

# Effectiveness of Kinesio Taping Versus Myofascial Release on Pain, Range of Motion and Functional Disability in Young Adults with Acute and Sub-Acute Mechanical Low Back Pain: A Comparative Study

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DOI: <https://doi.org/10.52403/ijhsr.20230207>

## ABSTRACT

**Context:** There is 75-84% prevalence of LBP and younger adults are affected more. The risk factors are obesity, weightlifting, sustained improper posture, etc. The aims of conservative treatment are to reduce pain and disability, improve ADL, etc. There is paucity in literature whether KT or MFR would be more beneficial for MLBP.

**Aims:** To compare effects of KT and MFR on pain, ROM and functional disability in young adults with acute and sub-acute MLBP at end of two weeks intervention.

**Methods and Material:** Young adults as per selection criteria (20 in each) were allocated to two groups by alternate allocation method. Group A received KT and conventional therapy while Group B received MFR and conventional therapy, twice a week for two weeks. 10 minutes before and after treatment, outcome measures that is pain by NPRS and ROM by Modified Schober's Test were assessed by blind assessor. Modified Oswestry Disability Index scale was filled by participant at baseline and after 24 hours of 4th intervention session.

**Statistical analysis:** The data was analysed using Paired t-test and unpaired t-test in "Primer" statistical package.

**Results:** When paired t-test was performed, results were statistically significant for both groups ( $p < 0.001$ ). However, when unpaired t-test scores were performed, results were not statistically significant ( $p > 0.05$ )

**Conclusions:** There is no significant difference in the effectiveness of kinesio taping and myofascial release on pain, range of motion and functional disability in young adults with acute and sub-acute mechanical low back pain at end of two weeks intervention.

**Keywords:** [LBP (Low Back Pain), MLBP (Mechanical Low Back Pain), KT (Kinesiotaping), MFR (Myofascial Release), NPRS (Numeric Pain Rating Scale), ROM (Range Of Motion)]

**Key Message:** kinesiotaping or myofascial release techniques can be an effective adjunct to conventional therapy to reduce pain and functional disability and improve ROM in young adults with acute or sub-acute MLBP.

## INTRODUCTION

Mechanical low back pain is the most common health problems among all the population of the world, [1] and is considered to be a largely self-limiting. Up to 35% to 50% of the young adults develop MLBP and is one of the commonest causes of work absenteeism. [2] The predisposing or risk factors are obesity, carrying weights, stress, sitting in a position for a long period of time, sustained improper posture, etc. [1, 3] Functional ROM is limited in acute onset of pain and if persisted for long time, ROM decreases as soft tissue shorten and strength decreases. The impairment then is result of consequences of adaptations rather than initial injury. [4] Once LBP becomes chronic, it can be a major reason of long-term disability, absence from work and high socioeconomic burden on health-care systems. [5] Low back pain has recurrence rates of up to 90%. [6] Hence if treated in acute and sub-acute phase may reduce functional disability and also reduce recurrence in future. In general, the aims of conservative treatment for MLBP are to reduce pain, improve activities of daily living (ADL), and to teach patients how to cope up with pain. [7]

**Kinesio Taping (KT):** Kinesiology tape is a thin, stretchy, elastic cotton strip with an acrylic adhesive, [5, 8] designed to support lower back, improve postural alignment and reduce stresses on the spine. [9] The beneficial effects found were normalization of muscular function, increase in lymphatic and vascular flow, and reduction in pain. [10, 11]

**Myofascial release (MFR):** MFR includes the application of a low-load, long duration stretch to the Myofascial complex, with the intention to restore optimal length of the fascial tissue, decrease pain, and improve functionality. The fascia is manipulated, directly or indirectly. [12] So as to alter the

density of the ground substance, and hence allowing the collagen fibers to separate. [12]

## Aim & Objectives:

To compare effects of Kinesio-Taping and myofascial release on pain, Range of motion and functional disability in young adults with acute and sub-acute mechanical low back pain using numeric pain rating scale, modified Schober's test and Modified Oswestry Disability Index scale respectively at end of two weeks intervention.

## MATERIALS & METHODS

- I. Study Design: Comparative Study
- II. Study Setting: Physiotherapy OPD's In And Around City
- III. Study Population: Young Adults (18-35 Years Age) Having Acute And Sub-Acute Mechanical Low Back Pain
- IV. Sample Size: 40

Sample size calculated using standard sample size formula:  $n = (Z\alpha/2 * \sigma)^2 / E^2$

Confidence level: 95%

Mean= 6.43; SD= 1.15 (Flexion ROM-Schober's test). [13]

Absolute Precision= E-0.5%

$n = ((1.96 * 1.96) * (1.15 * 1.15)) / (0.5 * 0.5)$   
 $= 20.32 = 20$  cases

- V. Sampling Technique: Simple Random Sampling (By Alternate Allocation)
- VI. Method Of Selection Of Study Subjects:

### 1. Inclusion Criteria:

- Both Males and Female. [1]
- Young adults (18-35 years age). [1]
- Mechanical Low Back Pain (postural LBP)
- Acute and sub-acute pain (<3months). [3]
- Mild to moderate pain intensity on NPRS. [14]

### 2. Exclusion Criteria:

- Non-mechanical LBP (rheumatologic, vascular, gastrointestinal, renal,

infectious, or oncologic causes, spinal deformities).<sup>[15]</sup>

- Congenital/acquired malformation
- Spine surgeries
- Pregnant and post natal women
- Fibromyalgia
- Undergoing any other therapy or treatment
- Contra indications related to K-Taping,<sup>[10]</sup> and MFR.<sup>[12]</sup>

### 3. Subject Withdrawal Criteria:

- Not willing to continue to be a part of study
- Unable to continue/ come for consecutive intervention sessions

### VII. Operational Definitions:

Mechanical low back pain: postural low back pain i.e. no pain on repetitive movements, intermittent local pain,

Sustained static loading provokes pain, pain goes off with change of position, no effect on movement or function.<sup>[16]</sup>

### VIII. Outcome Measures:

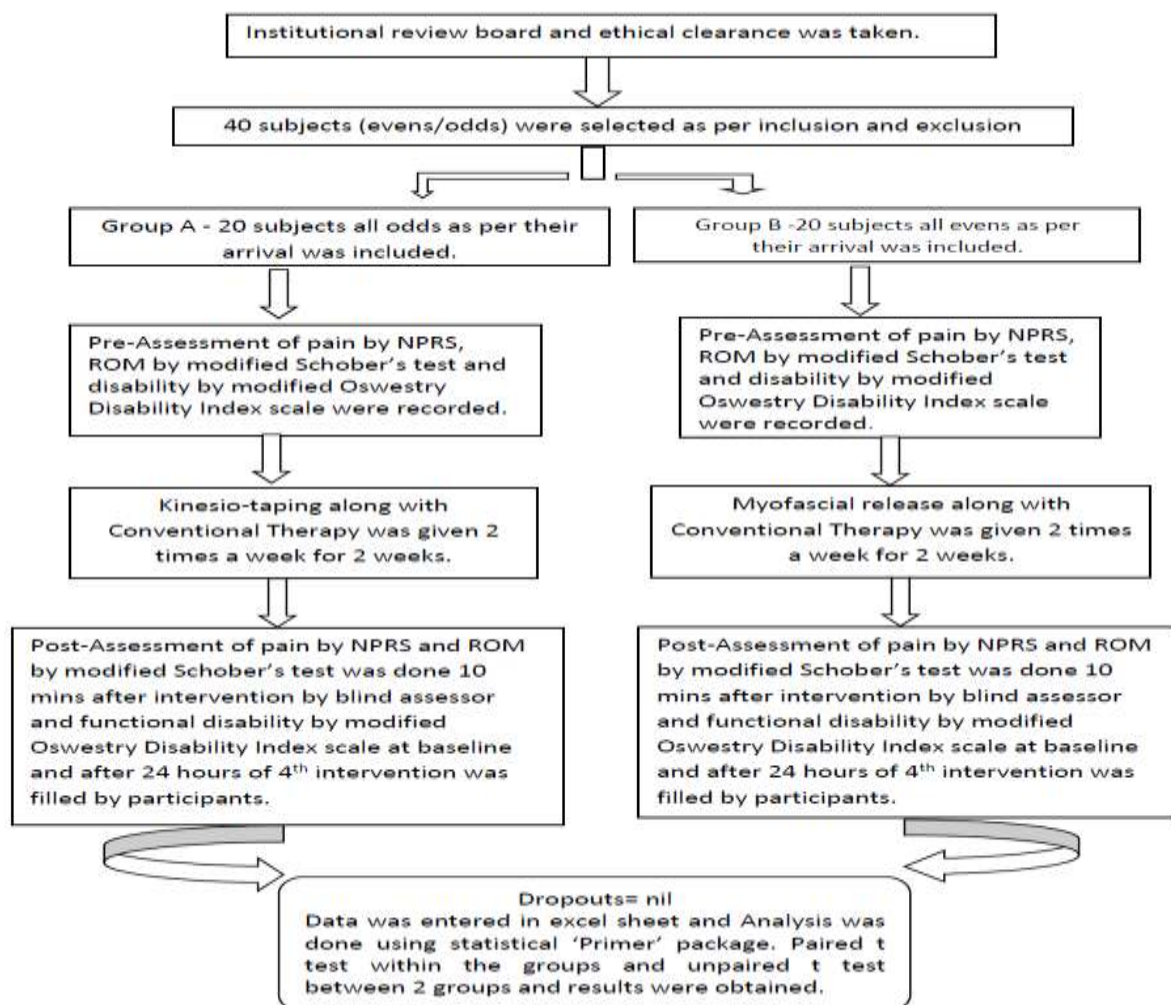
- Numeric Pain Rating Scale (r=0.96, validity-0.86 to 0.95).<sup>[17]</sup>
- Modified Schober's Test (inter-rater (r=0.96) and intra-rater (r=0.94) reliability).<sup>[18]</sup>
- Modified Oswestry Disability Index scale (r=0.89, validity= 0.74 to 0.95).<sup>[19]</sup>

### IX. Study Instruments

- Pen / marker, Paper/ data collection sheet/ questionnaire, Plinth, Measuring tape and Kinesio-tape

### Method Of Measurement:

#### X. Study Layout:



#### XI. Experimental Study:

Explained Interventions Techniques:

1. **Numeric Pain Rating Scale:** It assessed the pain intensity levels perceived by the patient using an 11-point scale (ranging from 0 to 10), with 0 representing “no pain” and 10 as “the worst possible pain”. The participants were asked to report the level of pain intensity in the last seven days. <sup>[14]</sup>
2. **Modified Schober’s Test:** The subject standing erect, knees extended, arms relaxed at the sides and body weight centered. Marks on the skin to be made using a pen. The first mark at the lumbosacral junction, as indicated by the posterior superior iliac spines; a second mark was made 10 cm above and a third mark made 5 cm below the lumbosacral junction. The subject then was asked to bend forward as far as possible until the onset of the pain and the new distance between the second and third marks to be measured. Similarly, the distance between the superior and inferior marks was measured as the subject extended the spine as far as possible. The initial length (15 cm) was then subtracted from the final length of trunk flexion to obtain the extent of trunk flexion, while the final length of the trunk extension was then subtracted from the initial length (15 cm) to obtain the extent of trunk extension. <sup>[13]</sup>
3. **Modified Oswestry Disability Index Scale <sup>[20]</sup>:** The index is a self-rating questionnaire used to evaluate functional physical disability. It includes 10 sections of six propositions, each rated on a 0–5 scale. Relative values are reported (total score/total possible score × 100%). Higher scores indicate worse disability. <sup>24</sup>
4. **Kinesio-Taping Technique:** In all participants, two I-shaped Tapes (width 5cm, and 0.5mm thickness) were applied on the paravertebral muscles (bilaterally) parallel to the spinous

processes of the lumbar spine. The participant assumed sitting position without back support so as to allow forward bending while the therapist standing behind the participants. The initial anchor point of tape (4 to 5cm) was removed from its paper backing and applied to the posterior superior iliac crest without stretch. After that, the participant performed maximum trunk flexion and the tape was applied in the shape of an “I” over the skin in the paravertebral region up to the T12 vertebra at 10-15% stretch. The second anchor point of tape (4 to 5cm) was fixed directly over the level of transverse process of the T12 vertebra without a stretch. The same was then repeated on the other side. The tape rubbed manually by hand several times to warm the adhesive film to achieve adhesion. <sup>[18]</sup>



Figure 1: Kinesiotaping Technique

5. **Myofascial Release Technique:** The patient was placed in prone position to maximize the stretch and vertical stroking technique was performed. Counter pressure was applied by one hand in cephalic direction, while the knuckles or palm of the other hand applied slow stretch to the muscles and fascia in direction of barrier. When a barrier was reached, the pressure was maintained until there is release and hand felt the motion as well as softening of tissue. Then pressure

progressed to next barrier. It was then repeated three to four times. [4]



Figure 2: Myofascial release Technique

6. Conventional Therapy: The conventional physical therapy management consisted of passive static stretching exercises for the back, iliopsoas, and hamstring muscles and strengthening exercises for the abdominal muscles. One set of stretching exercises, each involving a 30-sec hold and 30-sec of rest repeated three times and one set of strengthening exercises, consisting of 10 repetitions with a 5-sec hold was performed. [5]



Figure 3: Conventional Therapy Exercises

## RESULTS AND STATISTICAL ANALYSIS

Statistical analysis was carried out using Microsoft Excel and “Primer” statistical package. Statistical measures such as mean, Standard Deviation (SD), test of significance such as Paired t-test, unpaired t-test were used to analyse data. 95% confidence interval was taken into consideration. As the data was parametric, paired t-test was used to compare the difference of scores on pre and post intervention in both group A and group B and unpaired t-test between the group A and group B. The results were concluded to be significant with  $p < 0.001$ .

The distribution of subjects with acute or sub-acute MLBP according to their age,

gender, BMI and NPRS is mentioned in table 1. The pre and post intervention comparison with the two study groups demonstrated statistically significant improvement in Pain, ROM and disability scores (Table2). However, the data of comparison between the groups for post test scores showed no statistically significant changes for Pain, ROM and disability scores indicating that both interventions showed to be equally effective (Table3).

Variable	Kinesiotaping	Myofascial release
Age	27.15±3.57	27.4±3.34
Gender	M=5; F=15	M= 8; F=12
BMI	25.55±5.09	24.82±2.39
NPRS	4.2±1.28	4.4±2.0

Table1: demographic and distribution characteristics of the variables

	outcome	Flexion	extension	NPRS	MODI
Kinesio-taping	Pre	4.08±0.67	1.86±0.57	4.15±1.22	28.6±13.48
	Post	5.2±0.82	2.66±0.65	1.5±1.0	10.9±4.56
	Mean difference	1.12±0.33	0.795±0.30	2.65±0.67	17.7±9.359
	p-value	<0.0001	<0.0001	<0.0001	<0.0001
	t-value	15.168	11.65	17.667	8.458
Myofascial release	Pre	4.13±0.735	1.99±0.66	4.65±1.089	27.00±10.08
	Post	5.87±0.835	3.075±0.72	1.2±1.005	10.80±4.32
	Mean difference	1.74±0.469	1.08±0.372	3.45±0.825	16.20±6.86
	p-value	<0.0001	<0.0001	<0.0001	<0.0001
	t-value	16.574	12.977	18.689	10.555

Table 2: with-in group comparison for ROM, NPRS and MODI for the two study groups

OUTCOME	Kinesiotaping	Myofascial release	P value	T value
FLEXION	1.12±0.33	1.74±0.469	0.015	2.545
EXTENSION	0.795±0.30	1.08±0.372	0.063	1.909
NPRS	2.65±0.67	3.45±0.825	0.350	0.946
MODI	17.7±9.359	16.20±6.86	0.943	0.071

Table 3: mean difference and between group comparison for ROM, NPRS and MODI for the two study groups

## DISCUSSION

The occurrence of Non-specific low back pain is very common among all working adults. The study conducted by Shyamal Koley, [21] et al, found that, back pain has positively significant correlations with height, weight, BMI and flexibility measure and negatively significant correlation with percent body fat.

The mechanical low back pain (which was previously called nonspecific low back pain) is defined as pain without any identifiable or known cause and of duration less than 12 weeks with no other positive clinical findings. [3,22] It manifests as pain, stiffness, or muscle tension that is located below the costal margin and above the inferior gluteal folds. [13] Common causes of mechanical back pain found in literature includes strain on muscles of the vertebral column and abnormal stress. [3,23] Which can be caused by Lifting heavy objects, levered postures (bending forward), Static loading of the spine (prolonged sitting or standing) discogenic pain, and myofascial pain. [24] The treatment strategies for MLBP should be such that it reduces pain, improves range of motion so as to reduce disability and reoccurrence. [18]

The KT and MFR groups showed equal effects in terms of pain, ROM and disability.

**The ROM of lumbar spine was improved post Kinesiotaping intervention may be due to:** 1) increased cutaneous feedback supplied by kinesio taping. 2) It improves the proprioception and as a result more recruitment in the motor units of the lumbar erector spinae muscles to perform the activity. 3) At extremes of motion, stretching effect of KT on the skin, stimulates cutaneous mechanoreceptors and signal information of joint movement or joint position. Thiago Vilela Lemos et al in their study the effect of kinesio taping in forward bending of the lumbar spine concluded that Kinesio Taping influenced fascia mobility, allowing for slight improvement of lumbar flexibility. [25]

**The mechanisms by which kinesio taping reduces pain may be:** (1) Kinesio taping provides cutaneous stretch stimulation, which attenuates an afferent transmission of painful stimuli (gate control theory), thus the pain reduction. (2) The neural feedback received by patients increases their ability to reduce mechanical irritation of soft tissues.

**Whereas Improvement in lumbar ROM post myofascial release intervention may be due to:** 1) The volume and consistency of ground substance changes. 2) The cross-linkages or adhesions between the fibers are

broken, and the ground substance also seems to change from a solid to a gel quite quickly, which allows considerable amount and lasting improvement. 3) The fiber affinity is reduced as the inter fiber distance is increased, thus increased extensibility in the tissue. Arun Balasubramaniam, et al in their study found that Myofascial release therapy can help in improving the mobility and dysfunctional state of soft tissues which supports the findings of our study. [26]

**The rationale for analgesic effect of MFR is explained by:** (1) During sustained release there is activation of both muscle and joint mechanoreceptors. As simultaneous gating takes place of nociceptive impulses and mechanoreceptor stimulation, nociceptive inhibition occurs at the dorsal horn of the spinal cord. (2) MFR procedure encourage the circulation of fluid in and around the tissues to enhance venous and lymphatic systems and aid in decongesting areas of fluid stasis. Thus reducing the pain and improving the function.

Patients had moderate disability which reduced to minimal disability in both groups after intervention. The reduction of disability might be result of reduction of pain and improvement in ROM. The components of MODI scale included activities like sitting, walking, sleeping, traveling and social life have effectively improved. KT gave both physical and neurological support to dynamic structures like muscles by providing passive support to weak or injured muscles. This can assist everyday activities, high level sport, etc. Myofascial release helps in removal of scar tissues, when the scar tissue is stripped away, normal function return, thus long term pain is resolved. The abnormal stresses are reduced, correct posture is regained and hence reduces functional disability.

All parameters i.e. ROM, pain and disability had almost equal improvements in either intervention groups when done along with

conventional exercises. For LBP syndrome, exercise can be useful in: a) improving back flexibility, strength and cardiovascular endurance; b) reducing back pain intensity when it is performed regularly; c) reducing back pain-related disability. Whereas the kinesiotaping and myofascial release had added effect on both groups of participants by aiding in improving ROM, reducing pain and disability by their either mechanism.

## CONCLUSION

There is no significant difference in the effectiveness of kinesio taping and myofascial release on pain, range of motion and functional disability in young adults with acute and sub-acute mechanical low back pain at end of two weeks intervention.

### *Declaration by Authors*

**Ethical Approval:** Approved

**Acknowledgement:** None

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

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How to cite this article: Shubhada K. Trivedi, Sanket S. Nagrale. Effectiveness of Kinesio taping versus myofascial release on pain, range of motion and functional disability in young adults with acute and sub-acute mechanical low back pain: a comparative study. *Int J Health Sci Res*. 2023; 13(2):35-43.  
DOI: <https://doi.org/10.52403/ijhsr.20230207>

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