

Assess Therapeutic Efficacy of Elastic therapeutic tape, Sports Utility In Lower Trunk Flexors Among Cricket Players

Karthikeyan T

Physiotherapist, NIMHANS, Bangalore, India

Article Info

Received: April 14, 2021

Accepted: April 26, 2021

Published: May 05, 2021

***Corresponding author:** Karthikeyan T, Physiotherapist, NIMHANS, Bangalore, India.

Citation: Karthikeyan T. "Assess Therapeutic Efficacy Of Elastic therapeutic tape, Sports Utility In Lower Trunk Flexors Among Cricket Players". J Orthopaedic Research and Surgery, 2(2); DOI: <http://doi.org/03.2021/1.1013>.

Copyright: © 2021 Karthikeyan T. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Introduction

The therapeutic taping technique which is used to alleviate pain and facilitates lymphatic drainage by microscopically lifting the skin. This lifting affects forms convolutions in the skin increasing interstitial space and allowing for decreased inflammation in affected areas.

Objective: The purpose of this study was to determine if the use of ETT, in healthy collegiate cricket athletes, is effective in terms of decreasing fatigue by maintaining strength of low back muscles and increases range of motion of lumbar spine.

Methodology: Pre and post test experimental design 30 players were taken for study. The study is done in two phases. Phase 1 consists of Trunk flexion range of motion will be recorded without Elastic therapeutic tape, before and after match (1 hour. play). Phase 2 represents Trunk flexion range of motion will be recorded without Elastic therapeutic tape, before match, with elastic therapeutic taping before and after match (1 hour. play). Results show that the Low back flexion ROM (flexibility) of cricket players without Elastic therapeutic tape after match on day 1 and with elastic therapeutic tape on day 2 after match 16.467cm and 12.623cm respectively. Using a paired 't' test on the data the 't' values were found to be 18.9111, compared at 5% level of significance. The author concluded that the elastic therapeutic taping when applied to cricket players, it enhances low back muscular flexibility (ROM) than without applications of tape condition.

Key words: ett; cp and ltf

Introduction

The therapeutic taping technique which is used to alleviate pain and facilitates lymphatic drainage by microscopically lifting the skin. This lifting affects forms convolutions in the skin increasing interstitial space and allowing for decreased inflammation in affected areas. This tape application can be applied in hundreds of ways and have the ability to reduce pain and inflammation, promote post-surgical healing, optimize performance, prevent injury and promote good circulation and can assist the body's natural healing process [1].

The Elastic therapeutic tape, Method is a definitive rehabilitative taping technique that is designed to facilitate the body's natural healing process while providing support and stability to muscles and joints without restricting the body's range of motion as well as providing extended soft tissue manipulation to prolong the benefits of manual therapy administered within the clinical setting. Overuse or repetitive microtrauma to muscles, joints, ligaments and bones are common injuries seen in athletics. In athletes, low back strength is an important component of participating in many sports, including racquets sports, judo, weight lifting, baseball, martial arts and rock climbing [2].

In Electromyographic (EMG) studies, performed on collegiate and professional cricket players, it was discovered that the back extensors, lumbar erector spinae, multifidus and DL fascia showed marked activity during portions of the serves, forehand and backhand strokes. Therefore, a marked increase in activation of the lumbar muscles may lead to overuse injury 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 [3].



This would result in decreasing the overall effectiveness of an athlete's sports ability.

Previous studies found that neuromuscular control and accuracy of proprioception was affected following muscle fatigue or decreasing muscle strength. Therefore, as muscle fatigue or muscle force degenerates, it will place the low back muscle at risk of injury [4].

Repetitive stress on the low back muscles is a common chronic injury occurring in the cricket athlete. Common cricket injuries region and prevalence are 4:- Back --24% , Shoulder-- 21% , Ankle -- 19% , Knee -- 15% , Elbow -- 12%.

As there is a high prevalence of back injuries in cricket game, about 38% of players miss tournaments because of low back problems, , like lumbar strains⁸ which is caused by following reasons:-

Physical demands of cricket cause musculoskeletal adaptations that are sometimes positive (increased strength) and sometimes negative (decreased joint ROM and reduced muscular flexibility). These repeated demands to produce force by muscle shortening can cause a cycle of micro trauma to the tight muscle, followed by scar formation, followed by more micro trauma with continued use. These adaptations can become mal adaptations, reducing joint ROM, changing biomechanical patterns, and decreasing the efficiency of force production, thus increasing the chance of injury to the muscle³. Lower back pain and back injuries are common complaints among elite cricket players, and this correlates with poor lower back and hamstring ROM[5].

Fatigue and performance

As cricket players practice and play matches that last hours, fatigue is a major concern. Fatigue has been shown to have a detrimental effect on a player's body mechanics, thereby reducing ball velocity (performance), possibly in a protective mechanism to avoid injury by limiting the large ranges of motion and forces in a compromised biomechanical position.

Several treatment regimens are used in clinical practice for maintaining range of motion, but there are only a few studies that support the effects of these interventions in the long term. The use of low back taping with rigid /elastic tape is a common method for treating athletes diagnosed with reduced range of motion.

Elastic tapes are often used as a counter force action to decrease the overloading forces and therefore decrease the amount of tension placed on low back muscles [6]. Because of application of ETT it may restrict other musculature around the low back, causing losses in circulation and range of motion.

Elastic therapeutic tape (ETT) is a new and popular taping method proposed by KenzoKase, that claims to:

1. Gather fascia to align the tissue in its desired position.
2. Lift the skin over areas of inflammation, pain, and oedema.
3. Increase stimulation of the mechanoreceptors to either stimulate or limit movement.

4. Provide a positional stimulus to the skin,
5. Decrease pressure over the lymphatic channels that provide a path for the removal of exudates[7].

Unlike conventional athletic tape, ETT uses elastic properties to provide less muscular and blood flow restrictions. ETT can also limit the amount of irritation to the skin, that is often present with conventional athletic tape, because it is latex free and uses heat activated adhesive to adhere to the skin. It has about the same thickness as the epidermis, to limit the body's sensory stimulus, and can be stretched between 55% and 60% of its resting length longitudinally. Despite its widespread popularity, minimal evidence exists to support and prevent the use of ETT in the treatment of common musculoskeletal disorders[8].

The unique property of elastic therapeutic 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:-

Elastic therapeutic 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. Elastic therapeutic 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.

Elastic therapeutic tape also is felt to affect deeper tissues in the body. Increased space theoretically allows muscles greater contractility, which in turn pushes more fluid through the muscle, resulting in better muscle performance. The end results are believed to be reduced muscle fatigue, increase in range of motion, and better quality of muscle contraction.

Research has found that Elastic therapeutic tape, improves range of motion, ETT increases active range of motion of the lower trunk flexors, ETT increase active ROM in calf and hamstring muscles, increases muscle bioelectrical activity 24 hours after tape application in healthy patients, aids in the functional motor skills of the upper extremity in a paediatric population.

On the contrary, research suggests that ETT does not improve proprioceptive response at the ankle with measures of reproduction of joint position sense, does not have an implication to decrease shoulder pain intensity or disability over time with patients with rotator cuff tendonitis/ impingement³², does not improvement active lateral trunk flexion or extension range of motion¹³, and does not improve or worsen muscular performance in the posterior or anterior thigh of a healthy collegiate athlete. However, there are no published randomized clinical trials that



evaluate the effect of ETT on delaying muscular fatigue in an athletic population during a bout of exercise[9].

Therefore, the purpose of this study was to determine if the use of ETT, in healthy collegiate cricket athletes, is effective in terms of decreasing fatigue by maintaining strength of low back muscles and increases range of motion of lumbar spine.

Method

Purpose of Study

The purpose of the study is to find out the efficacy of elastic therapeutic taping on lower trunk flexion range of motion in cricket player.

Number of subjects- 30

Source of the subjects : Study was conducted in Rajeev Gandhi college of Physiotherapy Bhopal (MP)

Method of Selection- Sample of Convenience.

Study Design:

Pre-test post-test single group experimental design.

Study Setup And Duration:- Total duration of the study 6 weeks.

Each subject needs 2 days (Day 1 and 2). Each session of 1 hour for a day.

Variables

1. Independent variable: elastic therapeutic taping.
2. Dependent variable: lower trunk flexion flexibility.

Inclusion Criteria

1. Cricket player Age group 18-24 years.
2. Cricket player male players were taken.

Exclusion Criteria

1. Cricket Players having any low back injury with in 6 month.
2. Cricket Players having any pathology of hip, knee, thigh, and back.
3. Other factor affecting the flexibility was not calculated. Like temperature etc.
4. Measurement tools
5. Elastic therapeutic tape,
6. Measuring tape.
7. Step stool
8. Scissor
9. 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 Elastic therapeutic tape, before and after match (1 hour. play).

Phase 2:-

Trunk flexion range of motion will be recorded without Elastic

therapeutic tape, before match, with elastic therapeutic taping before and after match (1 hour. 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 performs a static stretch for 15 seconds in the flexion of trunk that were tested for injury prevention purposes. For flexion, subjects stood on the step stool with arms in a neutral position, heels together, and knees straight. Subjects bent forward as far as they could with fingers straight. The distance between the tip of third finger and the floor was measured.



Figure 1: flexion measurement

Range of motion was measured three times for reliability, before and after the match.

Taping Method:-

Subjects were taped using a method proposed for the sacrospinalis muscle. Y- shaped (2-inch width and 11-inch length) tape was used in the study. The taping technique required subjects to stand erect while the origin of the Y-shaped taping technique was attached over the centre of the sacrum. The origin of the Y tape was attached without stretching the kinsio tape while subjects gradually bent forward. The same procedure was applied to the other end of the Y tape. A 5-degree angle was maintained within the valley of the Y tape. The Y-shaped tape was applied from the origin of the sacrospinalis to the insertion as theorized to support a muscle function.



Figure 2: Y- shape Elastic therapeutic tape, for lower trunk.



Figure 3:- Low back elastic therapeutic taping in stretch position

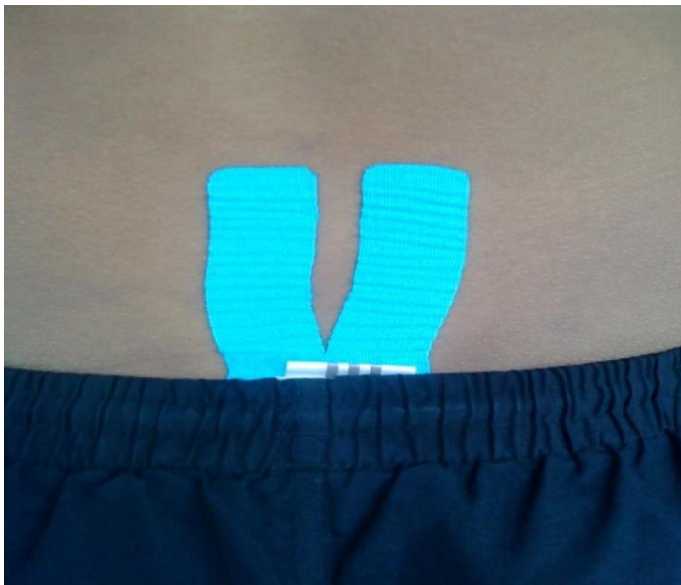


Figure 4:- Low back elastic therapeutic taping in relax position



Fig-5- Material Used

1. Scissor
2. Measuring Tape
3. Kinesiotape.

Results

Groups	Day 1 Without ETT		Day 2 With ETT	
	Before match	After match	Before match	After match
Mean	13.457	16.467	11.863	12.623
SD	5.141	5.434	5.146	5.098
t-value	15.6831		6.8492	
Significance	Statistically significant.		Statistically significant.	

Table 1: Analysis Of Low Back Flexion Pre And Post Without ETT V/S Pre And Post With ETT

Using a paired ‘t’ test on the data Low back flexion ROM (flexibility) of cricket players without Elastic therapeutic tape on day 1 and with Elastic therapeutic tape on day 2 match the ‘t’ values was found to be 15.683 and 6.849 respectively, compared at 5% level of significance. This implies that there is significant difference in low back flexion ROM of cricket players reflects improvement in flexibility with application of K Tape.

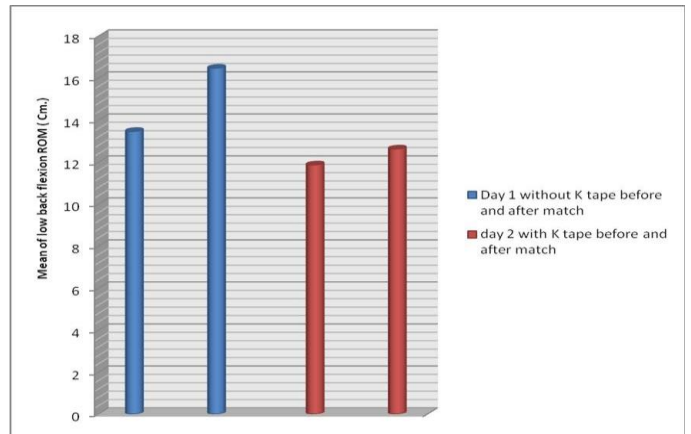


Fig 6: Graphical representation of low back flexion ROM pre and post without kinesiotape v/s pre and post with kinesiotape.



Groups	Day 1: Before Match Without Elastic therapeutic taping	Day 2: Before Match Without elastic therapeutic taping
Mean	13.457	13.447
SD	5.141	5.133
t-value	0.4741	
Significance	Not statistically significant.	

Shows mean of Low back flexion ROM(flexibility) of cricket players without Elastic therapeutic tape on day 2 and with Elastic therapeutic tapeday 2 before match 13.457cm and 11.86cm respectively . Using a paired 't' test on the data the 't' values was found to be 9.20,compared at 5% level of significance. This table implies that there is significant difference in low back flexion ROM of cricket players immediately after application of elastic therapeutic tape.

Table 2: Analysis Of Low Back Flexion Rom Day 1 Before Match Without Elastic Therapeutic Taping V/S Day 2 Before Match Without Elastic Therapeutic Taping

Shows mean of low back flexion ROM (flexibility) of cricket players without ETTape on day 1 and day 2 before match 13.457cm and 13.447cm respectively . Using a paired 't' test on the data the 't' values was found to be 0.4741,compared at 5% level of significance.

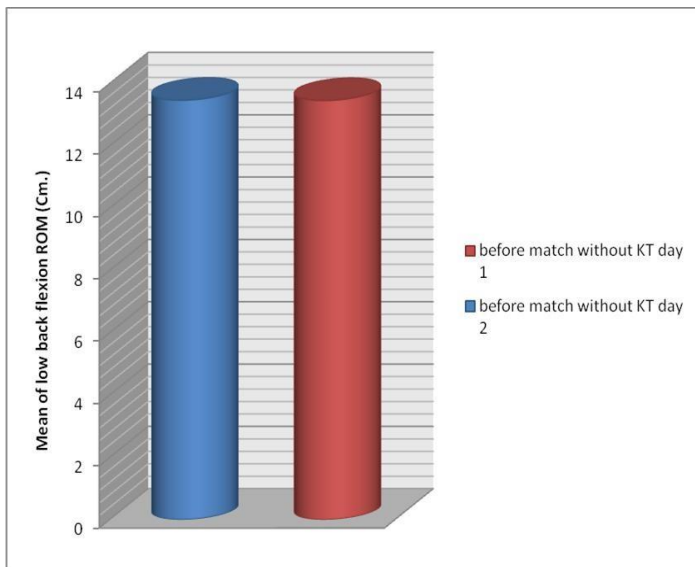


Fig 7: Graphical representation of low back flexion ROM day 1 before match without kinesiotape v/s day 2 before match without kinesiotape.

GROUPS	Day 2 Before Match Without Elastic therapeutic tape,	Day 2 Before Match With elastic therapeutic taping
Mean	13.457	11.863
SD	5.141	5.146
Tvalue	9.2099	
Significance	Statistically significant.	

Table 3: Analysis Of Low Back Flexion Rom without ETT Before Match Day 2 V/S With ETT Before match Day 2:-

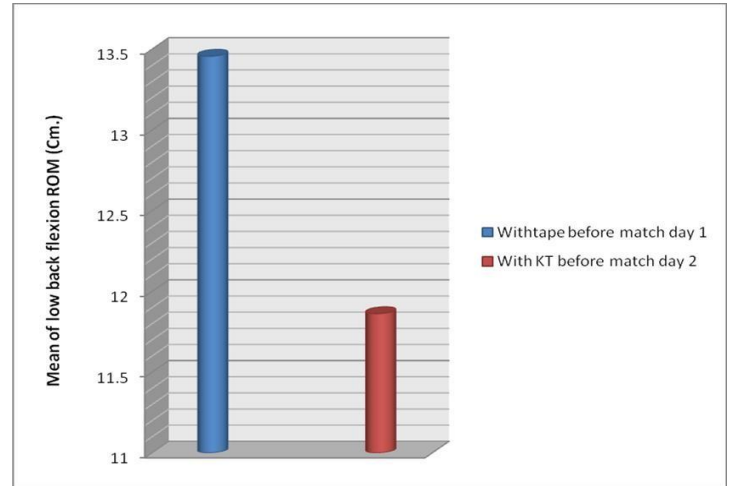


Fig 8: Graphical representation of low back flexion ROM Without elastic therapeutic taping before match day2 v/s With elastic therapeutic taping before match day 2.

Groups	Day 1 After Match Without Elastic therapeutic taping	Day 2 After Match With Elastic therapeutic taping
Mean	16.467	12.623
SD	5.434	5.098
t-value	18.9111	
Significance	Statistically significant.	

Table 5:Analysis Of Low Back Flexion Rom Without Elastic Therapeutic Taping After Match V/S With Elastic Therapeutic Taping After Match

Shows mean of Low back flexion ROM(flexibility) of cricket players without Elastic therapeutic tape after match on day1 and with elastic therapeutic tapeon day 2 after match 16.467cm and 12.623cm respectively . Using a paired 't' test on the data the't' values was found to be 18.9111,compared at 5% level of significance. This table implies that there is significant difference in low back flexion ROM of cricket players immediate after application of elastic therapeutic tapereflects it helps in increasing the flexibility.

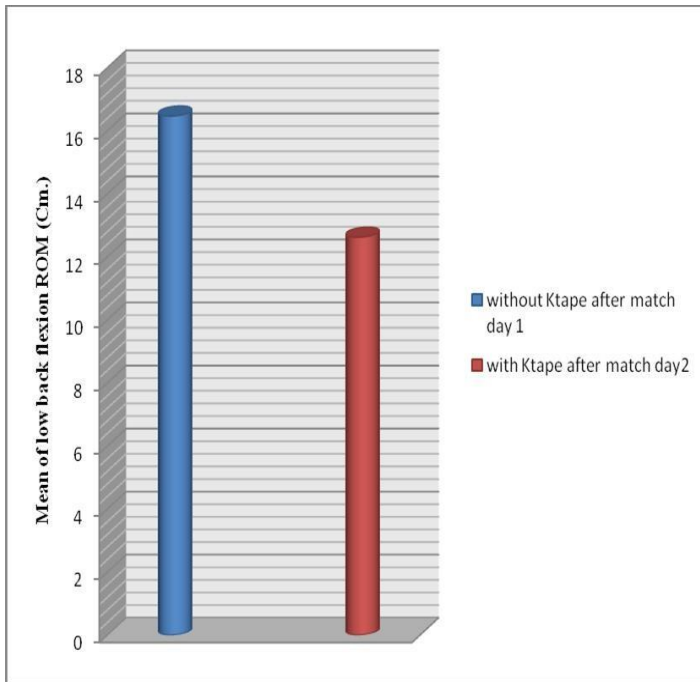


Fig 9: Graphical representation of low back flexion ROM without elastic therapeutic taping after match day 1 v/s with elastic therapeutic taping after match day 2.

Discussion

The present study was undertaken to determine the efficacy of Elastic therapeutic tape, on lower trunk flexion range of motion (flexibility) in cricket players. The study was done on cricket players. Their pre and post game (1 hr. play) lower trunk flexion range of motion was measured with and without elastic therapeutic tape on low back.

Data collected through study had shown 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 ($t=9.2099$). It indicates that Elastic therapeutic tape, when applied to healthy colligate cricket players, helps to maintain the flexibility of low back muscles.

The reasons for this improvement may be related to physiological mechanisms by which ETT 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 ETT aids in flexibility and muscle

contractions[10].

Other two studies measuring muscle activation after ETT application found results similar to those of the current study. A study done by Yoshida et al. effect of elastic therapeutic taping in lower trunk range of motion and founds increase in active range of motion in lower trunk muscles[11].

Another study found an increase in trunk flexion in ETT group, These studies support the current study; possibly suggesting that, as the low back muscles fatigued, ETT may have had an effect on recruiting additional motor units and increase in circulation to the contracting muscle and improves flexibility[12].

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

When ETT was applied over the low back muscles from centre of sacrum at the origin of sacrospinalis to its insertion on low back. 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 Halseth a, found that ETT 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 Husk²³, it was found that ETT, when applied to the ankle, caused an increase in joint position sense at 10° 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 somatosensory proprioceptive 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 that ETT application to the vastusmedialis showed a significant increase in bioelectrical muscle activity 24-72 hours after initial application. However, there was not a significant increase in activity 10 minutes or 96 hours after initial application. This finding does not support the protocol. The tape needs approximately 20 minutes to gain full adhesive strength.²⁷ The current study tested subjects 60 minutes after tape application, and it may be inferred that the results would have differed if 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 ETT may increase and help in maintaining active ROM of lower trunk flexion in Cricket



players.

Conclusion

This study indicates that elastic therapeutic taping when applied to cricket players, it enhance low back muscular flexibility (ROM) than without applications of tape condition. Also when ETT using a Y flexion pattern was applied, it improves the active range of motion in lower trunk flexion. This study provides evidence for the positive effect of elastic therapeutic tape in improving flexibility in Cricket players.

References

1. Benjamin Reich (2009), "kinesiotape as an adjunct to traditional physical therapy in the treatment of a patient with chronic low back pain: a case report.
2. Chandler TJ, et al "Flexibility comparisons of junior elite cricket players to other athletes". Am J Sports Med 2001;29:134-6.
3. Cheng Yuk Han BJORK et al. "USTA, Injury break down of elite U.S. junior cricket players" Complete conditioning of cricket 1998; pp184-185.
4. Hainline B. Low back injury. Clin Sports Med 1995;14:241–65.
5. Halseth T et al, "The effects of Elastic therapeutic tape, on proprioception at the ankle".
6. Hashemirad F et al "The relationship between flexibility and EMG activity pattern of the erector spinae muscles during trunk flexion-extension." 2009.
7. Hashimoto T, etal, "Changes in the volume of peripheral blood flow by using kinesio tape" 13 March 2005.
8. J.W. Chow et al, "lower trunk muscle activity during the cricket serves" Journal of science and medicine in port, 2003 page 512-518.
9. Kase K et al, "Clinical therapeutic applications of the Elastic therapeutic tape, method".
10. Albuquerque, NM: Elastic therapeutic tape, Association; 2003.
11. Kenzokase et al, "Therapeutic kinesiotape effect on body" ETTA 2009.
12. Kase et al, "Effect of elastic therapeutic taping on joints" ETTA; 1997.