

# Efficacy of Kinesiotaping In Lower Trunk Flexion Range of Motion In Tennis Players

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**Abstract-** Aim- To find out effect of kinesiotaping on lower trunk flexion range of motion in tennis players.

## Background and purpose:

Tennis players as a group, exhibit a 24% to 30% chance of being diagnosed with back problems at some point in their career. Kinesio tape (KT) is a popular therapeutic application that is used by athletic trainers, physical therapists and physicians to increase stimulation of circulation and mechanoreceptors in order to facilitate flexibility, muscular power/strength and decrease pain, edema and inflammation. The purpose of present study was to determine if KT used in tennis players is effective at decreasing fatigue by maintaining flexibility of the low back muscles, which are commonly associated with low back pain.

## Method and materials :

Pre test and post-test single group experimental design was done in Indore tennis club, Indore(M.P.) 30 male tennis players were selected on the basis of inclusion criteria. Kinesiotaping has been done using a Y strip intervention. The measuring tape was used to test the flexibility of the low back muscles at post-test of 1 hr. play preformed by each athlete.

## Result:

Result of analysis had shown significant difference in low back flexion ROM of tennis players ( $t = 6.49$ ) after match reflects improvement in flexibility with application of K tape.

## Conclusion:

Our research indicates that KT, when applied to tennis players, is associated with less of a decrease in muscular flexibility than seen in a "no tape" condition. More research must be done to test if KT has a therapeutic benefit for athletes with chronic low back problems.

athletes low back strength is an important component of participating in many sports, including rackets, sports, judo, weight lifting, baseball, martial arts and rock climbing.

In electro myographic (EMG) studies, performed on collegiate and professional tennis players, it was discovered that the back extensors, lumbar erector spine, multifidus and DL fascia showed marked activity during portions of the server, forehand and back hand strokes. Therefore, a marked increase in activation of the lumbar muscle may lead to overuse injuries resulting in reduced muscle strength or fatigue of low back muscles which may result in the muscle not being able to maintain force output and may also be a contributing factor in decreasing the range of motion of lumbar spine. This would result in decreasing the overall effectiveness of an athlete. The unique property of kinesio tape is to allow it to work in ways that cannot be duplicated by any other form of athletic or therapeutic taping. Following is a simplified of the major mechanisms of action :-

Kinesio tape works by pulling the upper layers of skin creating more space between the dermis or skin and the muscle. The space created is believed to relieve pressure on the lymph channels in the area between the muscle and the dermis or skin, creating more space for lymph flow and thus better lymph drainage through an affected area. This space also houses various nerve receptors that send specific information to the brain. When the space between the epidermis and the muscle is compressed, such as during an injury, these nerve receptors are compressed and send information to the brain regarding continuous touch, light touch, cold, pain, pressure, and heat. This information causes the brain to send out certain signals to the body on how to react to particular stimuli. Kinesio tape alters the information that these receptors send out certain signals to the body on how to react to particular stimuli. Kinesio tape alters the information that these receptors send to the brain and causes a less reactive response in the body, allowing the body to work in a more normal manner and removing some of the roadblocks that normally slow down the healing process and an athlete's sports ability.

## I. INTRODUCTION

Overuse or repetitive micro trauma to muscle, joint, ligaments and bones are common injuries seen in athletics. In

## II. REVIEW OF LITERATURE

- **YOSHIDA A**etal,(2007), the effect of kinesiotaping in lower trunk range of motion. Res sports med. Concluded that kinesiotaping improve active range of motion in lower trunk flexion.
- **SALVAT**etal,(2010), “A immediate effect of kinesiotaping on trunk flexion”. Concluded that, increase in trunk flexion in kinesiotape group.
- **RAFAEL MERINO MARBAN**,etal (2011), “the effect of kinesiotaping on calf’s injuries prevention in triathletes during competition. Pilot experience” concluded that it is possible to recommended kinesiotape for to avoid cramps or contracture during the competition.
- **MRINO MARBAN R**,(2008) “influence of gastronomies muscle on the sit and reach test after application of kinesiotape in triathletes. A pilot study.” Concluded that there is increase ij flexibility of gastronomic muscle after KT application.
- **Melissa**etal (2007) “ the effect of kinesiotex tape on muscular strength of forearm extensor on collegiate Tennis athletes”, andoconcluded that, there is less of decrease of forearm strength in tennis athletes.
- **Frost M**,etal (1982) reliability of measuring trunk motion in centimeters. Concluded that forward bending exhibited good single measurement reliability in centimeters.
- **Halseth T**, etal (2004) the effects of kinesio taping on proprioception at the ankle. Journal of sports science and medicine 3:1-7. Concluded that kinesio tape dose not appear to enhance proprioception (in terms of RJPS) in healthy individuals.
- **Kase K** (1994) illustrated kinesio-taping 2<sup>nd</sup> ed. Tokyo japan: ken’i-kal information. Concluded that KT application dose not seem to be an effective treatment method for both dressing pain and improving joint position with PFPS.
- **Hashimoto T**, etal (13 march 2005) changes in the volume of peripheral blood flow by using kinesio tape. Concluded that applying kinesio Taping techniques, an immediate effect is seen since that blood flow has been changed immediately (within 10 min.) after taping.

## III. PURPOSE OF STUDY

The purpose of the study is to find out the efficacy of kinesiotaping on lower trunk flexion range of motion in tennis player.

### Need And Significance Of The Study

- Literature suggests that it’s not possible to gain effective performance without appropriate flexibility. So, if kinesiotaping proves to be an effective measure to increase flexibility of lower trunk then performance of tennis players can be enhance using this measure.
- The method of justified then it will also help the player by not only enhancing the flexibility about also support and protection in biomechanically using ranges of the body.

### Statement of Question

Is there any significant effect of kinesiotaping on lower trunk flexion range of motion in tennis players?

### Hypotheses

Experimental Hypotheses:

There is significant effect of kinesiotaping on lower trunk flexion range of motion in tennis player.

### Null Hypotheses:

There is no significant effect of kinesiotaping on lower trunk flexion ROM in tennis player.

### Sample

- a. Number of subjects- 30
- b. Source of the subjects : study was conducted in sports authority of India Jabalpur (M.P)
- c. Method of selection-sample of convenience.

Study design : Pre-test post test single group experimental deign.

### Study Setup and Duration:-

During of study-2 days.

Each session of 1 hour for a day.

### Variables

- a. Independent variable : kinesiotaping
- b. Dependent variable : lower trunk flexion flexibility.

### Inclusion Criteria

- Age group 18-24 years.
- Only Female players were taken.

### Exclusion Criteria

- a. Players having any low back injury within 6 months.
- b. Players having any pathology of hip, knee, thigh and back.
- c. Other factors affecting the flexibility were not calculated. Like temperature etc.

**Measurement Tools**

- 1. Kinesio tape,
- 2. Measuring tape.
- 3. Step tool
- 4. Scissor

**Protocol**

Pre and post test experimental design 30 players were taken for study.

The study is done in two phases:-

**PHASE 1:-**

Trunk flexion range of motion will be recorded without kinesio taping before and after match (1hr. play).

**PHASE 2:-**

Trunk flexion range of motion will be recorded without kinesio taking before match, with kinesiotaping before and after match (1 hr. play).

**Measurement Procedure:-**

Initially each player was measured for lower trunk range of motion using a tape measure. Subjects performed a static stretch for subject perform a static stretch for 15 seconds in the flexion, subjects stood on the step stool with arms in a natural position, heels together, and knees straight. Subjects bent forward as far as they could with fingers straight. The distance between the trip of third finger and the floor was measured.

GROUPS	DAY 1 BEFORE MATCH WITHO UT K-TAPE	DAY 1 BEFOR E MATC H WITH K-TAPE	DAY 2 BEFORE MATCH WITHO UT K-TAPE	DAY 2 BEFOR E MATC H WITH K-TAPE
MEAN	13.458	16.123	11.534	12.235
SD	5.141	5.133	4.141	4.133
t-value	0.4741			
Significan ce	Not statistically significant			

**ANAYUSIS OF LOW BACK FLEXION ROM PRE AND POST WITHOUT KINESIOTAPE YS PRE AND POST WITH KINESIOTAPE**

GROUPS	Day 1 before Match Without Kinesiotaping	Day 2 Before Match without Kinesiotaping
MEAN	13.457	13.447
SD	5.141	5.133
t- value	0.4741	
Significance	Not statistically significant	

**ANALYSIS OF LOW BACK FLEXION RAOM DAY 1 BEFORE MATCH WITHOUT KINESIOTAPING VS DAY 2 BEFORE MATCH WITHOUT KINESIOTAPING**

Group	Day 2 before match without kinesiotaping	Day 2 before match with kinesiotaping
MEAN	13.457	11.863
Sd	5.141	5.146
t-value	9.2009	
	Statistically significant.	

**ANALYSIS OF LOW BACK FLEXION ROM WITHOUT KINESIOTAPING AFTER MATCH V/S WITH KINESIOTAPING AFTER MATCH:-**

Group	Day 1 after match without kinesiotaping	Day 2 before match with kinesiotaping
MEAN	16.467	12.623
Sd	5.434	5.098
t-value	18.9111	
Significance	Statistically significant.	

**IV. DISCUSSION**

The present study was undertaken to determine the efficacy of kinesio taping on lower trunk flexion range of motion (flexibility)in tennis players. The study was done on tennis players. Their pre and post game (1 hr. play) lower trunk flexion range of motion was measured with and without kinesiotape on low back.

Data collected through study had show significant difference in lower trunk flexion ROM of players before and after 1 hr. play without kinesiotape, as compared to same group before and after 1 hr. play with kinesiotape (t = 9.2009). It indicates that kinesi Tape, when applied to healthy colligate tennis players, helps to maintain the flexibility of low back muscles.

The reasons for this improvement may be related to physiological mechanisms by which KT is presumed to have a therapeutic benefit:

- Gather fascia to align the tissue in its desired position.
- Lift the skin over areas of inflammation, pain, and edema.
- Increase stimulation of the mechanoreceptors to either stimulate or limit movement.
- Provide a positional stimulus to the skin.
- Decrease pressure over the lymphatic channels that provide a path for the removal of exudates.

These physiological mechanisms still remain theoretical because there are limited researches to support these concepts. This may suggest that, as the motor units in the low back muscles fatigued during the workout, the KT aids in flexibility and muscle contractions.

Other two studies measuring muscle activation after KT application found results similar to those of the current study. A study done by Yoshida et al at 36 effect of kinesiotope in lower trunk range of motion and founds increase in active range of motion in lower trunk muscles.

Another study found an increase in trunk flexion in kinesiotope group by Salvatsalvat 1 et al. These studies support the current study, possibly suggesting that, as the low back muscles fatigued, KT may have had an effect on recruiting additional motor units and increase in circulation to the contracting muscle and improves flexibility.

Another objective of this study was to find out the immediate effect of KT on flexibility (trunk flexion ROM) on low back muscle in tennis players. On statistical analysis significant difference was found in trunk flexion range of motion just after the application of KT on tennis player ( $t = 9.2099$ ) reflecting improvements in Flexibility.

When KT was applied over the low back muscles from centre of sacrum at the origin of sacrospinalis to its insertion on low back. According to Kaseet all this technique will cause an increase in local circulation of blood and stimulation of mechanoreceptor which is then perceived by the brain as a proprioceptive stimulation.

However, a study by Halsethetall, found that KT does not affect joint position sense/proprioception at the ankle in healthy patients, as measured by a reproduction of joint position sense apparatus. In a study by Murray and Husk”, It was found that KT. When applied to the ankle. Caused an

increase in joint position sense at 100 plantar flexion and therefore may have caused stimulation to the cutaneous mechanoreceptors. Still, the role of cutaneous and subcutaneous mechanoreceptors may have some effect on proprioception and neuromuscular control on injured patients who have a diminished sense of proprioception. Theoretically, an external device may cause stimulation of the cutaneous mechanoreceptors and enhance somatosensoryproprioceptive input to joint receptors. However, there is still much controversy concerning the proprioceptive benefit of adhesive tape. Braces, etc.

Another factor that may have played a role in this study is time from application of the tape to activity. The current study tested subjects 60 minutes after tape application, which was determined based on recommendation from Kase et al Slupik et al reported that KT application to the vasusmedialis showed a significant increase in bioelectrical muscle activity hours after initial application. However there was not a significant increase in activity 10 minutes or 96 hrs after initial application. This finding does not support the protocol set out by Kase et al that stated “the tape needs approximately 20 nuts to gain full adhesive strength “the current study tested subjects 60 min. after tape application and it may be inferred that the results would have differed It tape application were applied at least 24 hours before testing, as has shown to be effective in previous studies.

Hence. Results of the study suggest that KT may increase and help in maintaining active ROM of the lower trunk flexion in Tennis players.

### Limitations of the study

1. Small sample size, to establish efficacy of treatment a large study sample is required
2. It did not include a control/placebo group and group assignment of subjects was not blended from the investigators. Thus, subjects could have expected an effect from using kinesiotope or anticipated the researches expectation toward the effects of kinesiotope.

### V. FURTHER RESEARCH

1. The tape measure method used to assess trunk ROM may not have been the most accurate method to assess possible physiological changes as a result of using kinesiotope. Further studies using electromyography and infrared thermography to detect changes in muscle excitability and temperature are warranted to assess the effects of KT on physiological changes.

2. To determine if kinesiotape produces the same effects on patients with low back pain and other joint pathology.
3. More research should be done on the effects of low back flexibility over an extended period of athletic activity on a larger subject pool.

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