

Effectiveness of Kinesio taping application on low back pain in university employees: A randomized controlled trial

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ABSTRACT

The aim of this study was to investigate the therapeutic effect of Kinesio-taping on treatment of low back pain. Twenty male university employees (with low back pain) aged 30 to 40 yrs, were randomly classified into two groups: Kinesio taping group (KT) comprised of ten patients, who obtained Kinesio taping application in addition to home exercise for back and abdominal muscles; and control group which comprised of ten patients, who received only home exercise recommendations without KT application. Pain and disability scores were recorded before starting the program and after 6 weeks at the end of the program. Baseline characteristics showed non-significant differences between the two groups ($p > 0.05$). There was significant difference between pre- and post-treatment in the KT group ($p < 0.05$); while the control group showed non-significant differences between pre- and post-program ($p > 0.05$). It could be concluded that KT is a beneficial adjunctive physical therapy tool that could help in decreasing disability and pain.

Keywords: Low back pain, Kinesio taping, university employees.

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INTRODUCTION

Low back pain (LBP) is a very common health problem worldwide and it is a cause of disability and has negative effect on performance at work and general well-being. LBP can be acute, sub-acute, or chronic (Katz, 2006). LBP was identified as the most common cause of disability in young adults, with more than 100 million workdays lost per year. Previous survey suggested that LBP accounted for a quadrupling of the number of work days lost from 7 million in 1980 to 28 million by 1987 (Croft et al., 1993).

The main symptom of LBP is the pain or the ache in the lower back and sometimes it comes down to the buttocks and legs in the common cases clearly within a short period, muscle weakness, decreased activity, and even impairment in body functions is consequent to pain problem. LBP has many risk factors such as pregnancy, strenuous physical work, overweight (Nordqvist, 2016; Engers et al., 2003). Some problems of the back as a strain of muscle or ligament, muscle spasm, improper lifting, structural problems, such as bulging disk, sciatic

nerve pressure, abnormal curvature of the spine such as scoliosis and bad sleep postures will cause LBP (Roberts et al., 2006).

The 2010 Global Burden of Disease Study (Lopez and Murray, 1998) estimated that LBP is among the top 10 diseases and injuries that account for the highest number of DALYs worldwide. Prevalence of LBP among adults is about 70 to 80%; in the general population there is at least one episode of LBP at some time in their lives (Waker et al., 2004). The commonly prescribed treatment options are conservative and stretching, taping, laser therapy and drug therapy, hydrotherapy, electrotherapy and topical application. They have all been investigated and have shown variable clinical benefit (Smeets, 2009).

Kinesio-taping (KT) is a technique that has been used in the clinical management of people with chronic back pain; it was developed by Kenso Kase in the 1970s (Kase et al., 1996). He developed the tape over 40 years ago in Japan and introduced it to the United States in the 1990s (Kase et al., 2003). Therapeutic KT can benefit a wide

variety of musculoskeletal and sports injuries, plus inflammatory conditions. It can be stretched to 120–140% of its original length and conventional tape (Paoloni et al., 2011). It has a beneficial effect for normalization of muscular function, improvement of lymphatic and vascular flow, decrease in pain, and contributes to correcting possible joint misalignments (Thelen et al., 2008; Paoloni et al., 2011).

Objectives

The aim of this study was to investigate the therapeutic effect of Kinesio-taping on treatment of low back pain in university employees.

MATERIALS AND METHODS

Subjects

Twenty male university employees who were suffering from low back pain were selected for study from Prince Sattam Bin Abdul-Aziz University, Al Kharj, KSA. This study aimed to investigate the effect of 6 weeks application of KT on LBP. The participants were enrolled in this study, according to the following criteria; the participated subjects have LBP, their age ranged from 30 to 40 years. The participants were randomly classified into two groups; KT group comprised of ten patients, received Kinesio taping application in addition to home exercise for back and abdominal muscles and control group comprised of ten patients, received only home exercise recommendations without KT application. The patients who were suffering have undergone back surgery, neurological problem, cardiovascular disease, skin problems such as sensitive skin and wound, respiratory disease, and orthopedic problems were excluded from the study.

Materials

For evaluation

All subjects were evaluated before and after 6 weeks of KT application of the following materials:

a) Visual analogue scale (VAS): It is a simple and frequently used material for the assessment of variations in the intensity of pain. In clinical practice, the percentage of pain relief, assessed by VAS, is often considered as a measure of the efficacy of treatment. However, from the patient's perspective, this spectrum appears continuous their pain does not take discrete jumps, as a categorization of none, mild, moderate and severe would suggest. Operationally, a VAS is usually a horizontal line, 10 cm in length, anchored by word descriptors at each end (Lee and Yoo, 2012).

b) Oswestry low back pain disability questionnaire: The survey appeared overleaf is partitioned into ten areas chose from a progression of trial questionnaires intended to evaluate confinement of different activities of daily living (Wewers and Lowe, 2000).

For treatment

Kinesio tape (KT): The Kinesio taping technique was developed by Dr. Kenzo Kase in Japan more than 25 years ago. It is a thin, cotton, porous fabric with acrylic sticky. It has been theorized to

improve a variety of physiological problems, including the range of motion and healing, based on the functions of the tape (Bennatt and Ritchie, 2001).

Procedures

Evaluation

a) Visual analogue scale: The patients were asked to mark on the line the point that they feel it represents their perception of their current state (e.g., "No pain" to "Unbearable pain"). The VAS score is determined by measuring in centimeter from the left hand end of the line to the point that the patient marks (Oliveria, 1999).

b) Oswestry low back pain disability questionnaire: This scale is used to describe patient's limits in action of daily functional activity caused by back pain. This was found to be the most suitable number for obtaining accurate assessments, without confusing the patient. It consists of 10 sections, each section has 6 statements. Every section is scored on a 0 to 5, 5 representing the greatest disability. The scores for all sections are added together; giving a possible score of 50. The total is doubled and expressed as a percentage. Interpretation of disability scores: 0 to 20% minimal disability the patient can adapt to most living exercises. Normally, no treatment is shown separated from counsel on lifting, sitting and work out. 21 to 40% moderate disability the patient encounters more agony and trouble with sitting, lifting and standing. Travel and social life are more troublesome and they might be crippled from work. Individual care, sexual movement and resting are not horribly influenced and the patient can for the most part be overseen by the moderate means. 41 to 60% sever disability, pain remains the principle issue in this gathering, and however exercises of daily living are influenced. These patients require detailed examination. 61 to 80% crippled back pain impinges on all parts of the patient's life. Positive intercession is required. 81 to 100% these patients are either bed-bound or overstating their indications. If patient marks two statements; the highest scoring statement is recorded as a true indication of his disability. If a section is not completed because it is inapplicable (e.g. Section 8-sex life), the final score is adjusted to obtain a percentage (Pijnappel, 2007).

Treatment

Kinesio tape (KT): Before applying KT, the skin should be prepared first to prevent wrinkles and any errors. The area to be treated should be cleaned, free of hair to avoid sticking of hair when KT is removed. Taping should last for 3 to 5 days. After this period, KT can be easily removed through showering or making it wet.

The two (I) shapes of KT were applied from the origin of the lumbar erector spinae (Iliocostalis Lumborum) to its insertion. In the case of flexion disturbances, the patient was able to support herself during flexion. The first 4 to 5 cm of tape was carefully removed from its paper backing. The base of the tape was applied to the sacrum in the neutral position. The patient was asked to do a maximum flexion of the spine and the paper backing of the tape was removed, except for the final 4 to 5 cm and the tape were used on one side paravertebral in the direction of the cranium, under slight traction. Finally, the last 4 to 5 cm of the tape were applied without traction. The same procedure was then applied to the other side. The tape was scrubbed by hand several times to warm the adhesive material to achieve better adhesion (Fahad et al., 2013).

Statistical analysis

Descriptive statistics (mean and standard deviation) were computed

for all outcome measures. Paired and unpaired t-tests were used to compare the mean differences of the study variables within and between both groups respectively. Level of significance was set at $p < 0.05$ for all statistical tests. Statistical analysis was completed using SPSS, version 16.

RESULTS

Twenty male university employees suffering from low back pain were selected for study from Prince Sattam Bin Abdul-Aziz University. Their age ranged from 30 to 40 years old. Pain (VAS) and disability were recorded before starting the program and after 6 weeks at the end of the program. They evaluated every week for six weeks. The results were expressed as mean \pm SD, and P values less than 0.05 were considered significant.

Baseline characteristics, there were no significant differences between the measured variables in the two groups as demonstrated in Table 1.

After 6 weeks of intervention, there were statistical significant differences between the two groups. In KT group, the pain (VAS) level was 6.8 ± 0.83 , and disability level in Oswestry low back pain disability questionnaire showed 16.6 ± 4.21 before treatment and become (VAS) level 3.8 ± 0.83 and disability level became 7.8 ± 0.83 after treatment respectively. There were significant differences between pre- and post-treatment in the KT group. While in control group, VAS changed from 6.5 ± 0.91 to 5.9 ± 0.72 and disability questionnaire changed from 15.9 ± 3.88 to 13.7 ± 3.6 at the end of the study with non-significant differences between pre- and post-program as demonstrated in Table 2.

Table 1. Baseline characteristics of KT and control groups.

Characteristic	KT group (n = 20)	Control group (n = 20)	P- value	Significance $p < 0.05$
Age (year)	30.2 ± 2.14	31.4 ± 1.7	0.1819	NS
Pain (VAS)	6.8 ± 0.83	6.5 ± 0.91	0.4511	NS
Disability	16.6 ± 4.21	15.9 ± 3.88	0.7036	NS

KT: Kinesio taping, Sig: significant, NS: non-significant.

Table 2. Statistical analysis of mean differences between the two groups at the end of the program.

Variables	KT group		Control group		Post-treatment p-value
	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	
Disability	16.6 ± 4.21	2.8 ± 0.83^s	15.9 ± 3.88	13.7 ± 3.6^{ns}	$<0.0001^s$
VAS	6.8 ± 0.83	3.8 ± 0.83^s	6.5 ± 0.91	5.9 ± 0.72^{ns}	$<0.0001^s$

KT: Kinesio taping, VAS: visual analogue scale, S: significant, NS: non-significant.

DISCUSSION

The aim of the present study was to investigate the effects of KT in the treatment of LBP in university employees. The KT was applied to patients with low back pain. In this study, significantly greater reductions in disability and pain intensity were obtained earlier in patients who have low back pain who received Kinesio taping.

Although the mechanism through which KT acts on musculoskeletal conditions is not yet clear, it is supposed to KT applies pressure to the skin or lengthens the skin and that this external load may stimulate cutaneous mechanoreceptors (large myelinated fibers) and inhibit pain transmission according to the gate control theory (Braggins, 2000).

Melzack and Wall proposed the gate control theory, which subtracts that the spinal cord contains a

neurological 'gate' that either blocks pain signals or allows them to continue on to the brain (Melzack and Wall, 1965). It is also supposed that the skin will be raised due to the flexibility of the tape, creating a wider space between the skin and the muscle, leading to elaboration of blood circulation and drainage of lymphatic fluids in the taped area, that way decreasing pain, increasing ROM and mending ADL. Previous studies have suggested that KT may enhance proprioceptive afferent feedback (Pijinappel, 2007; Gill and Callaghan, 1998).

The result of this study comes with agreement the study done by Paoloni et al. (2011), which observed a highly significant reduction in disability when using KT in the study group. This reduction in disability could be referred to the younger age subjects of the KT group (30 to 40 years) in the present study, when compared to the age group of the subjects (62 years) taken by Paoloni et

al. (2011) study investigated the effect of a combination of exercise and KT on pain and ADL in patients with LBP. Our findings in terms of reducing LBP were consistent with the results of Paoloni et al. (2011), who observed a highly significant reduction in pain, measured using a VAS, after four weeks of treatment with KT.

Also, Castro-Sánchez et al. (2012) compared the effectiveness of Kinesio taping and sham Kinesio taping in patients with chronic low back pain. They reported significant short-term improvements in pain intensity in the Kinesio taping group (Castro-Sánchez et al., 2012). Merino et al. (2010) found that hip and lower back flexibility have a significant increase in sit-bend distance after KT applied. Also, González-Iglesias et al. (2009) assessed cervical range of motion before and after taping and revealed that all directions of the cervical spine movement had significantly improved. These studies also applied KT from insertion to the origin, direction (González-Iglesias et al., 2009).

Another study tested the effects of a single application of Kinesio taping compared with Micropore (placebo group) taping and a control group with no intervention in patients with chronic low back pain for the results of pain intensity and disability. This is the first study that compared the Kinesio taping method with Micropore taping as a form of placebo therapy. They observed that, although the Kinesio Taping group showed an improved disability score. All other statistical comparisons between groups showed no statistical significance. These findings raise a question regarding the use of Kinesio Taping in clinical practice for patients with chronic low back pain from the effects observed (small) appears (Maurício et al., 2015).

Some studies come with disagreement with the present results as a study done by McConnell et al. (2011) who showed no significant effect of shoulder taping on maximum shoulder abduction ROM and total reduction of pain. Also, Akbas et al. (2011) approved that there is no effect of KT on pain in patients with Patellofemoral Pain syndrome.

However, more studies used to measure the effectiveness of KT and there was some difference with the present study because some of these studies find no beneficial effect of KT, the present study also finds more studies proved that there is a more beneficial effect for KT. So, the findings of this study continue to search to know if KT.

Conclusion

It has been concluded that Kinesio taping has significantly greater reductions in disability and pain intensity in patients who have low back pain. It could be concluded that KT is a beneficial adjunctive physical therapy tool that could help in decreasing disability and pain.

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