10 cm long visual analog scale, and a disability score of at smallest amount 20% on the Oswestry disability index (ODI) [20] at the time of assessment. **Exclusion criteria:** contraindication for taping, pain radiating to the knee, any known or doubted serious hereditary or acquired spinal pathology, spinal surgery, disc herniation, spinal deformity, rheumatoid arthritis and an incapability to tolerate the Biering–Sorensen test [21]. Written informed about study and consent was fill from all participants prior to study.

After the Pre examination, Subjects were randomly allotted into 2 group, the DT group ($n = 15$) and KT group ($n = 15$), Concealed allocation was performed using a computer-generated block randomized table of numbers (1 for DT group and 2 for KT group) created before the start of data collection by a researcher treatment according to the group assignment. The researcher's changed from the study protocol the duration between tape application and immediate post-application of measurement.

In the study procedure, we had declared earlier that the instant post-measurement would be done 2 hours after the tape procedure.Due to post-application outcome measurement because patients were unwilling to wait for 2 hours post taping. A 15 minutes rest interval was sufficient to measure the outcomes among subjects with LBP after tape, according to a study done by Velasco-Roldan et al. [31]. Outcome measures Baseline assessment included demographic data, recent episode of the condition, as well as consistent exercise. The routine

physical examination did to determine the subject did not include LBP with a neurological origin. The results were considered prior to tape application, 15 minutes after tape with tape in situ, and on the third day of post tape application without tape. The prime outcome methods were pain, back extensor endurance, and disability. Pain was assessed with self-report measures of visual analog scale (a 10 cm scale, where 0 denoted no pain and ten represented intolerable pain), which is a reliable and valid tool to measure pain among patients with chronic LBP. Back extensor endurance was check in seconds by using the Biering–Sorensen test, which is measured to have enough test–retest reliability (intraclass correlation coefficient (ICC) = 0.88) [21] for evaluating isometric back extensor muscle endurance Contestants' disability was measured using the English version [20] of the ODI. This is a self-rating form used to calculate functional physical disability. It contains ten sections of six propositions, each rated on a 0–5 scale, while relative values are reported (total score / total possible score X 100%). The secondary outcome procedures were mobility. The mobility of the spine (spinal flexion ROM) was measured using the modified Schober's test (MMST).



A B

C D

Fig 1. I- shaped dynamic tape (A. Taping position, B. Application of tape) and Kinesio tape (C. Taping position, D. Application of tape).

STATISTICAL ANALYSIS AND RESULT

Data were investigated with software SPSS Version 21.0 (company IBM-SPSS Inc., Armonk, NY). The regularity of spreading of all variables was tested using the Shapiro–Wilk test. The demographic and pre baseline characteristics between groups were compared by the one-way analysis of modification (ANOVA) for parametric variables and the chi-square test used for non-parametric variables. A mixed-methods ANOVA (3 x 3) was used to examine the main effect (group effect and time effect) and time x group interaction. All figures were directed with pre-protocol and intention-to-treat investigates. The while the *p*-value <0.05 was considered significant.

Table 1. Demographic And Baseline Characteristics Of The Groups:

Variable	DT Group (n = 15)	KT Group (n = 15)	p value
Age, y	37.47 ± 9.09	36.60 ± 9.06	0.953
Weight, kg	71.73 ± 7.36	72.00 ± 7.37	0.995
Height, m	1.69 ± 0.06	1.71 ± 0.06	0.702
BMI, kg/m^2	25.14 ± 2.47	24.79 ± 2.74	0.891
Marital status, n (%)			1.00
Single	2 (13.3)	3 (20)	
Married	13 (86.7)	12 (80)	
Education, n (%)			0.938
Undergraduate	1 (6.7)	2 (13.3)	
Graduate	6 (40)	8 (53.3)	
Master degree	6 (40)	3 (20)	
PhD	2 (13.3)	2 (13.3)	
Employment status, n (%)			0.407
Sedentary work	14 (93.3)	14 (93.3)	
Heavy work	1 (6.7)	1 (6.7)	
Smoking, n (%)	4 (26.7)	2 (13.3)	0.431
Duration of LBP, mo	12.33 ± 5.51	14.80 ± 6.03	0.521
Recent episodes of LBP, n (%)	13 (86.7)	14 (93.3)	0.760
Use of medication, n (%)	2 (13.3)	3 (20)	0.562
Regular exercise, n (%)	4 (26.7)	4 (26.7)	1.00
Pain (VAS 0-10 cm)	5.8 ± 0.87	5.71 ± 0.88	0.791
Endurance (sec)	50.99 ± 11.07	49.06 ± 10.34	0.611
Disability (0-100%)	28.13 ± 4.24	29.60 ± 5.19	0.681
Mobility (cm)	3.36 ± 0.45	3.38 ± 0.45	0.979

*DT=dynamic tape, KT = kinesiology tape, VAS=visual analog scale. *Values are mean ± SD unless otherwise indicated. * Significant difference: p < 0.05Table.2 shows the mean difference and effect size between groups (95% CI) in the three different assessments (pre, immediately post, and third day post) for all the outcome variables. There was significant improvement between the DT and KT.

Table 2. Mean Differences Between Groups [95% confidence interval (CI)] And *p*-value At Pre, Immediately Post And 3rd Day Post For The Variables

Variables	Groups	Mean ± SD			Mixed ANOVA (p-value)		
		Pre	Immediate post	3rd Day post	Interaction (Group and Time) effect TJ/ (p-value)	Group effect lip^2 (p-vlue)	Time effect lip^2 (p-value)
Pain (VAS 0 to 10)	DT	5.80 ± 0.87	3.71 ± 0.82	3.25 ± 0.93	0.550 (<0.00 l)*	0.398 <0.001)*	0.659 (< 0.001)*
	KT	5.71 ± 0.88	4.52 ± 0.93	4.11 ± 0.92			
Endurance (sec)	DT	50.99 ±11.07	66.19 ± 10.29	75.08 ± 1.54	0.768 (<0.00 l)*	0.232 (0.004)*	0.802 (<0.001)*
	KT	49.06 ±10.34	56.21 ± 8.93	57.93 ± 9.58			
Disability (0-100%)	DT	28.13 ± 4.24	27.73 ± 4.27	21.87 ± 4.10	0.638 (<0.00l)*	0.096 (0.120)	0.648 (<0.001)*
	KT	29.60 ± 5.19	28.93 ± 5.59	26.67 ± 4.45			
Mobility (cm)	DT	3.36 ± 0.45	3.48 ± 0.48	4.93 ± 0.55	0.711 (<0.001)*	0.218 (0.006)*	0.675 (<0.001)*
	KT	3.38 ± 0.45	3.49 ± 0.46	3.75 ± 0.67			

Mixed methods ANOVAs showed a significant difference between groups and time for pain, endurance, mobility, whereas the disability showed a significant difference only in time intervals (Table 2).

DISCUSSION

This randomized precise trial designed to compare the acute efficiency of DT to KT and controls in patients with CNLBP using the outcomes of pain, endurance, disability, mobility. To our information, this is the first study to analyze the effect of DT on CNLBP. This study's hypothesis that the enhancement would be found in the DT group compared to the KT group was not confirmed except with the endurance of back extensor muscle.

The muscles of back eccentric contraction is tremendously complicated while lifting objects or from forward roundabout to erect posture in person with LBP [26]. Back extensor muscles frequently have to produce an astonishingly large force to lift the body and/or hold objects. It is extremely significant to control the maximum torque produced by the spinal extensor musculature during the eccentric and concentric contraction in day-to-day events and to diminish the effect of external load or bodyweight on back extensors for patients with CNLBP [26]. The DT has the quality of a mechanical effect to decelerate the eccentric work, assisting the concentric movement, and absorbing the load placed on muscles during simple and complex movements [18].

Thus, we pointed to measure the immediate and effectiveness of DT on pain, endurance, disability, mobility. The results showed significant ($p<0.05$) immediate improvement only in back extensor endurance among sports person with CNLBP in favor of DT compared to KT. Among the other outcome comparisons, the DT group did not show any statistical significance, indicating improvements only in the group who underwent DT.

CONCLUSION

This randomized controlled trial revealed that the DT does not have a significant additional effect on pain, disability, mobility, among sports person with CNLBP compared to KT. Conversely, the participants experienced significant improvement in back muscular endurance after the application of DT. This finding advises that DT controls the processes that lead to back muscle fatigue. Therefore, more studies are required to examine the therapeutic benefits of DT in treating patients with CNLBP.

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