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EFFECT OF KINSIOTAPING ON LUMBAR CURVATURE AND MUSCULAR FATIGUE IN CHRONIC NONSPECIFIC LOW BACK PAIN PATIENTS

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Key words: Kinsiotaping; lumbar curvature; chronic low back pain, three dimensional motion analysis.

ABSTRACT

Purpose: Kinesio Taping (KT) is a technique that has been used in the clinical management of people with chronic back pain. This study investigated the efficacy of KT on patient with chronic non-specific low back pain using electromyography (EMG) and three-dimensional motion analysis (3DMA). **Subjects:** 50 patients with chronic low back pain aging from 25 – 40 years, with mean age (**36.62**±2.9) years. Patients were divided randomly into two equal groups, placebo group (A) received sham KT, and group B received real KT. **Methods:** The outcome measurements were electrical activity of lumbar Para spinal muscle using EMG pre and post KT, lumbar curvature using 3DMA and pain Pre and post KT using visual analogue scale (VAS) EMG and 3DMA were carried out at baseline and 2 weeks later while pain was recorded after 1 month. **Results:** Paired analysis for comparison between pre and post treatment measurements in each group showed significant decrease of lumbar curvature as well as medium frequency of Para spinal muscles in group B than group A. also there is significant decrease of pain in group B than on group A. Despite the equal baseline of all groups before treatment, there were significant decrease of lumbar curvature, medium frequency of Para spinal muscles and pain measurements in real KT group than placebo group. The results suggested that kinsiotaping have beneficial effects on pain, range of motion, and trunk muscle endurance in people with chronic non-specific low back pain of mechanical etiology.

INTRODUCTION

Lumbar dysfunction is a leading cause of disability. It occurs in similar proportions in all cultures, interferes with quality of life and work performance, and is the most common reason for medical consultations. Few cases of back pain are due to specific causes; most cases are non-specific [1].

Acute back pain is the most common presentation and is usually self-limiting, lasting less than three months regardless of treatment. Chronic back pain is a more difficult problem, which often has strong psychological overlay: work dissatisfaction, boredom, and a generous compensation system contribute to it [1].

Acute back pain is the most common presentation and is usually self-limiting, lasting less than three months regardless of treatment. Chronic back pain is a more difficult problem, which often has strong psychological overlay: work dissatisfaction, boredom, and a generous compensation system contribute to it [1].

Only about 15% of the patients seeking care for low-back pain get a well-defined diagnosis based on pathology. The rest have so called non-specific low-back pain. This is described as a “mechanical” back pain of musculoskeletal origin in which symptoms vary with physical activity [2].

Lumbar dysfunction or as it commonly described as Low back pain (LBP) is defined as any pain affecting the lower part of the back. It can be referred from elsewhere (such as kidney) or originating from the back directly. It classically considered *acute* if it is less than 6 weeks in duration and *chronic* if longer than 12 weeks [3].

isk factors are poorly understood. The most frequently reported are heavy physical work, frequent bending, twisting, lifting, pulling and pushing, repetitive work, static postures and vibrations. Psychosocial risk factors include stress, distress, anxiety, depression, cognitive dysfunction, pain behavior, job dissatisfaction, and mental stress at work [4].

Attempts to identify specific anatomical sources of low back pain in such patients have not been validated in rigorous studies, and classification schemes frequently conflict with one another. Moreover, no evidence suggests that labeling most patients with low back pain by using specific anatomical diagnoses improves outcomes. In a minority of patients presenting for initial evaluation in a primary care

setting, low back pain is caused by a specific disorder, such as cancer (approximately 0.7% of cases), compression fracture (4%), or spinal infection (0.01%) [5].Kinesio Taping, developed by Kenzo Kase in the 1970s, is a technique that has been used in the clinical management of people with chronic back pain [6].

It can be stretched to 120–140% of its original length, producing a lesser mechanical restraint and less restriction of mobility than conventional tape. Four beneficial effects have been claimed for Kinesio Taping: normalization of muscular function, increase in lymphatic and vascular flow, reduction in pain and contribution to correcting possible joint misalignments [7].

In the last few years the use of KT has extended among professionals, athletes and patients. However the specific effects and mechanisms of action of this kind of taping are still unknown. Although several studies have addressed the effects of KT on muscle strength [8].

Increase in electromyographic (EMG) activity has also been reported with KT [9], Range of motion increases statistically following KT treatment in subjects with several types of pain, without reaching clinical relevance [10,11].

Taken together the equivocal results obtained measuring both EMG and range of motion using three dimensional motion analysis system suggests a need fully characterize the effect of KT on muscle tone in the context of muscle strength, muscle extensibility and evoked EMG activity [11].

The two main theories proposed to explain the reported func- tional effects of KT are increased blood and lymphatic fluid circu- lation in the taped area due to a lifting effect, which creates a wider space between the skin and the muscle and interstitial space [12].

Further studies are required to establish the role of these physiological mechanisms during KT on skeletal muscle tone of patients with non specific mechanical low back pain.

In this study we compared the short-term effects of Kinesio Taping versus placebo tape application to the lumbar spine of people with chronic non-specific low back pain of mechanical etiology by using EMG and three dimensional motion analysis.

The research question for this study: Does 2 weeks of Kinesio Taping treatment have beneficial effects on pain, range of motion, and trunk muscle endurance in people with chronic non-specific low back pain of mechanical etiology?

So our study investigated the efficacy of KT on patient with chronic non-specific low back pain using EMG and three-dimensional motion analysis.

MATERIALS AND METHODS

Study design: The study was randomized controlled study conducted in the faculty of physical therapy, Cairo University, investigated the efficacy of KT on patient with chronic non-specific low back pain using wireless EMG to measure paraspinal muscular electrical activity and three-dimensional motion analysis to measure lumbar curvature.

Ethics approval: It approved by Pan African clinical trial registry under unique identification number for the registry is **PACTR201510001319256.** The study procedure was in accordance with the ethical standards of the responsible local committee on human experimentation of faculty of physical therapy, Kaferelshiek University. Before participating in the project, the aims of the study were explained orally to all the patients and written informed consents were obtained from all study participants.

Aim: Test retest design used to evaluate effects of kinsiotaping on patients with chronic non-specific LBP by assessing developing of fatigue in lumbar Para spinal muscles and its relation to lumbar curve with and without kinsiotaping to determine its effects after 1 month of treatment.

Inclusion criteria: Fifty male patients with chronic nonspecific low back pain (LBP), aging from 25 – 40 years, average body size (normal to mild overweight according to body mass index BMI) participated in this study. To be eligible **for inclusion** in the study participants were required to have had low back pain for at least 3 months, to be aged between 25 and 40 years, to score of four or more on the Roland-Morris Low Back Pain and Disability Questionnaire at randomization [13].

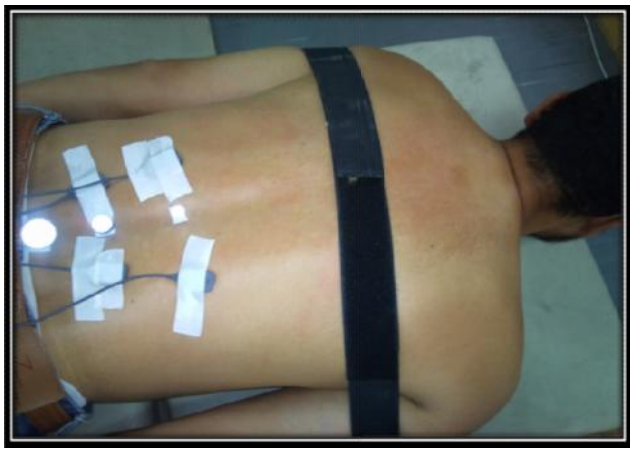
Exclusion criteria: Musculoskeletal or neurological injury with residual deficits, Previous surgery, Symptoms of nerve root engagement (i.e., pain distal to the knee), spondylolisthesis, spinal stenosis, inflammatory disease and cancer, Metabolic or vascular disease with a neurological component such as diabetes or atherosclerosis.

Grouping: Patients were randomly assigned into 2 groups each containing 25 patients. **Group (A)** Placebo group (sham kinsiotaping) and **group (B)** Ares type of kinsiotaping was putted on lower back parallel to the spine (real kinsiotaping).

Randomization was allocated using the numbered envelope method. 50 subjects were divided randomly into group A and B; subjects were blinded about which group they were allocated.

Methods

Patients lay in a prone position on an exercise bench with



the low back, hips, and knees securely fixed by straps as shown in Fig [1].

Fig 1: Passive reflected skin markers adhered to the spinous process of thoracic vertebrae number12, lumbar vertebrae number 3 and lumbar 5 by using double adhesive straps

The subjects also were secured at the level of the scapula by a leather strap, while in this position, the subjects were asked to attempt to extend the trunk; given the impossibility of performing this movement, this attempt led to an isometric contraction of the low back muscles. All subjects performed the protocol once [14]**.** Passive reflected skin markers adhered to the spinous process of thoracic vertebrae number12, lumbar vertebrae number 3 and lumbar 5 by using double adhesive straps Fig [1].

The protocol consisted of 3 stages: (1) one attempt at the maximal voluntary contraction (MVC), lasting approximately 5 seconds, (2) one fatigue test, which consisted of maintaining a calculated sub maximal level of 80% of the MVC for 35 seconds; and (3) a post fatigue test (at the same 80% of the MVC) for 10 seconds to monitor recovery. The highest value obtained in the first stage was used to calculate the submaximal level of 80% of the MVC. There were 2-minute intervals between stages; subjects were given strong verbal encouragement.

The basic principle of the Proflex Motion Capture Unit (MCU) as shown in Fig (2) is to expose reflective markers to infrared light and to detect the light reflected by the markers. The 2D image of the markers is processed by the MCU and the 2D coordinates of each marker are output as a data stream. A system of several units can be setup to perform multi-camera measurements. 2D data from each camera in such a system can be retrieved simultaneously.

Fig 2: The basic principle of the Proflex Motion Capture Unit (MCU)

Qualysis medical AB system captured lumbar curvature during first and last stage of EMG protocol.

The EMG and force signals were acquired simultaneously during the protocol with a Pentium 200-MHz PC-compatible microcomputer Fig (3), through a 12-bit analog-to-digital converter board, with a sampling frequency of 2,000 Hz per channel.

The EMG activity was recorded bilaterally from the longissimus (L1) and iliocostalis lumborum (L2) muscles, in accordance with standards for reporting EMG data [15].

EMG sensors electrodes (2.0 cm in diameter) were placed in a bipolar configuration on the bellies of the muscles, along the supposed alignment of the muscle fibers.

The reference electrode was placed on the left wrist. Preparation for surface EMG activity detection included shaving and application of alcohol to cleansed skin. Impedance between electrodes was checked and accepted when maintained at less than 5 k [ohms]. Recordings were made by use of an 8-channel EMG system.

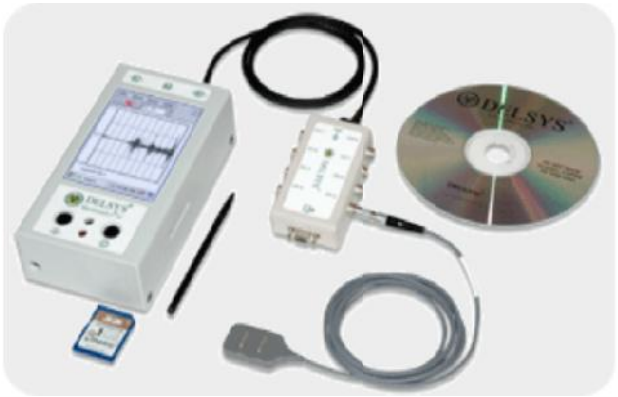


Fig 3: Wireless EMG with 8 dual channel output

Pain was assessed by visual analog scale (VAS) for each patient in both groups (A&B) before starting the study and after the end of study (1 month). VAS is a scale that allows continuous data analysis and uses a 10cm line with 0 (no pain) written at one end and 10 (worst pain) on the other end. Then after that real technique of kinsiotaping was applied for group B (Para spinal application) as shown in fig (4) and sham kinsiotaping were applied for group (A) as shown in fig (5) and changed every 3 days for 2 weeks for both groups and all measure (EMG-3DMA) were repeated again after 14 days of initial evaluation) and pain was recorded after 1 month of initial assessment.

Fig 4: shows Para spinal application of kinsiotaping (Real kinsiotaping)

Fig 5: shown sham kinsiotaping

Statistical analysis: Data collected were analyzed statistically using

- Descriptive statistics (mean and standard deviation)
- Inferential statistics using student T test.
- Pearson correlation coefficient to determine the correlation between changes occurs in electrical activity of lumbar Para spinal muscles and lumbar curve in last stage of assessment protocol pre and post kinsiotaping.

RESULTS

50 subjects suffered with chronic low back pain with mean age (36.62±2.9) years, mean weight (84.38±10.8) kilograms (Kg), mean height (170.91±5.04) Centimeter (Cm), and mean BMI (28.85±2.92) Kg\m^2, mean fat percentage (15.02±5.82)%, mean skeletal muscle percentage (37.691±3.92)%, and mean visceral fat percentage (6.03±3.12) % were assigned according to presence of pain after 3 months into two groups.

Group (A): Twenty-five patients who received sham technique of kinsiotaping were included in this group. The data in table (1) represented their mean age (35.14±3.0) years, mean weight (85.89±8.3) kilograms (Kg), mean height (172.61±4.36) Centimeter (Cm), mean BMI (27.81±2.56) Kg\m^2, mean fat percentage (11.51±3.04)%, mean skeletal muscle percentage (39.54±3.68) %, and mean visceral fat percentage (4.57±1.78) %.

Group (B): Twenty-five patients who received real technique of kinsiotaping were included in this group. The data in table (1) and represented their mean age (27.33±2.65) years, mean weight (89.46±12.47) kilograms (Kg), mean height (171.33±6.04) Centimeter (Cm), and mean BMI (30.41±2.78) Kg\m^2, mean fat percentage (18.73±7.02)%, mean skeletal muscle percentage (34.91±2.36)%, and mean visceral fat percentage (8.21±3.45) %.

There was no significant difference between both groups as reflected by the independent t-test in their ages and heights where their t and P-values were (1.35, 0.18) and (0.45, 0.65) respectively, while there was a significant difference in the weights, BMI, fat %, skeletal muscle %, and visceral % where their t and P-values were (2.76, 0.008), (3.21, 0.003), (4.05, 0.0001), (4.71, 0.0001), and (4.64, 0.0001) respectively.

Table (1): Physical characteristics of subjects in both groups (A&B).

Items	Total subjects	Group (A)	Group (B)	Comparison		
	Mean±SD	Mean±SD	Mean±SD	t-value	P-value	S
Age (yrs)	35.14±2.9	36.14±3.0	36.33±2.65	1.35	0.18	NS
Weight (Kg)	84.38±10.8	85.89±8.13	89.46±12.47	2.76	0.008	S
Height (Cm)	170.91±5.04	172.61±4.36	171.33±6.04	0.45	0.65	NS
BMI (Kg\m^2)	28.85±2.92	27.81±2.56	30.41±2.78	3.21	0.003	S
Fat %	15.02±5.82	11.51±3.04	18.73±7.02	4.05	0.0001	S
Skeletal muscle %	37.69±3.92	39.54±3.68	34.91±2.36	4.71	0.0001	S
Visceral fat %	6.03±3.12	4.57±1.78	8.21±3.45	4.64	0.0001	S

***SD: standard deviation, P: probability, S: significance, NS: non-significant.**

Table (2) demonstrated the total lumbar angle mean value pre and posttest for the whole subjects participated in the study. There was a significant difference in the paired t-test between pre and posttest values as the mean value of pre test was (18.16± 9.15) and for posttest was (21.16±10.03) where the t-value was (4.21) and P-value was (0.0001). The percentage of difference was 16.46%.

Table (2): Total lumbar angle **pre and post fatigue test.**

Total number of the subjects	Total lumbar angle	
	Pre test	Post test
Mean	18.16±9.15	21.16±10.03
Mean difference	2.99	
Percentage of difference	16.46 %	
t-value	4.21	
P-value	0.0001 Significance	

Table (3): Total lumbar angle **pre and post fatigue test for** subjects in group (A & B)

	Group (A)		Group (B)	
	Pre test	Post test	Pre test	Post test
Mean	21.91±11.02	21±11.3	22.45±3.55	17.86±4.5
Mean difference		0.91	4.59	
% of difference	4.5 %	36.17 %		
t-value	1.21	6.07		
P-value	0.29	0.0001		

***SD: standard deviation, P: probability, S: significance, NS: non significant, DF: degree of freedom**

Group (A): Table (3) demonstrated the total lumbar angle mean value pre and post fatigue test after sham kinsiotaping for subjects in group (A). There was no significant difference in the paired t-test between pre and posttest values as the mean value of pre test was (**21.91±** 11.02) and for posttest was (21±11.26) where the t-value was (1.21) and P-value was (0.29). The percentage of difference was 4.5 %.

ii) Between Groups:

Table (4) revealed the independent t-test results for the total lumbar angle pre and post fatigue test between groups A and B. There was no significant difference in pre test values between group (A) and group (B) where the t-value was (0.23) and p-value was (0.86). While there was a significant difference in the posttest values between group (A) and group (B) where the t-value was (2.13) and p-value was (0.05).

Table (5) Independent t-test **between groups A and B for** EMG of the right & Left iliocostalis muscle pre and post fatigue test revealed the independent t-test results for the EMG have the **right iliocostalis** muscle pre and post fatigue test between groups A and B. There was no significant difference in pre test values between group (A) and group (B) where the t-value was (1.89) and p-value was (0.24). While there was a significant difference in the posttest values between group (A) and group (B) where the t-value was (3.26) and p-value was (0.03).

while the independent t-test results for the EMG of the **left iliocostalis** muscle pre and post fatigue test between groups A and B. There was no significant difference in pre test values between group (A) and group (B) where the t-value was (0.91) and p-value was (0.36). While there was a significant difference in the posttest values between group (A) and group (B) where the t-value was (4.43) and p-value was (0.001).

Table (6) Independent t-test **between groups A and B for** EMG of the left & right longismus muscle pre and post fatigue test**.** revealed the independent t-test results for the EMG of the **left longismus** muscle pre and post fatigue test between groups A and B. There was no significant difference in pre test values between group (A) and group (B) where the t-value was (1.06) and p-value was (0.3). While there was a significant difference in the posttest values between group (A) and group (B) where the t-value was (5.04) and p-value was (0.0001).

While the independent t-test results for the EMG of the **right longismus** muscle pre and post fatigue test between groups A and B. There was no significant difference in pre test values between group (A) and group (B) where the t-value was (2.05) and p-value was (0.2). While there was a significant difference in the post test values between group (A) and group (B) where the t-value was (4.32) and p-value was (0.003).

Pain intensity: The group means and SDs for pain intensity, which collected after 1 month from assessment, are shown in **table [7]**

For total subjects participated in the study the mean of pain intensity was (**7.55**±2.93). For the patients (group A) the mean of pain intensity was (**5.38**±1.34). But for patients (group B) the mean of pain intensity was (**1.15**±1.01).

Table (7) revealed the independent t-test results for the pain intensity between groups A and B. There was a significant difference in pain intensity between group (B) and group (A) where the t-value was (14.48) and p-value was (0.0001).

Table (4): Independent t-test **between groups A and B for** total lumbar angle pre and post fatigue test**.**

Independent t-test	Total lumbar angle	
	Pre	**Post**
Mean difference	**0.6**	**6.17**
t-value	**0.23**	**2.13**
P-value	**0.86**	**0.05**
S	**NS**	**S**

***SD: standard deviation, P: probability, S: significance, NS: non-significant, S: significant**

Table 5: Independent t-test **between groups A and B for** EMG of the right & Left iliocostalis muscle pre and post fatigue test**.**

Independent t-test	EMG of the right iliocostalis muscle		EMG of the left iliocostalis muscle	
	Pre	**Post**		
Mean difference	**10.26**	**14.11**	**9.65**	**24.54**
t-value	**1.89**	**3.26**	**0.91**	**4.43**
P-value	**0.24**	**0.03**	**0.36**	**0.001**
Signifcance	**NS**	**S**	**NS**	**S**

***SD: standard deviation, P: probability, S: significance, NS: non-significant, S: significant**

Table 6: Independent t-test **between groups A and B for** EMG of the left & right longismus muscle pre and post fatigue test**.**

Independent t-test	EMG of the left longismus muscle		EMG of the right longismus muscle	
	Pre	**Post**		
Mean difference	**11.54**	**27.3**	**17.2**	**32.8**
t-value	**1.06**	**5.04**	**2.05**	**4.32**
P-value	**0.3**	**0.0001**	**0.2**	**0.003**
Significance	**NS**	**S**	**NS**	**S**

Pain intensity:

Table (7): Mean and SD of pain intensity **&** Independent t-test **between groups A and B**

Pain intensity	**Mean±SD**
Total subjects	**7.55±2.93**
Group (A)	**5.38±1.34**
Group (B)	**1.15±1.01**
Mean difference	**4.23**
t-value	**14.48**
P-value	**0.0001** ^{S}

DISCUSSION

In this study we investigated the efficacy of kinsiotaping (KT) on patients with chronic non-specific low back pain using EMG and three-dimensional motion analysis (3DMA)

(3DMA) Aimed to detect total lumbar angle pre and post application of kinsiotaping and its relation to develop lumbar dysfunction or LBP while surface electromyography was used to determine muscular fatigue and its effect of developing of back pain pre and post KT application.

At the end of the second-week period with the tape in its position, there were statistically significant decrease of electrical activity (medium frequency) of both illiocostalis and longismus muscles of group B which indicated increase muscular resistance to fatigue than before while in placebo group (A) there were no any statistically significant change pre and post placebo tape.

Which mean that lumbar muscle endurance improved significantly after the 2 weeks of kinsiotaping

Adelaida et al 2012 agree with those results who found that Trunk muscle endurance improved significantly after one week of kinsiotaping and this benefit was maintained four weeks later [16].

The precise mechanisms underlying the effect of Kinesio Taping on musculoskeletal pain are not yet clear. Some authors have hypothesised that Kinesio Taping relieves pain because sensory modalities operate within interconnecting, intermodal and cross-modal networks [17].

Others have suggested that keratinocytes may be non-neural primary transducers of mechanical stimuli, probably via a signal transduction cascade mechanism (eg, intracellular Ca2+ fluxes) to evoke a response on adjacent C-fibres [18].

Our results agree with yoshida et al 2007, whom have been explained by central nervous system neuro modulation promoted by activation of cutaneous mechanoreceptors [19,20], including the implication of muscle Ia afferents. However absence of change of passive resistive torque in response to movement velocity suggests that potential mechanical sensory input generated by KT may not be strong enough to influence muscle mechanics. According to this hypothesis Wong et al. showed an increase of muscle recruitment demonstrated as a shorter time to peak extension torque, but without effect on torque itself [21].

An additional theory is that KT may apply pressure or continual stretching of the skin within the taped area, and this external activation of cutaneous mechanoreceptors would activate modulatory mechanisms within the central nervous system demonstrated as an increase in muscle excitability [20,21].

It has been suggested that people with low back pain have a reduced physiological capacity to remove lactate, thereby maintaining metabolites within the muscle for a longer duration. [22] Although intracellular acidosis is considered to contribute to muscle fatigue, it also plays a role in preserving excitability when depolarization occurs within the muscle during activity; that is, intracellular acidosis has a protective effect during muscle fatigue, which Considering recovery capacity (ie, a return to a non-fatigue condition [23] as an important tool in the analysis of neuromuscular function and low back pain.Furthermore, our study revealed that there is significant decrease of lumbar angle in-group B after kinsiotaping which mean decrease shearing stress on lumbar spine, which consider one of important causes of back pain due to excessive lumbar lordosis. The increased anterior pelvic tilt induces a greater flexion of the sacroiliac joints, and therefore a higher torque on the L5-S1 joint and discs. This possibly increases the shear forces at this level and overloads the disc, thus increasing the risk of disk degeneration [24].

Nachmemson Al et al., 2000 and Nikolai Bogduk, 2005 agreed with our results whom suggested that there is relation between increase lordosis of lumbar spine and stress distribution on osteoligamentous lumbar spine and therefore cause low back pain [25, 26].

That can be explained through lumbar extension (increased lordosis), both the articular surfaces and the capsular ligaments support the forces on the facet joints. **Shirazi-Adl and Drouin, 1987** using a finite element model, reported that the facet joints carry large forces in extension, whereas in small degrees of flexion they carry none. Under a 10-N·m extensor moment, the L4-5 facet articular processes carried a contact force of approximately 90 N as compared with zero contact force at the L4-5 level under a flexor moment of 10 N·m. Addition of compression tends to increase these contact forces in extension, but it has no effect on them in small degrees of flexion. With hypolordosis (lumbar flexion), there is less compression of the facet joints together with an increase in the space available within the spinal canal and especially of the foramina of exit, which relieves the compressive effect on the nerve roots and the cauda equine [27].

In contrast, Chen et al. (2007), Cools et al. (2002) and Fu et al. (2008) reported that taping of the skin had no effect on the excitability of the muscles of healthy persons [28,29,30].

Perhaps the simple answer in the one given by Cowan et al. (2002) who stated that since normal healthy adults do not have any pains, reduction of muscle power does not take place, and therefore no change in muscle power is shown [31].

The hypothesis of Alexander et al. (2008) provides the basis for this explanation. Alpha-motor neurons, which innervate skeletal muscle, and gamma-motor neurons that innervate muscle spindles are not individually activated but are activated simultaneously. This phenomenon is called alpha-gamma co-activation. Unlike skeletal muscle fiber, when muscle spindle fiber contracts, the sensitization of groups Ia and II afferent nerve fibers does not reduce but rather is maintained in a state of continuous excitement [32].

In addition to that our study revealed that pain intensity was decreased signifcually in-group B than group A which may explained through effect of KT on skin sensory receptors as well as its effects on lymphatic circulation which prevent accumulation of waste products of muscular cells that may stimulate pain receptors.

Future studies are needed to investigate the change in anterior pelvic tilt angle after a long period of application of KT. Additionally; the effect of KT on the anterior pelvic tilt in patients with a posterior pelvic tilt also needs to be studied.

Also this study limited to male patients only to avoid pain may result from menstruation in female patients (dysmenorrhea), which may bias the results of VAS. Another study limitation is that we only investigated the short-term results of Kinesio Taping and cannot draw conclusions on its longer-term effects, which deserve investigation in future randomised clinical trials. Moreover, in clinical practice, therapists may not apply Kinesio Taping alone as an isolated intervention in people with chronic non-specific low back pain. Further research is required on the use of Kinesio Tape

in combination with other manual therapies and/or active exercise programs.

CONCLUSION

The previous results of this study objectively demonstrate that kinsiotaping have beneficial effects on pain, range of motion, and trunk muscle endurance in people with chronic non-specific low back pain of mechanical etiology

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Nil :Conflict of interest

REFERENCES

1. Ehrlich GE. low back pain .Bulletin of the World Health Organization 2003,, 81 (9).
2. Waddell G. low back pain. Spine; A twentieth century health care enigma. 1996,: 21:2820-2825.
3. Seferlis T, Németh G, Carlsson A-M. , Prediction of functional disability, recurrences, and chronicity after 1 year in 180 patients who required sick leave for acute low-back pain. Spinal Disord; 2000J 13:470-477.
4. Linton SJ. a review of psychological risk factors in back and neck pain. Spine; 2000, 25: 1148-56.
5. Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. Ann Intern Med.; 2002, 137:586-597.
6. Kase K, Tatsuyuki H, Tomoko O Development of kinesio tape. Kinesio taping perfect manual. Kinesio Taping Association (1996) 6: 117–118.
7. Kase K, Wallis J, Kase T Clinical therapeutics applications of the Kinesio Taping method. Tokyo: Ken Ikai Co Ltd. (2003)
8. Fu TC, Wong AM, Pei YC, Wu KP, Chou SW, Lin YC. Effect of Kinesio taping on muscle strength in athletes-a pilot study. J Sci Med Sport 2008;11:198e201.
9. Slupik A, Dwornik M, Bialoszewski D, Zych E. Effect of Kinesio Taping on bioelec -trical activity of vastus medialis muscle. Preliminary report. Ortop Traumatolgy Rehabil 2007;9:644e51.
10. Thelen MD, Dauber JA, Stoneman PD. The clinical efficacy of kinesio tape for shoulder pain: a randomized, double-blinded, clinical trial. J Orthop Sports Phys Ther 2008;38:389e95 .
11. Gonzalez-Iglesias J, Fernandez-de-Las-Penas C, Cleland JA, Huijbregts P, Del Rosario Gutierrez-Vega M. Short-term effects of cervical kinesio taping on pain and cervical range of motion in patients with acute whiplash injury: a randomized clinical trial. J Orthop Sports Phys Ther 2009;39:515e21.
12. Yoshida A, Kahanov L. The effect of kinesio taping on lower trunk range of motions. Res Sports Med 2007;15:103e12.
13. Roland MO, Morris RW A study of the natural history of back pain. Part 1: Development of a reliable and sensitive measure of disability in low back pain. Spine. (1983) 8: 141–144.
14. CT Candotti , Electromyography for Assessment of Pain in Low Back Muscles, PHYS THER, 2008.Vol. 88, No. 9, September, pp. 1061-1067.
15. Dedering A. Roos af Hjelmsater M, Elfving B, Harms-Ringdahl K, Nemeth G., Between-days reliability of subjective and objective assessments of back extensor muscle fatigue in subjects without lower-back pain. J Electromyogr Kinesiol; 2000 10:151–158.
16. Adelaida et al, Kinesio Taping reduces disability and pain slightly in chronic non-specific low back pain: a randomised trial , Journal of Physiotherapy 2012 Vol. 58
17. McGlone F, Reilly D The cutaneous sensory system. Neuroscience and Biobehavioral Review (2010) 34: 148–159.
18. Lumpkin EA, Caterina MJ Mechanism of sensory transduction in the skin. Nature (2007) 445: 858–865.
19. Akbas E, Atay AO, Yuksel I. The effects of additional kinesio taping over exercise in the treatment of patellofemoral pain syndrome. Acta Orthop Traumatol Turc 2011;45:335e41.
20. Konishi Y. Tactile stimulation with Kinesiology tape alleviates muscle weakness attributable to attenuation of Ia afferents. J Sci Med Sport 2013;16:45e8.
21. Wong OM, Cheung RT, Li RC. Isokinetic knee function in healthy subjects with and without Kinesio taping. Phys Ther Sport 2012;13:255e8.
22. Roy S.H., C.J. De Luca, M. Emley and R.J. Buijs. spectral electromyographic assessment of back muscles in patients with low back pain undergoing rehabilitation. Spine, 1995, 20: 38–48.
23. Pedersen TH, Nielsen OB, Lamb GD, Stephenson DG., intracellular acidosis enhances the excitability of working muscle. Science; 2004,305:1144-1147.
24. McGill SM, Hughson RL, Parks K., changes in lumbar lordosis modify the role of the extensor muscles. Clin Biomech.; 200015(10):777–780.
25. Nachmemson Al, Waddell G & Norlund Al., epidemiology of neck and low back pain. J scientific evidence of neck and back pain, 2000; PP. 165-188.
26. Nikolai Bogduk, "Clinical Anatomy of the Lumbar Spine and Sacrum, 2005; 4 Ed.
27. Shirazi-Adl A, Drouin G. load-bearing role of facets in a lumbar segment under sagittal plane loadings. J Biomech; 1987, 20:601–613.
28. Chen, W., Hong, W. and Huang, T.: "Effects of kinesio taping on the timing and ratio of vastus medialis obliquus and vastus lateralis muscle for person with patellofemoral pain", J Biomech, 200740: 40-42.
29. Cools, A., Witvrouw, E., Danneels, L. and Cambier, D.: "Does taping influence electromyographic muscle activity in the scapular rotators in healthy shoulders?", Man Ther, 2002; 7:154-162.
30. Fu, T., Wong, A. and Pei, Y.: "Effect of Kinesio taping on muscle strength in athletes - A pilot study", J Sci Med Sport, 2008, 1: 198–201.

31. Cowan, S., Bennell, K. and Hodges, P.: "Therapeutic patellar taping changes the timing of vasti muscle activation in people with patellofemoral pain syndrome", Clinic J Sport Med, 2002,12: 339-347.
32. Alexander, R.: "Functional Fascial Taping for Lower Back Pain", Journal of Bodywork and Movement Therapies, 2008;12(3): 263-264.