

Research Article

Comparative Effectiveness of Muscle Facilitation Kinesio Taping and Corrective Kinesio Taping Techniques along with Conventional Physiotherapy in the Treatment of Non-specific Low Back Pain

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Abstract:

Background: Low back pain is a common problem in society and a major public health burden, responsible for substantial work disability leading towards mobility restriction, quality of life impairment and long term disability.

Objective: To compare efficacy of muscle facilitation kinesio taping and corrective kinesio taping techniques.

Methodology: A randomized clinical trial (RCT) conducted at Physiotherapy Department, Mayo Hospital Lahore. Sample size of 72 patients was collected using “GPower Software” and randomly distributed in two groups (n=36) using concealment method. Group-A was treated with muscle facilitation kinesio taping techniques along with conventional physiotherapy and Group-B with corrective kinesio taping technique along with conventional physiotherapy. Four treatment sessions were given to each patient for two weeks. Improvement in range of motion using Bubble Inclinometer, pain reduction in terms of Numerical Pain Rating Scale and functional disability in terms of Oswestry Disability Index were recorded accordingly.

Results: Mean paired value at Oswestry Disability Scale in Group-A was 19.4144+6.8869 and in Group-B 10.3516+3.7666. Mean paired difference in intensity of pain at Pain Numeric Rating Scale in Group-A was 4.083+0.874 whereas in Group-B 2.500+0.697. Improvement in spinal ranges of motion were also observed as “p” value was less than 0.05

Conclusion: The study concluded that muscle facilitation kinesio taping technique has more efficacy than corrective kinesio taping technique in treatment of non-specific low back pain.

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Introduction

Non-specific Low Back Pain (LBP) is referred as the back pain without any specific or known pathology like spinal fracture, tumor, cauda equina syndrome, infection, deformity etc⁽¹⁾ Low back pain is a common musculoskeletal dilemma. It is unlikely

sensory and emotional experience or discomfort with or without leg pain usually persisting less than 6 weeks.⁽²⁾ It's a huge public health problem which is also responsible of work disability with elevated health care expenditure. Nearly 70-80% of adolescents undergo episodes of Low back pain in their lives. Many factors contribute towards the

etiology of this problem. About 90% of back pain is caused either by benign or auto limited causes like soft tissue disorders, joint injuries etc. Some of the etiological factors includes stress resulting in musculoskeletal and neurological conditions (muscle spasm, disk lesions, sciatica), traumatic (vertebral fractures), lumbar strain or sprain, metabolic (fractures caused by osteoporosis), malignancies, postural strain, infections, post surgical conditions (acceleration of the disk degeneration after a slipped disc surgery), aging and age related postural changes.⁽³⁾ (LBP) can lead towards work disability. 70-80% of general population undergo episode of LBP atleast once in life. It can lead towards long term disability, mobility restriction and impaired the quality of life.⁽⁴⁾

Dr. Kenzo Kase introduced Kinesio Taping in 1996. The concept of Kinesio taping was originated from the fact that functions of muscles and other soft tissue structures could be aided by an external component.⁽⁵⁾ Stretched kinesio tape produces pulling force at skin by lifting fascia and other soft tissues,⁽⁶⁾ thus creating enough space which in turn enhances mechano receptors communication and elevates recruited motor unit numbers. The composition of kinesio include various components like the tape is constructed with 100% cotton, elastic fibers and is latex free & can be applied at various degree of stretch depending upon the requirement of patient and it can be stretched along longitudinal axis only. The adhesiveness of Kinesio Taping (KT) is 100% medical grade, acrylic and heat activated.⁽⁷⁾ Athlete can wear it while playing and patient for 3 to 4 days. Kinesio tape can be cut and applied in a number of ways such as I-strap, Y-strap, X-strap, Button Hole Cut, Fan Cut.^(6,8) The applications of both (KT) techniques vary in stretch level at the time of application of tape. Muscle facilitation technique is applied from "Origin to Insertion" with 25% to 35% tension while corrective technique is applied with 50% to 75% tension with downward pressure especially when dealing with mechanical correction.⁽⁷⁾

During literature search, not even a single study proves which kinesio taping technique has better clinical outcomes so it directs the need of future researches to be conducted on this topic.

The main aim of interest under selecting this topic was to find out the clinical efficacy of muscle facilitation kinesio taping & corrective kinesio taping techniques for the treatment of non-specific low back pain.

Patients & Methods

It was a Randomized clinical trial conducted at Department of Physical Therapy, Mayo Lahore and completed within 6 months after the approval of synopsis. Simple random sampling technique was used. Sample size of 72 patients collected using "GPower software 3.0.10" with effective size = 0.8615, Alpha (type 1 error) = 0.05 and Power = 0.95. Patients were randomly allocated in two groups using concealment method. Subjects of non-specific Low back pain from both genders (male & female) having age 30 to 50 years were included according to following criteria: Patients of LBP for atleast four weeks, Mechanical low back pain without any active pathology or systemic illness following McKenzie assessment criteria, patients with more than 20% Oswestry disability index score.

The exclusion criteria was: Positive Straight leg raise or Lasegue's Test for lumbar radiculopathy, Positive Bragard's sign & Neri's sign, Patients with "red flag" for serious spinal condition e.g. tumors, infection etc, Skin sensitivity or skin allergy, history of traumatic lumbar disc prolapsed, history of previous spinal surgery or kinesio therapy, history of any severe musculoskeletal pathology.

Patients were divided into 2 groups each comprising of 36 patients using concealment method. Group-A received muscle facilitation kinesio taping technique along with conventional physiotherapy while Group-B corrective kinesio taping technique along with conventional physiotherapy. Informed consent was taken from every patient. The conventional physical therapy treatment protocol given to every patient includes: Hot pack over the back muscles for 10 minutes, Back isometrics (2 sets of 5 repetitions each), pelvic bridging (2 sets of 5 repetitions each), partial curls (2 sets of 5 repetitions each). Each treatment session comprises of 25 minutes and 6 follow up plans were given to each patient in 2 weeks. Comparison of results was done after 2 weeks.

Outcome measures used for data collection were

“oswestry low back pain disability questionnaire” & “pain numerical rating scale (PNRS)”. bubble inclinometer used to measure lumbar flexion, extension, side bending and spinal rotation. Data was analyzed using SPSS 21.0. Quantitative variables were presented as mean±Standard Deviation (SD) while Qualitative variables in frequency and percentage tables. T-test was applied & p value < 0.05 was considered.

Results

In this study 72 patients were enrolled. Details of participants including Gender of Group-A with 66.67% male and 33.33% female participants while Gender of Group-B with 63.89% males and 36.11% females. The minimum age of both groups was 30 years and maximum age was 50 years. Group-A contained 72.22% educated and 27.78% illiterate while Group-B contained 77.78% educated and 22.22% illiterate patients. 72.22% of sample size was married and 27.78% were unmarried in Group-A however Group-B had 86.11% married and 13.89% unmarried people. Both study groups had localized behavior of pain. It was observed that patients who were treated with muscle facilitation kinesio taping technique along with conventional physiotherapy their pain, functional disability and spinal ranges including lumbar flexion, extension, side bending and spinal rotation improved greatly as compared to those who were treated with corrective kinesio taping technique along with conventional physiotherapy. At 2nd week mean paired difference on oswestry disability Index in muscle facilitation kinesio taping technique treatment group was 19.4144 ± 6.8869 where as mean paired difference of corrective kinesio taping technique group was 10.3516 ± 3.7666 . The mean paired difference in intensity of pain at numeric pain rating scale in muscle facilitation kinesio taping technique group after 2 weeks was $4.083 \pm .874$ whereas that of corrective kinesio taping technique group was 2.500 ± 0.697 thus in both cases i.e. Oswestry Disability Index (ODI) as well as Numerical Pain Rating Scale (PNRS) muscle facilitation kinesio taping technique along with conventional physiotherapy was statistically found to be more effective technique. The mean paired difference in lumbar flexion after 2 weeks of treatment in Group-A was 9.306 ± 2.240 while in Group-B mean paired difference was 4.944 ± 2.124 .

Table 1: Statistical Analysis of Pain Intensity on NPRS

Study Group		Pre-treatment Numeric Pain Rating Scale Score	Post-treatment Numeric Pain Rating Scale Score
Muscle Facilitation Kinesio Taping	Mean	6.69	2.61
	N	36	36
	Std. Deviation	1.238	1.022
Corrective Kinesio Taping	Mean	6.47	3.97
	N	36	36
	Std. Deviation	1.253	1.276

Table 2: Statistical Analysis of Oswestry Disability

Study Group		Pre-Treatment Percentage of Oswestry Disability Scale	Post-Treatment Percentage of Oswestry Disability Scale
Muscle Facilitation Kinesio Taping	Mean	38.2675	19.4144
	N	36	36
	Std. Deviation	10.35745	5.52093
Corrective Kinesio Taping	Mean	39.7586	29.4069
	N	36	36
	Std. Deviation	9.69033	7.56951

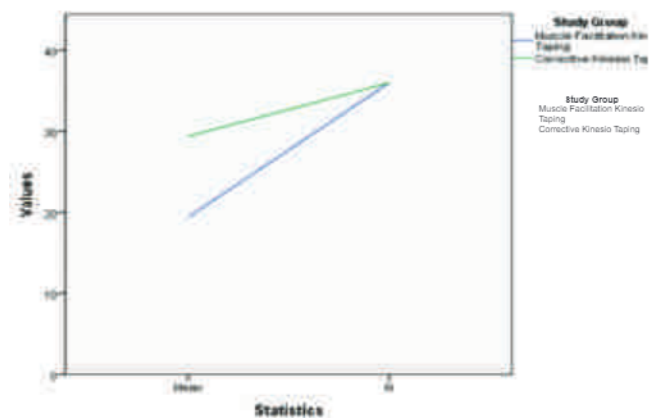


Figure 1: Post Treatment Percentage of Oswestry Scale

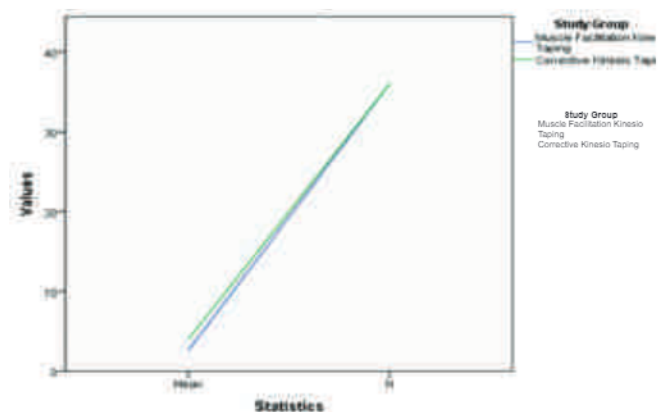


Figure 2: Post Treatment Pain Numerical Rating Scale Score

For lumbar extension the mean paired difference of Group-A was 6.278 ± 1.907 and that of Group-B was 3.611 ± 1.128 . In Group-A the mean paired differences for right & left side bending were 4.417 ± 1.628 and 3.611 ± 1.440 respectively whereas in Group-B the mean paired differences for right & left side were 2.750 ± 1.105 and 2.472 ± 1.444 respectively.

First graph depicted that post mean percentage for oswestry disability scale is less which shows that muscle facilitation kinesio taping techniques is more effective than corrective kinesio taping technique. (Figure 1) Similarly second graph showed that post mean values at NPRS of Group-A is less than Group-B which shows that muscle facilitation kinesio taping technique is more effective in reducing pain. (Figure-2)

Discussion

NSLBP is a common and widespread health problem.⁽⁹⁾ It's a back pain without having history of any particular pathological condition such as fracture, carcinoma or infection etc.

Different treatment protocols are present according to the severity of symptoms including behavioral therapy, cognitive therapy, medication, electrophysical agents, manual therapy, general exercises and spinal stabilization exercises. Kinesio Taping acts as additional component of guideline-endorse physiotherapy program.⁽¹⁰⁾ and it has better outcomes in musculoskeletal conditions.⁽⁷⁾

The main reason behind the use of kinesio is prevention and as an adjuvant treatment particularly of musculoskeletal system. However, in some cases it could also enhance the performance of athletes. It is also a very good treatment protocol when dealing with various musculoskeletal damages like bursitis, sprains, contusions, joint instability etc.⁽¹¹⁾

Kinesio tape has many functions:

It Supports weak muscles and restores their function, improves blood & lymphatic flow, reduces pain, can enhance performance, provide stabilization, activity & performance level of athlete can be enhanced, can speed up the healing by increasing blood flow towards injured area and KT has also psychological effect as well as Placebo effect.⁽⁶⁾

Purpose of this study was to compare the Physiotherapy conventional protocols along with Muscle Facilitation Kinesio Taping Technique & Corrective

Kinesio Taping Technique in management of patients with NSLBP using the changes in clinical outcome (Pain, Disability) and physical function (Range of motion). Significant reduction in pain scores was observed within group analysis but improvement and patient satisfaction in Muscle Facilitation Kinesio Taping Technique was more as compared to Corrective Kinesio Taping.

The patients of non specific low back patients were taken by using McKenzie system of Assessment.⁽¹²⁾ It was a challenging task because all other active pathological states have to be ruled out through assessment. Different tests including straight leg test (Lasegue's test), Bragard's sign and Neir's sign were utilized to rule out any ongoing radiculopathy in patients. Straight leg raise test also known as Lasegue's Test is one of the most commonly used test in neurological assessment of patient with displaced lumbar radiculopathy symptoms that are commonly caused by disc herniation. These symptoms include radiating pain down the leg, loss of muscle strength, numbness and tingling sensation in one or both legs. The straight leg raise test has been evaluated to have Sensitivity of 91% and Specificity of 26%. The inclusion of ankle dorsiflexion in SLR is named as Bragard's sign while the inclusion of Cervical Flexion in SLR is Neri's sign. So the aim was to exclude all those cases in which low back pain arises from a specific disorder affecting lumbar spine.

Statistical analysis of this study showed significant reductions in pain & disability after treatment with Kinesio taping along with conventional physiotherapy. The functional capacity of muscles of low back region was also improved after kinesio application for 2 weeks. Paired sample t-test was used for analysis of Pre & Post treatment values differences by applying both techniques and Independent Sample T-test was used for comparison of results between two groups. This study concluded that both treatment techniques, muscle facilitation and corrective kinesio taping techniques, are effective in reducing non specific low back pain and increasing active lumbar ROM because of absence of significant difference in both groups, however, Muscle Facilitation Kinesio Taping technique was clinically superior to Corrective Kinesio Taping technique as the mean paired difference between Pre and Post treatment values were greater in Muscle facilitation kinesio taping than Corrective kinesio taping technique.

Oswestry Low Back Pain, ODI and Numerical Pain Rating Scale (NPRS) were used as outcome measures. Oswestry and Ranges (ROM) including Lumbar flexion, extension, side bending and spinal

rotation were measured using Bubble Inclinometer before and after treatment sessions. Pre treatment scores for Pain, ROM varied insignificantly across the two treatment groups with $p > 0.05$ however by the end of 2 weeks of Kinesio taping along with conventional physiotherapy treatment sessions, significant differences between both groups were present, reported as pain having $p < 0.05$. Paired sample t.test of before & after treatment sessions reported significant improvement ($p = 0.00$) in Pain & Oswestry Disability index & also slight improvement in ROM of lumbar movements in both groups.

The results of this study are also supported by some of the previous studies showing that it is clinically significant by adding Kinesio taping to a conventional physiotherapy program and it provides relief of pain along with functional improvement as compared to conventional physiotherapy alone.^(6-8,10,13-16)

There are few limitations and weakness to this study. First, patients were selected solely from Physiotherapy Department, Mayo Hospital Lahore so the research may not give a larger prospective concerning the prevalence of disease. Second, duration of treatment was limited (follow up should be more than 2 weeks). Third, only Lumbar musculature was given importance in Conventional Physiotherapy treatment. So further detailed studies with long term follow ups are required to further evaluate the findings.

Conclusion

This study concluded that both treatment techniques, muscle facilitation kinesio taping and corrective kinesio taping are effective in non-specific low back pain but muscle facilitation kinesio taping technique was superior to corrective kinesio taping technique in alleviating pain intensity, functional disability & enhancing range of motion. Medical professionals may apply KT to a patient during or after treatment to support low back musculature, to encourage tissue healing process and to improve muscle performance.

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