

## The Effectiveness of Thoracolumbar Fascia Kinesiotaping on Non Specific Chronic Low Back Pain in Selected Patients

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### ABSTRACT

Non specific chronic low back pain(NSCLBP) is described as a tenderness or soreness, stretch or tension, and tightness or stiffness in the area of lower back, without any specific cause or pathology of that pain for 12 weeks. The part of fascial girdle is thoracolumbar fascia which covers lower portion of trunk and contain nerve endings and recurrent injury may contribute to low back pain. The objective of the present study was to observe the consequence of thoracolumbar kinesiotaping and trunk stabilization exercises on chronic lumbopelvic pain which was non - specific. About 100 male and female participants were included, in the study, having age group ranging from 18 to 60 years with nonspecific back pain for not more than 90 days. Selected participants were allocated to either of groups according to random sampling in two groups i.e. Control Group A (n=50), in which patients were given lumbar stabilization exercises and Experimental Group B (n=50) patients were given conventional physiotherapy with thoracolumbar fascia kinesio taping. Following this the assessment of patients was done by following methods: Oswestry Disability Index for functional disability, NPRS for pain, Tampa Scale for movement fear, Trunk ROM. The results demonstrated statistically significant improvement between both the groups in pain, kinesiophobia and trunk flexion, rotation to both side ROM (p=0.001) while all other variables was found to be non significant between both groups at the end of 4th week. This study concluded that there is efficacy of kinesiotaping for thoracolumbar fascia for patients having low back pain of chronic and non specific in nature.

**KEY WORDS:** KINESIOTAPE, KINESIOPHOBIA, NON-SPECIFIC LOW BACK PAIN, NPRS, ODI.

### INTRODUCTION

One of the most commonest problem encountered in clinical physiotherapy and practice is back pain, (Caporaso et al.,2012; Dagenais et al.,2010). It is the main

cause of restriction at workplace (Picavet et al.,2008). In back pain, usually the pain surrounds the lumbo-Sacro-coccygeal area around the pelvic muscles and may radiate to surrounding soft tissue structure up-to knee. Pattern of pain alters social life, functioning and activities of normal life (ADL). Low back pain which is non-specific can be seen with, before or after ossification of bones, (Kjaer et al., 2011 Aldera et al.,2020). Posture of human being is regulated by sensory tissue present in trunk and lower limbs, and any abnormalities in these tissues causes instability. Another possible cause of postural sway is acute pain inhibition. Due to pain proprioception is also affected and increase in pre-synaptic inhibition

### ARTICLE INFORMATION

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(Alexander et al., 2011; Mosley and Hodges, 2005; Brumagne et al., 2000, Hlaing et al., 2020).

Structures of spine like vertebral end plates are responsible for pain due to signal changes that disrupt and fissure the end plates as well as fatty degeneration of adjacent bone marrow occurs. One such structure that is also responsible is thoracolumbar fascia which has nerve supply and irritates back pain, (Secher et al., 2008; Schilder et al., 2014). The quality of patient's lives is affected due to this restriction affecting pain free movement and is ranked 6th globally causing great loss not only financially but also productively, (Chiarotto et al. 2014, WHO Bulletin 2019). When mechanical traction is produced by muscular activity around the spine, TLF particularly respond and come into action for easy and effective load transfer. Tightness that occurs in fascia causes unnecessary stretch of intra-fusal muscle fibres, due to which alteration occurs in stretch-sensitivity in afferents fibres. It has been reported that recurrent signs of trauma and inflammation in a piece of TLF of the patients with lower back pain, (Willard and Vleeming, 2012). For the advance treatment of low back pain which is chronic and non-specific in nature, a new approach was introduced in 1973 known as kinesiio taping which covers the area which is injured and leads to decrease in pain, (Campolo et al., 2013 Lemos et al., 2015).

Dr. Kenzo Kase has developed these tapes which have similar properties like skin and has more elasticity than conventional bandage. The kinesiio tape could be elongated till 40-60 % of original length. The tape elevates the epidermis due to which there is decrease in nociceptive stimulus. Accordingly, the Kenzo kase kinesiio tape has multiple functions: it inhibits or facilitates the muscle function, decrease pain, support the surrounding structures, realign joints, improve blood circulation and lymphatic flow, improves proprioception and fascial tissue alignment, (Added et al., 2013 Kachanathu et al 2014). According to researcher's knowledge till date there is no such study conducted which has analysed the effect of thoracolumbar taping on pain, functional disability, kinesiophobia and lumbar range of motion in low back pain.

## MATERIAL AND METHODS

In the present study, total 110 participants were volunteered, out of which 6 were not able to complete the protocol and 4 dropped out due to tape allergic reaction. Out of which 100 patients participated in which male (n=52) and female(n=48) participants were included, having age group ranging from 18 to 60 years with nonspecific chronic back pain for 12 weeks or more and had an Oswestry Disability Index (ODI) score of more than 15%. Those subjects who suffered with spondylolisthesis, osteoporosis, history of spinal surgeries, pregnancy, psychiatric disorders, serious cardio-respiratory disease, spinal tumors or fractures, active or recent malignancy, spinal canal stenosis, large herniated disc, scoliosis were excluded, thus those who fulfilled eligibility criteria for

the study, were only considered for the investigation, following the criteria of Magalhaes et al., (2013).

After thorough assessment and routine tests done by physician, patients were referred to the physiotherapy OPD for their treatment of nonspecific low back pain. The patients were examined and assessed by experienced researcher. Participants were informed and explained about the objective, treatment protocol, duration etc. of study. After written consent, participants were enrolled in the study. Selected participants were allocated to either of groups according to simple random sampling technique in two groups i.e. Control Group A (n=50), in which patients were given conventional physiotherapy which includes lumbar stabilization exercises and Experimental Group B (n=50) patients were given conventional physiotherapy with thoracolumbar fascia kinesiio taping (Fig 1.1). Conventional physiotherapy treatment included group of exercise (lumbar spine stabilization exercise) and Hydro collateral pack (moist heat pack).

All patients received 8 treatment sessions group A (conventional) & group B (conventional physiotherapy and thoracolumbar fascia taping). After that baseline data (age, weight) were recorded by researcher before giving intervention. Following this the assessment of patients was done by following methods: 1) Oswestry Disability Index for functional disability. 2) NPRS for pain. 3) Tampa Scale for movement fear i.e. kinesiophobia. 4) Trunk ROM.

Fig 1.1 Thoracolumbar fascia Kinesiio-tape



## RESULTS AND DISCUSSION

110 patients participated in the study and 100 out of these underwent the treatment and completed the study. All the patients underwent a pre-assessment analysis which included age and weight measurement. 50 patients were given lumbopelvic stabilization exercises with hot pack in group A. 50 patients were given kinesiio-taping along

with conventional treatment in group B on lower back for 4 weeks. The demographic data of the subject was as: Age:18-60 years, Mean for Group A is  $37.54 \pm 10.51$  and for Group B is  $39.4 \pm 10.45$ . Weight is Mean for group A =  $55.32 \pm 7.94$  and for group B =  $56.66 \pm 7.72$ .

Age, weight was assessed and analysis was done which revealed homogeneity in key demographic variables between the groups. Hence matched group were taken. The TAMPA score for movement fear, ROM of lumbar spine, numeric pain rating score for analysing pain and the Oswestry Disability Index score for analysing quality of life for all the patients belonging to the experimental group (KINESIOTAPING group) and the lumbo-pelvic stabilization group were taken prior applying the intervention. The mean scores of all the variables of both the groups were calculated before the intervention and after 2nd week and 4th week of intervention.

**Table 1.1. Changes in NPRS between Group A and Group B**

WEEK	(GROUP A) Mean $\pm$ SD	(GROUP B) Mean $\pm$ SD	t-value	p-value
WK 0	$7.28 \pm 1.78$	$7.78 \pm 1.21$	1.63	0.10 <sup>NS</sup>
WK 2 <sup>nd</sup>	$4.58 \pm 1.21$	$4.88 \pm 1.54$	1.0	0.28 <sup>NS</sup>
WK 4 <sup>th</sup>	$2.34 \pm 1.28$	$1.84 \pm 1.49$	1.79	0.01 <sup>**</sup>

SD: standard deviation NS: not significant WK: week of intervention \*\* Significant at  $p \leq 0.05$

The results did not show any significant difference in TAMPA between mean of group A (lumbar stabilization exercises) and group B (kinesiotaping) at 0 week, ( $t = -0.45$ ,  $p = 0.65$ ). However, at week 4, this difference was found to be significant ( $t = 4.45$ ,  $p = 0.00$ ). (TABLE 1.2).

**Table 1.2. Changes in TAMPA between Group A and Group B**

WEEK	(GROUP A) Mean $\pm$ SD	(GROUP B) Mean $\pm$ SD	t-value	p-value
WK 0	$48.56 \pm 3.28$	$48.20 \pm 4.59$	0.45	0.65 <sup>NS</sup>
WK 2 <sup>nd</sup>	$43.92 \pm 3.79$	$41.74 \pm 5.07$	2.43	0.01 <sup>**</sup>
WK 4 <sup>th</sup>	$39.22 \pm 4.85$	$34.88 \pm 4.89$	4.45	0.00 <sup>**</sup>

SD: standard deviation. NS: not significant WK: week of intervention \*\* Significant at  $p \leq 0.05$

The result showed non significant difference in flexion ROM between group A and group B (kinesiotaping), at 0 week ( $t = -1.72$ ,  $p = 0.08$ ). However, at week 4 flexion ROM for group A while that of group B (kinesiotaping), this difference was found to be significant ( $t = 3.45$ ,  $p = 0.01$ ). (TABLE 1.3) Table 1.3 Changes in Flexion ROM between Group A and Group B.

**Table 1.3. Changes in Flexion ROM between Group A and Group B**

WEEK	(GROUP A) Mean $\pm$ SD	(GROUP B) Mean $\pm$ SD	t-value	p-value
WK 0	$4.70 \pm 1.14$	$4.33 \pm 0.98$	1.72	0.08 <sup>NS</sup>
WK 2 <sup>nd</sup>	$5.54 \pm 1.13$	$5.82 \pm 0.95$	1.31	0.19 <sup>NS</sup>
WK 4 <sup>th</sup>	$6.52 \pm 1.15$	$7.28 \pm 1.02$	3.45	0.01 <sup>**</sup>

SD: standard deviation. WK: week of intervention. NS: not significant \*\* Significant at  $p \leq 0.05$

The result showed no significant difference in right rotation ROM between mean of group A (lumbar stabilization exercises) and mean of group B (kinesiotaping) which was at 0 week ( $t = 0.798$ ,  $p = 0.42$ ). However, at week 4, this difference was found to be significant ( $t = 3.50$ ,  $p = 0.01$ ) (TABLE 1.4)

**Table 1.4. Changes in Right rotation ROM between Group A and Group B**

WEEK	(GROUP A) Mean $\pm$ SD	(GROUP B) Mean $\pm$ SD	t-value	p-value
WK 0	$4.06 \pm 0.83$	$3.93 \pm 0.70$	0.798	0.42 <sup>NS</sup>
WK 2 <sup>nd</sup>	$5.14 \pm 0.77$	$5.02 \pm 0.81$	0.717	0.47 <sup>NS</sup>
WK 4 <sup>th</sup>	$6.17 \pm 0.76$	$6.39 \pm 0.74$	3.50	0.01 <sup>**</sup>

SD: standard deviation WK: week of intervention NS: not significant \*\* Significant at  $p \leq 0.05$

The result showed no significant difference in left rotation ROM between mean of group A (lumbar stabilization exercises) and mean of group B (kinesiotaping) which was at 0 week ( $t = 2.35$ ,  $p = 0.21$ ). However, at week 4, this difference was found to be significant ( $t = 2.58$ ,  $p = 0.01$ ). (TABLE 1.5)

**Table 1.5. Changes in Left rotation ROM between Group A and Group B**

WEEK	(GROUP A) Mean $\pm$ SD	(GROUP B) Mean $\pm$ SD	t-value	p-value
WK 0	$4.49 \pm 0.84$	$4.12 \pm 0.70$	2.35	0.21
WK 2 <sup>nd</sup>	$5.51 \pm 0.73$	$5.26 \pm 0.72$	1.66	0.09
WK 4 <sup>th</sup>	$6.65 \pm 0.65$	$6.32 \pm 0.60$	2.58	0.01 <sup>**</sup>

SD: standard deviation WK: week of intervention \*\* Significant at  $p \leq 0.05$

The objective of the research was to check the clinical effectiveness of kinesiotaping for thoracolumbar fascia as a treatment intervention for patients having chronic non specific LBA in clinical outcome i.e. (pain & functional

disability) and physical function (range of motion & kinesiophobia). NSLBP is the pain of musculoskeletal in origin and mechanical in nature of which clinical sign varies with the type of activities one is performing. NSLBP represents in form of pain, muscle tension, occasionally stiffness that is situated below the costal surface and on and over the gluteal folds inferiorly. It is commonest and mainly one of the self-limiting disorder. Many studies in literature having different research designs, researched to assess the relevance of manual therapy on LBP, which consisted of manual treatment alone or with electrotherapy modalities compared to exercises alone or with other interventions like consultation from medical professional with patient education; motor control exercises along with behavioural therapy; group exercises with CBT. Therefore, the researcher stated the design of the present research, with the application of fascial kinesio taping with exercise and hot pack in one group as compared to only conventional exercise with hot pack in other group.

The results demonstrated statistically significant improvement between both the groups in pain, kinesiophobia and trunk flexion, rotation to both side ROM. The result of the research concluded that thoracolumbar fascial kinesio-taping with or without conventional physiotherapy was effective in decreasing pain and increasing functional abilities. Patients who had received thoracolumbar fascial kinesio-taping in combination with hot pack and lumbopelvic strengthening exercises shows decreased pain and improved functional performance in comparison to one who received general physical therapy treatment only.

The findings of the present study revealed statistically significant differences between both the groups i.e. Group A (lumbopelvic strengthening exercises and hot pack) and Group B (Kinesiotaping and strengthening exercises with hot pack) and  $p = 0.01$ . Also pain was found to statistically improve within groups. It has been seen that KT puts pressure onto the skin or sometimes stretches the skin and it's that external load which may stimulate skin receptors which are sensitive to mechanical pressure which are large myelinated fibres specially and thus stops the transfer of pain in accordance to gate control theory. Melzack and Wall postulated that spinal cord consisted of a neurological "gate" that sometimes blocks pain signals or sometimes allows signals to transduce to the brain (Al Shareef et al., 2016). In contrast to the study by Paoloni and co workers, we observed decrease in disability which was statistically non-significant but kinesiophobia was highly statistically significant ( $p=0.00$ ) which was measured using the TAMPA in both the groups of the present research.

In the present research the investigators had given core stabilization exercise for the participants with NSCLBP to stabilize and strengthen the deep spinal muscles which induces and improves trunk stabilization reducing pressure on the torso which leads to back pain reduction. Improvement in pain perception could be seen as a result of re-arrangement of the general control of the muscles

of the spine which is placed deeply thus reducing the activity of many more superficial muscles (Bharti, Arora and Arora, 2015).

In present study researcher found statistically significant improvement ( $p=0.000$ ) in forward flexion and rotation to both sides of lumbar spine between both the groups. There was no statistical improvement in extension and side-flexion both left and right. There was improvement in all the range of motions within groups. The improvement can be adjunct to the previous researches conducted which stated that KT influences sensorimotor function. Also, KT-induced change in muscle tone could result from stimulation of mechanoreceptors, which results in reflexive activation of motor units in the same muscle that was the source of the neural stimulus, (Lemos, Crolina and Gonsalves, 2014).

The thoracolumbar fascia is a stable structure because of the large flow of piezoelectric charges, which promote the deposition of collagen fibres and confers resistance to this tissues, and thus requires high tensions to be mobilized and stretched. Therefore, the present study found that a fascial correction technique and application without tension promoted changes in fascia mobility, allowed for discrete gains in lumbar flexibility, and had no significantly improved in extension and lateral flexion range of motion, (Lemos et al., 2009). Results showed statistically insignificant difference in extension and lateral flexion to both sides. This can be due to the short term results of kinesio tape application used in present study as inferences relative to long term effect can be seen in other studies, (Sarkar et al., 2018).

The therapists also used multimodal approach to the management of patients with NSLBP and had not used kinesio taping as an isolated intervention. This could be the reason that there is no statistical difference found in between the groups. This theory is supported by different authors in the literature. The limitation of the study is that the follow up was not done in study to assess the sustained effect of kinesiotape. Also, different age group analysis was not done. The future scope of this research could be following-duration of the study can be increased with regular follow ups. Results of the isolated kinesiotape can also be considered. Other variables like proprioception can also be taken to have a better perception of efficient pain management.

## CONCLUSION

The present study concluded that there is efficacy of kinesiotaping for thoracolumbar fascia as an intervention for patients having low back pain of chronic and non specific in nature. The study states that experimental hypothesis is accepted.

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