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The effectiveness of kinesio taping on pain and throwing accuracy following shoulder impingement syndrome in elite male cricketers

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Abstract

A pre experimental research design was adopted to evaluate effectiveness the effectiveness of kinesio taping on pain and throwing accuracy following shoulder impingement syndrome in elite male cricketers". Pre and post-test Mean values of Group A. Pre-test and post-test mean values are 6.6 and 4.47 respectively. This shows that there is improvement of Mean value of pain in post-test when compared with pre-test. Post-test values of pain between Group A and Group B. It denotes there is a significant difference between Group A&B. So Kinesio Tape (4.47) gives better improvement than sham tape (6.04) in pain reduction.

Keywords: Effectiveness, kinesio, shoulder impingement syndrome elite male cricketers

Introduction

Throwing is an important tool in a cricketer's armoury. Throwing the ball in quickly and accurately from the outfield is a significant skill for every fielder to master. Throwing technique is a heavy prerequisite for a fielder to be able to project the ball from any area of the field with accuracy and speed to save runs and aim for a run-out (Elliot and Anderson). These days cricketers are more susceptible to high risk injuries as they are expected to train themselves longer, harder and earlier in life in sports (Weighman & Brownie).

Due to repeated throwing movements in the shoulder, degenerative changes occur in glenohumeral joint structures. So a good technique is essential for cricketers, with it one will be able to throw with accuracy and power regardless of their athletic ability. ROSS suggested that throwing can result in overuse shoulder problems like impingement syndrome and it is becoming more prevalent at the elite cricketers. Shoulder injuries impair the ability to throw and the accuracy of the throw depending on the intensity of pain.

It was developed by the chiropractor, Dr. Kenso kase in 1970's. The profile of Kinesiotape rose after the tape was donated to 58 countries for use, during 2008 Olympic games⁵¹. There are many different taping techniques including the "I", "X", "Y" patterns, all of which can vary in directions and tape tension. Few studies have been performed evaluating the clinical effects of taping shoulders in patient presenting with the clinical signs and symptoms of impingement although some promising results have been reported.

Kinesiotaping is theorized to have several therapeutic functions including restoring muscle function by supporting surrounding weakened muscles, improving vascular and lymphatic flow to aid in decreasing edema, decreasing pain by way of stimulating neurological system and connecting articular misalignments and also helping to increase the range of motion. It is thought to microscopically lift the skin creating tiny convolutions that increase interstitial space by lifting the fascia and soft tissue under the areas where it applied In addition it may reduce the tension in the interconnected fascia layers in response to a mechanical load put on the tissue during movement. This strategy has gained popularity in improving the rehabilitation of injuries and muscular performance.

The elimination of perspiration, freedom of motion, smooth feeling and attractive colours are the particular properties of Kinesiotaping that have been shown to be desirable in young athletes.

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Statement of the problem

“The Effectiveness of Kinesio Taping on Pain and Throwing Accuracy Following Shoulder Impingement Syndrome in Elite Male Cricketers”

Objectives

The objectives of the study were to

- To find the effectiveness of Kinesio tape on pain and throwing accuracy following shoulder impingement syndrome in elite male cricketers.
- To find the effectiveness of Sham tape on pain and throwing accuracy following shoulder impingement syndrome in elite male cricketers.
- To compare effectiveness of Kinesio tape and Sham tape on pain and throwing accuracy following shoulder impingement syndrome in elite male cricketers.

Methodology

The study has been designed to compare pain and throwing accuracy after tape application between K tape (group A) and sham tape (Group B) following shoulder impingement syndrome in elite male cricketers. The subjects consisted of 33 right-handed cricketers and 13 left-handed cricketers in both groups (A&B). This study demonstrated that pain and throwing accuracy remained significantly reduced in K tape (Group A) and sham tape (Group B) after tape application. So the mean post-stretch values of both the groups are compared and the results are statistically obtained.

First the pre-test and the post-test measurements through NRS pain Scale and Functional Throwing Performance Index for K taping group (Group A) and sham taping group (Group B) were statistically calculated. In Group A, the mean values of the pre-test measurements was 6.60 for pain, 74.39 for throwing accuracy and pre-test measurements of group B was 6.21 for pain and 77.51 for throwing accuracy. The post-test measurements of group A has significantly reduced values 4.47 for pain and 65.18 for throwing accuracy and post-test measurements of group B has slightly reduced values 6.04 for pain and 76.94 for throwing accuracy.

The aim of the study is to check the efficacy of therapeutic k tape application on pain and throwing accuracy following shoulder impingement syndrome. Thus for the pain, the mean post-test values of both the groups are compared. According to independent t test, the mean post-test value of both Group A and Group B was 4.47 and 6.04 respectively and it is statistically significant. So group A is effective in reducing the pain following impingement syndrome. For the throwing accuracy, the mean post-test values of both the groups are compared with independent t test, the mean post-test value of both Group A and Group B was 65.18 and 76.94 respectively and it is statistically significant. So group A is not effective in improving the throwing accuracy following impingement syndrome.

During the study, age, height, weight and dominant arm were also measured. The mean age, height, weight and of Group A are 23.26, 175.53, 74.66, and for Group B its 22.57, 176.2, 77.73 respectively. Hence the above mentioned values of Group A are comparatively higher than Group B. These factors along with the morphology and muscular flexibility may also be a reason for decreasing pain and throwing accuracy after tape application. Thus the decline in value of pain after therapeutic k tape application has clinical implication rather than throwing accuracy.

The relatively short term effect of pain and throwing accuracy

can be altered after 15 minutes, 30 minutes, 1 hour or next day from the tape application. The positive effect on pain and declining effect of throwing accuracy may be due to several factors and it is described below.

For pain

Various authors have previously reported improvements in function of pain. Chang et al., stated that kinesiotape could stimulate cutaneous mechanoreceptors and deliver more signals to the CNS reducing the pain. The expanding and contracting properties of k tape provides gentle sensory stimulation to various sensory receptors (Ruffini, Pacinian, Krause's bulb, Merkel's disk, free nerve endings, hair follicles etc.) in the skin during movement. This activates the spinal inhibitory system through stimulation of touch receptors and activates the descending inhibitory system to decrease pain modulation via the gate control theory (Melzack and wall) is one plausible explanation for such a change, because it has been proposed that tape stimulates neuromuscular pathways via increased afferent feedback. This theory states that touch and Proprioceptive peripheral nerve fibres (a beta) are rapidly conducting and they transmit information to the substantia gelatinosa (SG) and other spinal cord neurons. There are two modes of pain perception one a more acute sensory experience and the other a prolonged sense of pain produced through the neural matrix. Kinesio tape may affect both types of sensory input and potentiate a global physiologic influence.

Jaraczewska E, Long C also says kinesio taping reduce the pain and range of motion in the shoulder.

The application of K tape enhances the healing process of inflammation in the shoulder impingement syndrome. Kinesiotape takes advantage of the mechanical connection of the anchoring filaments to the endothelial cells by way of connection to the dermal layer, the lymphatic channels can be “opened up” by the elastic qualities of the tape creating the characteristic convolutions on the tape allowing lymph obligatory load to fill the lymphatic capillaries toward the areas of decreased pressure under the kinesio tape, which allows fluid to move freely. The elastic property of the kinesiotape also creates the gentle massage with movement, which facilitate the healing process. The effect of taping the muscle enhances the deeper lymphatic mechanisms. Kinesiotaping on the superficial lymphatics encourages edema movement. The edema reduction removes heat and chemical substances in tissue, improving circulation and reducing the trigger points. Decreasing pressure and chemical receptors provides immediate pain relief and improves the healing process.

Considering the two previous physiologic effects, the kinesiotaping, when applied correctly, can also help minimize the fascial contraction during soft tissue injury and helps in reducing the pain in shoulder joint pathology.

It is by these mechanisms that Kinesiotape when applied correctly can take advantage of the neural control of human movement.

For accuracy

Throwing action involves both the abductor and external rotator muscles of the shoulder. In this study, only the abductor muscles were taped and external rotators of shoulder joint is not considered, which could explain the loss in throwing accuracy.

Injury to the shoulder affects joint proprioception. Since

proprioception was not taken into consideration, this may have caused the reduction in throwing accuracy. In this study right handlers (17) are more than left handlers (6) could also show the difference in throwing accuracy.

Luttgens stated that abnormal scapular biomechanics that occur as a result of shoulder impingement syndrome create imbalance between agonist and antagonist muscle groups. In this study mainly considering the deltoid and supraspinatus, other muscles of shoulder are not considered. In addition to shoulder injury, scapular abnormalities could also affect throwing accuracy which was also not factored in this study. Kinesio taping applied to skin apparently provided tactile input. However tactile input has been reported to interact with motor control by altering the excitability of the central neuron system.

Cricketers new to taping may perceive the tape to be discomforting until they get used to it. This initial perception may also have led to the observed loss in throwing accuracy. Another possible reason for the decline in throwing accuracy could also be due to not facilitating the dynamic stabilizers of the shoulder.

Results and discussion

- There is a significant difference between the pre and

post-test measurements of Pain and throwing accuracy in both Group A and Group B where, the calculated value is greater than the table value (2.074). Hence the null hypothesis is rejected.

- There is a significant difference between the post-test measurements of pain and throwing accuracy in both groups, where the calculated value is greater than table value (2.009)
- On comparing mean value of pain of both groups, Group A shows lower mean value(4.47) than Group B(6.04). So K tape(Group A) is more effective than sham tape(Group B).
- On comparing the mean value of Throwing accuracy of both groups, Group A shows lower mean value(65.18) than Group B(76.94). So K tape(Group A) is less effective than sham tape(Group B).

Table 1: Basic anthropometric measurements of group a and group B

Group	Mean		
	Age	Height	Weight
Group A	23.26	175.53	74.66
Group B	22.57	176.2	77.3

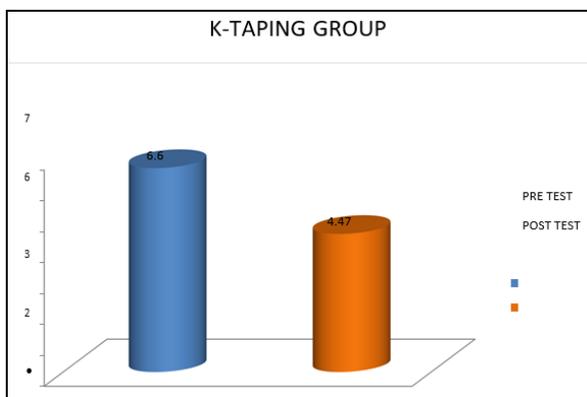
Table 2: Comparison of the pre-test and post-test values within group a for pain

Test	Mean	S.D	Mean Difference	t-value	Table Value	SIG p≤0.05
Pre-Test	6.60	1.27				
Post-Test	4.47	1.23	2.13	9.290	2.074	0.000

(p*** < 0.05).

S.D. - Standard Deviation SIG. - Significance

The above table reveals the Mean, Standard Deviation (S.D), t-value, table value and p- value of the pain between pre-test and post-test within Group – A (K TAPE).



Graph 1: Diagrammatic representation of pretest and post-test values of group a for pain

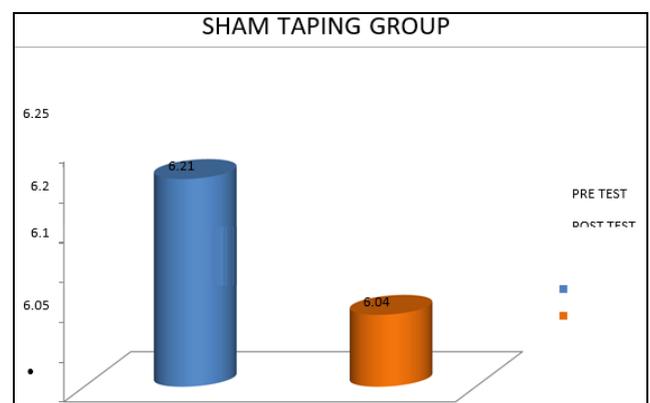
Table 3: Comparison of the pre-test and posttest values within group b for pain

Test	Mean	S.D	Mean Difference	t-value	Table value	SIG p≤0.05
Pre-test	6.21	1.04	0.17	2.152	2.074	0.043
Post-test	6.04	1.10				

(p*** < 0.05)

S.D. - Standard Deviation SIG. - Significance

The above table reveals the Mean, Standard Deviation (S.D), t-value, table value and p-value of the pain between pre-test and post-test within Group – B (SHAM TAPE).



Graph 2: Diagrammatic representation of pretest and post-test values of group B

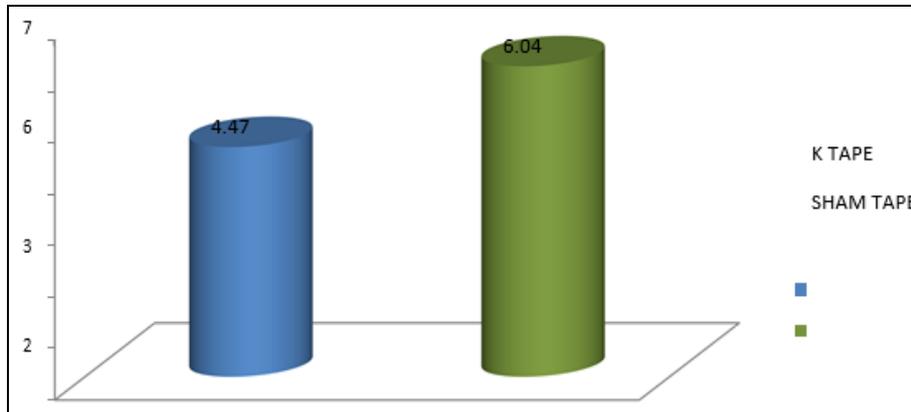
Table 4: Comparison of posttest values between group A and group B for pain

Group	Mean	S.D	Mean Difference	t-value	Table Value	SIG p≤0.05
K tape	4.47	1.23	2.	4.519	2.009	0.000
Sham group	6.04	1.10				

(p*** < 0.05)

S.D. - Standard Deviation SIG. - Significance

The above table reveals the post-test values of Mean, Standard Deviation (S.D), t-value, table value and p-value of the pain between Group A(K tape) and Group-B (SHAM TAPE).



Graph 3: Diagrammatic representation of post-test values of group a and group b for pain

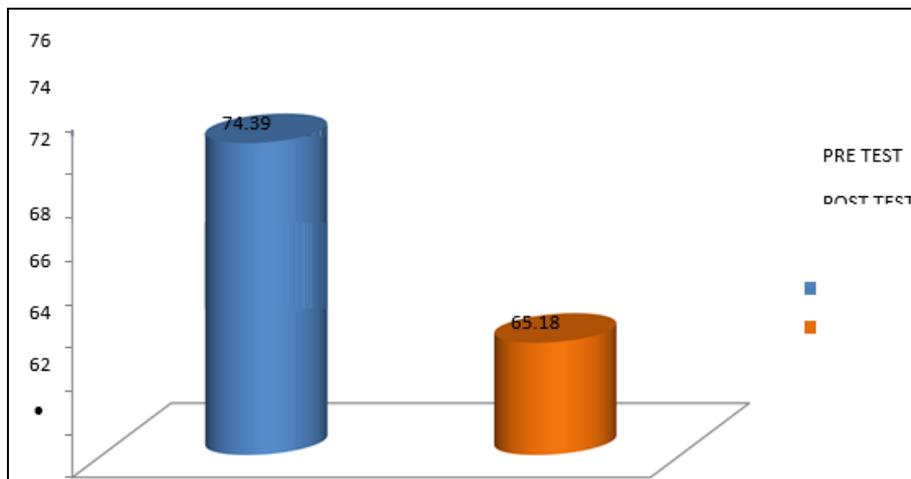
Table 5: Comparison of the pre-test and post-test values within group b for throwing accuracy

Test	Mean	S.D	Mean difference	T-value	Table value	SIG $p \leq 0.05$
Pre-test	74.39	6.68	0.17	4.767	2.074	0.000
Post-test	65.18	8.67				

($p^{***} < 0.05$), S.D. - Standard Deviation SIG. - Significance

The above table reveals the Mean, Standard Deviation (S.D), t-value, table value and p-value of the throwing accuracy

between pre-test and post-test within Group – A (K TAPE).



Graph 4: Diagrammatic representation of pretest and post-test values of group a for throwing accuracy

Table 6: Comparison of the pre-test and post-test values within group b for throwing accuracy

Test	Mean	S.D	Mean Difference	t-value	Table Value	SIG $p \leq 0.05$
PRE-TEST	77.51	5.82	0.17	3.298	2.074	0.003
POST-TEST	76.94	5.51				

($p^{***} < 0.05$), S.D. - Standard Deviation SIG. - Significance

The above table reveals the Mean, Standard Deviation (S.D), t-value, table value and p-value of the PAIN VALUE between

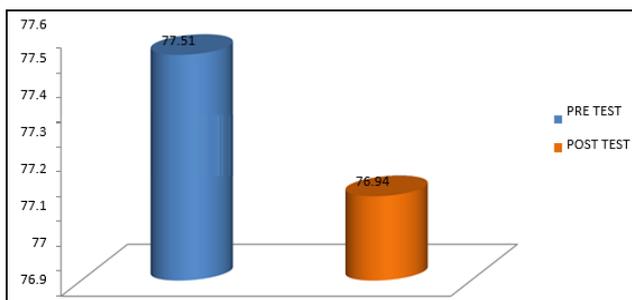
pre-test and post-test within Group – B (SHAM TAPE).

Table 7: Comparison of post-test values between group A and group B for throwing accuracy

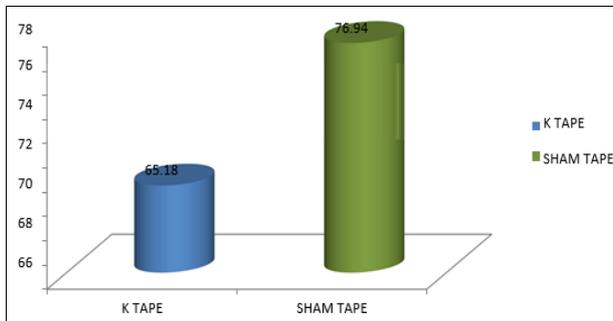
Test	Mean	S.D	Mean difference	T-value	Table value	Sig $P \leq 0.05$
K-Tape	65.18	8.67	0.17	5.488	2.009	0.000
Sham-Tape	76.94	5.51				

($p^{***} < 0.05$), S.D. - Standard Deviation SIG. - Significance

The above table reveals the Mean, Standard Deviation (S.D), t-value, table value and p-value of the throwing accuracy between Group A(K TAPE) and Group – B (SHAM TAPE).



Graph 5: Diagrammatic representation of pretest and post-test values of group b for throwing accuracy



Graph 6: Diagrammatic Representation of Post-test Values of Group A And Group B For Throwing Accuracy

Conclusion

Based on this study on elite male cricketers, it can be concluded that K taping technique provides immediate relief in pain following shoulder impingement syndrome but it also adversely affects throwing accuracy.

Therefore, K taping technique is not ideal for on field management of shoulder impingement syndrome as it affects throwing accuracy while relieving pain. K taping may be better suited for the rehabilitation phase of shoulder impingement syndrome in elite male cricketers.

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