



## RESEARCH ARTICLE

### EFFICACY OF RIGID TAPING AS AN ADJUNCT TO REDUCE KINESIOPHOBIA IN NON SPECIFIC LOW BACK PAIN

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#### ABSTRACT

Low back pain has been growing musculoskeletal disorder. In previous studies it has been stated that, "Fear avoidance belief have been hypothesized as most important psychological factor in predicting disability among patients with low back pain". In order to provide effective rehabilitation it is necessary to explore both physiological and psychological factors. In this experimental study, 30 individuals were included according to inclusion criteria and divided in 2 groups, group A : control group (15) and group B : experimental group (15). Control group was given - ergonomics for back, core muscle (Multifidus, Transverse abdominis) activation with progression to limb loading exercises and experimental group was given rigid taping along with conventional therapy for 4 weeks. Results showed that on comparison between 2 groups a significant difference in post intervention values of average of reduction of kinesiophobia, disability and pain. The t-value for comparison of post kinesiophobia is  $t=3.343(p=0.0039 < 0.005)$ , t-value for comparison of post disability is  $t=2.257(p=0.032)$ , t-value for comparison of post pain is  $t=6.517(p<0.0001)$ . The present study shows not only the kinesiophobia is reduced with rigid taping but, also patients may show significant improvement in disability and pain.

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#### INTRODUCTION

Low back pain has been a major public health burden for many years, responsible for substantial work disability and elevated healthcare costs. Around 70- 80% of adults in general population are believed to experience at least one produces mobility restriction, long term disability, quality of life impairment and work absenteeism (Anderson 1999, Frymoyer and Durrett 1997, Ryan *et al.*, 2009, Waxman *et al.*, 2008). Mechanical low back pain or non specific low back pain is having unknown cause, puts stresses on the tissues around vertebral column and there may be muscle strain. The international association for the pain has defined, Pain is "an unpleasant sensory and emotional experience, which is primarily associated with tissue damage" and a chronic pain as "pain which persists beyond the normal time of healing and more than 12 weeks." FEAR is unpleasant sensation caused by nearness of realistic danger or pain. It is one of the oldest and strongest emotions of mankind. To every physical activity it acts as a ruler or dictator. Whereas phobia is intense, persistent, irrational fear of specific object, situation or

activity. There is strong relation between the fear and pain. Chronic Pain is known to interfere with activities of daily living and can generate an experience of illness and dissatisfaction with life, i.e. changes in behaviors for both physical and psychological reasons. When pain is perceived as life threatening, people tend to maintain engagement in daily activities. Conversely, when pain is interrupted catastrophically, it may lead to pain related fear and safety seeking behaviors. Fear may motivate avoidance, which can be avoidance of pain experience - cognitive avoidance, or avoidance of painful activities - behavioral avoidance. Kinesiophobia is a term that was introduced by Miller, Kori and Todd in 1990 at the Ninth Annual Scientific Meeting of the American Pain Society and describe as situation where "a patient has an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or reinjury." It is a salient predictor of pain disability in chronic pain population. The Tampa Scale for Kinesiophobia (TSK) is a 17 item questionnaire used to assess the subjective rating of kinesiophobia or fear of movement. The original questionnaire was developed to "discriminate between non-excessive fear and phobia among patients with chronic musculoskeletal pain." Several studies have found the scale to be a valid and reliable psychometric measure.

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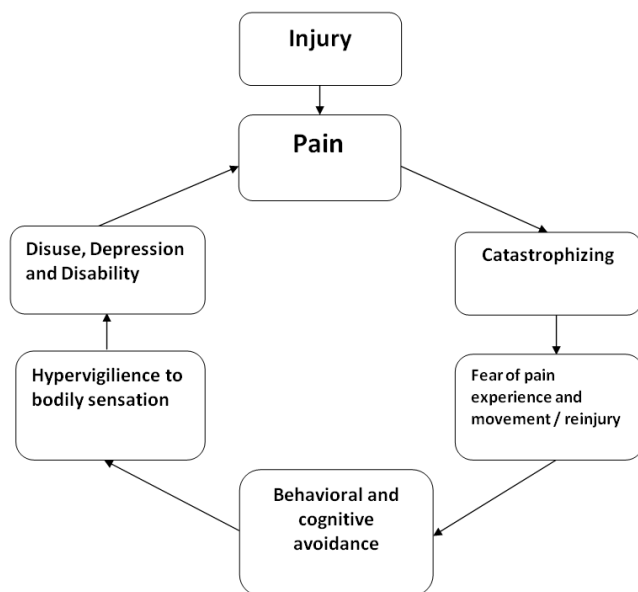


Figure 1. Vicious cycle of Pain

The TSK is a self-completed questionnaire and the ranges of scores are from 17 to 68 where the higher scores indicate an increasing degree of kinesiophobia. Lower back taping technique is designed to support the low back, improve postural alignment and reduce stress on the spine during activity. They can be used for both treatment and prevention of recurring low back injuries, particularly associated with poor posture or caused by excessive bending forward, sitting or lifting activities by stabilization and restriction of range of motion of joint.

There are many different tapes and bandages available for use by physiotherapists. There are 2 mechanisms of action of taping- Inhibitory and Facilitatory i.e. to increase or decrease the neurological input of a muscle so as to either facilitate or inhibit its recruitment by the nervous system. The intention is to retrain the nervous system to recruit the muscle in proper patterns and decrease overuse and synergistic dominance that typically results from it. However, when the purpose is to support the lower back and restrict undesired movement, adhesive, non stretch rigid (sports tape) is generally most appropriate which should always be used in combination with hypo allergic tape as an underlay, such as fixomull. For back strapping 38 mm / 3.8cm is used. In order to provide effective rehabilitation for low back pain, it is necessary to explore both physiological and psychological factors as predictors of disability and rehabilitative outcomes. Only giving treatment which we used as conventional therapy does not help individuals for earlier return to the daily activities and completely get rid of low back pain. So, the study aims at to study the efficacy of rigid taping as an adjunct to conventional therapy to individual to reduce his kinesiophobia which is considered as predictive factor of low back pain. So, all physiological and psychological factors are given equal attention according to rehabilitation point of view and earlier return of individual to the daily living activities.

## MATERIALS AND METHODS

**Study set up:** OPD's in and around Pune

**Study design:** Experimental study.

**Study duration:** 4weeks

**Sample size:** 30

**Sampling method:** Purposive sampling.

**Selection criteria**

**Inclusion criteria**

1. Age group:20-40yrs
2. Gender: Male and Female
3. Participants having mechanical low back pain/non specific low back.
4. Participants having kinesiophobia above 37 on 17 items Tampa scale for kinesiophobia.

**Exclusion criteria**

1. Degenerative disorders
2. Recent fracture of spine.
3. Pathologies of spine
4. Neurological signs and symptoms.
5. Any recent spinal surgery.

**Materials used**

- Evaluation Performa
- Rigid tape
- Under wrap tape

**Outcome measures**

- Visual Analogue Scale.
- Tampa scale for kinesiophobia, consisting of 17 items.
- Modified Oswestry pain disability scale.

**1.Pain:** Pain was recorded by participants using a 10 centimeters visual analogue scale where 0 represented no pain and 10 represented unbearable pain.

**2.Kinesiophobia:** Fear of movement and of re injury was measured using 17 item Tampa scale for kinesiophobia. Each item is rated on a 4 point likert scale ranging from 'strongly disagree' to 'strongly agree'. The total score is calculated after inversion of score of 4, 8, 12 and 16. Higher the calculated score higher the kinesiophobia. This measure has good internal consistency, test re test reliability, responsiveness, concurrent viability and predictive validity.

**3.Disability:** was measured using questionnaire. The modified Oswestry disability index contains ten items related to limitations in daily activities, rating each on 0-5 point scale; the points are added together and converted into a percentage. Oswestry scoers are categorized as:-

- Minimal disabled (0-10%)
- Moderately disabled (20-40%)
- Severely disabled (40-60%)
- Crippled (60-80%)
- Bed bound (80-100%)

**Procedure**

Patients were selected according to inclusion criteria and were given prior information about the study and consents were

taken. Kinesiophobia was assessed on Tampa scale as pre score. 30 individuals were divided into 2 groups.

**Group A:** 15- control group - ergonomics for back, stretching to trunk flexor, extensor, side flexor and rotator, short hip flexor, extensor, adductor, quadriceps, hamstrings, calves muscles. Static exercise, cat camel exercise, flexion exercise

(curl ups), extension exercise (prone on elbow), with progression to limb loading exercise.

**Group B:** 15- experimental group- rigid taping along with conventional therapy. Above protocol was given for 4 weeks. Then post kinesiophobia was rated on the Tampa scale for kinesiophobia. Data was collected and analyzed.

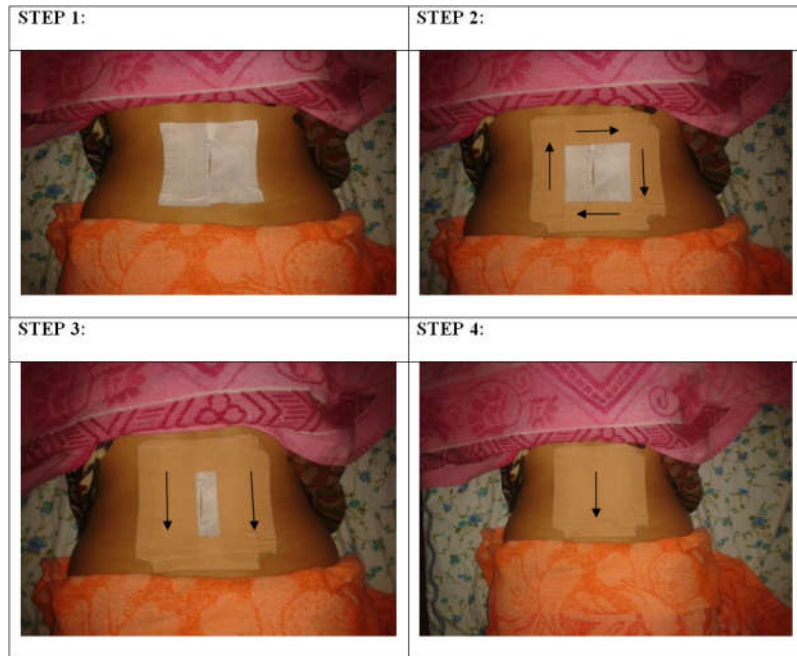


Fig. 2. Application of rigid taping for low back pain

Table 1. Comparison between pre scores of kinesiophobia, disability and pain in control group & Experimental group

	Pre control group	Pre experimental group	t value	P value
Kinesiophobia	46.07	43.60	1.007	0.3227*
Disability	24.40	23.86	0.220	0.827*
Pain	7.73	7.40	0.874	0.389*

\* values are statistically not significant for 2 tailed (P value < 0.10)

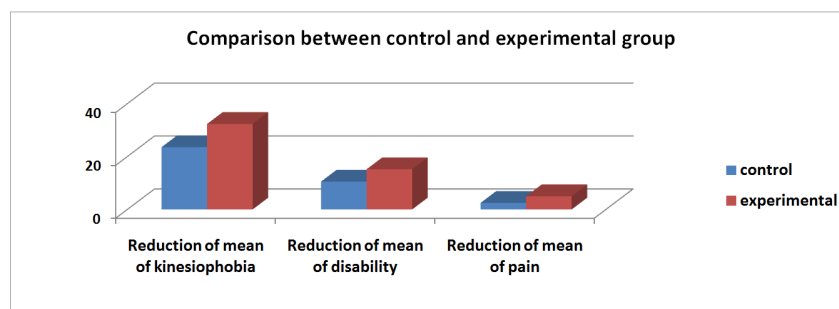
Table 2. Comparison between pre post scores of kinesiophobia, disability and pain in control group & Experimental group

	Kinesiophobia		Disability		Pain	
	Pre	Post	Pre	Post	Pre	Post
Control group	46.07	32.33	24.4	15.2	7.73	5
t-value	7.936*		11.17*		15.04*	
Experimentalgroup	43.6	23.53	23.8	10.5	7.4	2.4
t-value	11.83*		9.07*		27.15*	

\*values are statistically significant for 2 tailed (P value < 0.0001)

Table 3. Comparison between post scores of kinesiophobia, disability and pain in control and experimental group

	Control	Experimental
Kinesiophobia	23.534	32.334
Disability	10.534	15.2
Pain	2.467	5



## RESULTS

**Statistical analysis:** The SPSS software 20 was used for data analysis. Two groups were assessed for normality using Shapiro Wilk test. Pre interventions homogeneity of the both the group samples was checked using Unpaired t test (non significant difference = homogenous sampling). Pre and post intervention comparison in each group was done by using paired t test and post – post comparison between two groups for kinesiophobia, disability and pain was done using unpaired t test.

**Demographic data:** The mean for control and experimental group is 30.40 and 29.73 years respectively. There were 7 females and 8 males in control group and 9 males and 6 females in experimental group.

**Interpretation Table 1:** The comparison between groups at pre intervention is statistically not significant which shows that there is homogeneity between two groups.

### Interpretation Table 2:

A significant difference in pre and post intervention values of average kinesiophobia, disability score in percentage and pain intensity on visual analogue scale is seen in control group as well as in experimental group. Paired t-test is used for statistical analysis of the data. The t-value for kinesiophobia is  $t = 7.936$  and  $t = 11.83$  ( $p < 0.0001$ ), t-value for disability is  $t = 11.17$  and  $t = 9.07$  ( $p < 0.0001$ ) and t-value for pain is  $t = 15.043$  and  $t = 27.15$  ( $p < 0.0001$ ) for control and experimental group respectively, which shows extremely significant difference in pre and post intervention values.

### Interpretation Table 3:

A significant difference in post intervention values of average of reduction of kinesiophobia, disability and pain in control and experimental groups is seen. Unpaired t-test is used for statistical analysis of the data. The t-value for comparison of post kinesiophobia is  $t = 3.343$  ( $p = 0.0039 < 0.005$ ), t-value for comparison of post disability is  $t = 2.257$  ( $p = 0.032$ ), t-value for comparison of post pain is  $t = 6.517$  ( $p < 0.0001$ ), which shows highly significant difference in control group.

## DISCUSSION

Patients having kinesiophobia more specifically having fear of movement and fear of that physical activity which lead to reinjury, have tendency to react to these fears either with 'confrontation' or 'avoidance'. In the absence of serious somatic pathology, confrontation with activities is conceptualized as an adaptive response, eventually leading to the reduction of fear and to recovery. In contrast, avoidance leads to the maintenance or exacerbation of fear, possibly resulting in phobic state. Further avoidance of both social and physical activities may finally lead to physical and psychological consequences augmenting disability. (Vlaeyen a.b.c.1995) Low back pain, in particular chronic low back pain, is an important public health problem because of its high impact on disability, absence due to sickness, and work related disability and health care costs. Despite increasing research, low back pain is still poorly understood. Many potential risk factors—lifestyle, physical, psychosocial, and both work-related and non-work-related—have been studied. Some

physical factors such as lifting and carrying loads, whole-body vibration, and frequent bending and twisting have already been established, but the evidence for all other factors is mixed or lacking, and the associations are often weak. The present study shows that, the people with chronic low back pain, significantly greater reduction in disability and kinesiophobia were obtained immediately after treatment by the participants who received genuine rigid taping as an adjunct to conventional therapy than those who received only conventional therapy. There is significant reduction in pain in pre and post scores but of similar magnitude reduction in control and experimental group.

The precise mechanism underlying the effect of rigid taping on musculoskeletal pain is not clear. Some author hypothesized that pain is relieved by rigid taping because sensory modalities operate within interconnecting, intermodal and cross modal networks (Mcglone and Reilly, 2010). Others have suggested that keratinocytes may be non neural primary transducers of mechanical stimuli, probably via a signal transduction cascade mechanism (e.g., intracellular  $Ca^{++}$  fluxes) to evoke a response on adjacent c-fibers (Lumpkin and Caterina 2007). Another hypothesis is that the cutaneous stretch stimulation provided by rigid taping may interfere with the transmission of mechanical and painful stimuli, delivering afferent stimuli that facilitate pain inhibitory mechanisms (gate control theory) and pain reduction (Deleo 2006, Paolini *et al.*, 2011). A further possible mechanism by which rigid taping induce these changes may be related to the neural feedback received by the participants, which may improve their ability to reduce the mechanical irritation of soft tissues when moving the lumbar spine (Kase *et al.*, 2003). Furthermore, Kase colleagues (1996) proposed a theoretical framework to explain the decrease in lumbar pain-associated disability observed immediately after rigid taping. They argued that when muscle is hypertonic it stimulates golgi receptors to transmit information to the central nervous system, where inhibitory motor neurons are activated, and that taping application would act by stimulating golgi receptors to initiate this process. The patient's attitudes and beliefs about pain increasingly found to be risk factors, as well as their associations are also much stronger than those for other risk factors studied. Aspects of cognitive treatments focusing on these attitudes and beliefs are now commonly used in the behavioral treatment of chronic (disabling) low back pain, and significant effects are particularly found in patients reporting high levels of pain-related fear.

## Conclusion

- Conventional therapy shows reduction in kinesiophobia.
- But, conventional therapy is used along with rigid taping as an adjunct proves to be more effective, as it shows significant reduction in kinesiophobia.
- So, the present study shows not only the kinesiophobia is reduced with rigid taping but, also patients may show significant improvement in disability and pain.

## Further scope of study

- Sports candidates can show different result.
- Males and females can show different result.
- Correlation between the pain and kinesiophobia also can be studied.

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