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Comparison of the Efficacy of Kinesio Taping and Conventional Physical Therapy in Shoulder Impingement Syndrome

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Abstract

***Objective**:*
The objective of the study was to compare the efficacy of Kinesio Tapping and conventional physical therapy for the treatment of subacromial impingement syndrome.

Material and Methods:
A comparative study was conducted. In the study 54 patients were selected randomly in the experimental group (n=27, Kinesio taping+conventional therapy) and control group (n=27, conventional physical therapy only). Patients were treated for four weeks. Shoulder pain disability index (SPADI) and numerical pain rating scale (NPRS) were used for the outcome measure before and after the treatment protocols.

Results:
Total of 54 patients with shoulder impingement participated in this study with age ranges from 40 to 60, where the mean and SD for age was 48.91±6.26. In 54 patients, 34(63%) were male, while 20(37%) were female. After treatment, the mean scores ±SD for Visual analogue scale in the experimental group was 3.05 ± .51 While Conventional therapy VAS was 4.97± 2.02, showing that patients significantly improved in the treatment group. The mean scores ±SD for SPADI in the Tapping group was 50.37 ± 20.27 While Conventional therapy SPADI was 75.67± 11.15, showing that patients significantly improved in the treatment group.

Conclusion:
This study concludes that KT and conventional PT are effective on pain reduction and disability in patients with SIS as compared to only conventional physical therapy treatment of SIS.

***Key Words:** Physical Therapy, Exercise, Kinesio Tape**,** Shoulder, Shoulder Impingement Syndrome*

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INTRODUCTION

Shoulder disorders are the third most common musculoskeletal complaints after back and knee with an overall incidence of the problems is estimated to be 11/1000 patients per year while the lifetime prevalence of shoulder pain is estimated from 7% to 35% of the population (Van der Windt et al., 1996, Pillastrini et al., 2015, Lim and Tay, 2015). Subacromial impingement syndrome (SIS) and rotator cuff pathology are the most commonly diagnosed conditions among all shoulder problems (Bauvir et al., 2015, Pillastrini et al., 2015) . Shoulder pain affect one third of the population and approximately 65% of individuals have SIS (Michener et al., 2003) . The condition is considered he third most common musculoskeletal disorder of general practitioner consultation in the UK and its frequency range from 7% to 26% (Linsell et al., 2006). SIS is the mechanical compression of the structure of the soft tissues in the coracoacromial arch or reduction of the subacromial space which may lead to rotator cuff impingement in the subacromial space (Hegedus et al., 2008, Matsen and Arntz, 1990). However, the present literature shows that SIS is the final pathway of multiple shoulder pathologies described as a wider spectrum of symptoms rather than a single disease (Hegedus et al., 2008, Brukner and Brukner, 2012, Cools et al., 2008).

Present literature provides us with several treatment methods for SIS which vary and depend on the classification of SIS and duration of symptoms. These methods include medication, manual therapy , electro-physical agents (Khadilkar et al., 2008), educational program(Demoulin et al., 2012), cognitive behavioral therapy (George et al., 2008) and spinal stabilization exercise (Costa et al., 2009). During literature search, multiple studies suggest clinical significance of KT and conventional physical therapy while few studies show no clinical significance of KT and conventional physical therapy for the treatment of SIS. Furthermore, no such studies are identified that compare KT's effectiveness and conventional physical therapy in SIS. Therefore, this randomized control trial is intended for the comparision of the effectiveness of KT and conventional physical therapy for treating SIS.

MATERIALS & METHODS

A Randomized Control Trial was conducted at tertiary care hospitals of Peshawar using Simple Random technique for sampling. 54 SIS patients were selected randomly to experimental group taping plus conventional Physical therapy and control group with only conventional treatment. Patients (n=27) were treated with Kinesio taping plus conventional therapy, while patients (n=27) were treated with conventional physiotherapy for 04-weeks. The conventional PT consists of exercise and mobilization along with therapeutic modalities and home-based education. The re-assessment of the patients were done after one week followed for one month. The taping treatment method was used once in a week with total

treatment duration of 04-weeks. Each tapping was applied for 03-days and next taping was applied after rest of 02-days. Each patient in evry study group was checked for any skin allergy reaction to KT. Patients between the ages of 18 and 60 have subacromial impingement syndrome, while patients have a history of shoulder dislocation, Bony abnormalities, shoulder tumours, Labral tears, rotator cuff tears, and Neurological cervical problems were excluded from study. Shoulder pain, disability index questioner (SPADI) and visual analog scale (VAS) was used for the outcome measure before and after the treatment protocols. Data was analyzed through software SPSS version 21.

All patients were assessed at baseline and 1 month of post-intervention. SPADI and VAS was used for the outcome measure. For age and BMI frequency, percentages, and mean values were calculated. Frequency and percentages were calculated for descriptive variables. Data were plotted in charts and graphs. Student t-test was used to find differences between the two groups. The Chi-square test was employed to get the differences amongst different categorical-variables. Statistical significance level was accepted as $p < 0.05$.

RESULTS

Total of 54 patients with shoulder impingement participated in this study with age ranges from 40 to 60. The mean and SD for age was 48.91±6.256. In this study, 34(63%) were male while 20(37%) were female, as shown in Table1.

Table 1: Gender of the patients

Gender	Frequency	Percent
Male	34	63%
Female	20	37%
Total	54	100%

Table 2: Age of the patients

Age group (Years)	Frequency	Percent
40-50	31	57.4
50-60	23	42.6
Total	54	100.0

All the study paticipents were randomly distributed into experimental-group (taping plus conventional Physical therapy) and control-group (only conventional physical therapy). 27 patients were given the treatment of Kinesio taping plus conventional therapy, while other 27 participents were given conventional physical therapy only for four weeks. After treatment the mean scores ±SD for Visual analogue scale in the experimental group was 3.05 ± 0.51 While Conventional therapy VAS was 4.97± 2.02, showing that patients significantly improved in the treatment group (Table 3). The mean scores ±SD for SPADI in the Tapping group was 50.37 ± 20.27 while conventional

therapy SPADI was 75.67± 11.15 (Table 3) showing that the

±SD for SPADI in the Tapping group is 50.37 ± 20.268 While Conventional therapy SPADI is 75.67± 11.153 showing that patients significantly improved in treatment group.

Table 3: VAS and SPADI (post therapy comparison between the groups by independent t test)

POST THERAPY COMPARISON	VAS	SDAPI	Levene's Test for Equality of Variances (Sig.)
Tapping and Conventional therapy (Experimental)	3.05±0.098	50.37 ± 20.268	0.00
Conventional (Control)	4.97±0.389	75.67± 11.153	0.00

Table 4: VAS and SPADI (pre to post comparison by pair sample t test)

	VAS		SPADI	
	PRE	POST	PRE	POST
MEAN±SD	6.06±0.738	4.01±1.752	84.86±2.918	63.02±20.628
Pair sample t-test	PAIR 1		PAIR 2	
Sig 2 tailed	0.000		0.00	

Table 2 is showing pre to post comparison in VAS AND SPADI. Test statistics 0.000 is showing significant difference between both pairs.

Patients significantly improved in the treatment group. P-value of <0.05 was considered statistically significant.

Table No. 3 is showing post-therapy comparison between the experimental and control group. After treatment, the mean scores ±SD for Visual analogue scale in the experimental group was 3.05 ± 0.51 While Conventional therapy VAS was 4.97± 2.02 showing that patients significantly improved in treatment group. After treatment the mean scores

Within group comparison by pair sample t-test: Before treatment the mean ± SD VAS was 6.06 ± .738, while after treatment the mean ± SD VAS was 4.01 ± 1.752. Within group analysis by paired sample t-test showed significant improvement on VAS. Before treatment the mean ± SD SPADI was 84.86 ± 2.918, while after treatment the mean ±

SD SPADI was 63.02 ± 20.628. Within group analysis by paired sample t-test showed significant improvement on SPADI (Table 4).

DISCUSSION

This study aimed to compare the effectiveness of KT and conventional PT on pain reduction and decreasing the disability in the study paticipents (patients) with SIS compared to conventional PT alone for the treating SIS. Improvements in pain, function and ROM by KT application has been reported by various authors (Frazier et al., 2006, Jaraczewska and Long, 2006, Murray, 2001, Osterhues, 2004, Yoshida and Kahanov, 2007).

Literature supports tapping for various therapeutic reasons (Ernst et al., 1999, Host, 1995, Macdonald, 2004). The therapeutic effects of taping found in literature include control of posture at joint (Host, 1995, McConnell, 1986), joint stabilization (Macdonald, 2004), inhibition of muscle activity (McConnell, 1986) , pain reduction (Macdonald, 2004), increasing joint torque (Ernst et al., 1999) and increasing excitability of motor neuron (Nishikawa and Grabiner, 1999).Some other benefits of taping found in literature are cutaneous stimulation (Nishikawa and Grabiner, 1999, Perrier et al., 2000) , increased muscle effort (Ernst et al., 1999) , improved sensory-motor control (Barrett et al., 1991, Hurley, 1997, Lephart et al., 1992, Robbins et al., 1995) , inhibition or facilitation of muscle activity (Alexander et al., 2003, Ng and Cheng, 2002) , modulation of pain through altered afferent input (Gagliese and Melzack, 1997). A study performed by Thelen et al shows that KT has an immediate effect on joint ROM though it did not improve pain and disability score in 42 patients with rotator cuff impingement (Thelen et al., 2008) . Whereas our findings provide an improvement in SPADI scale showing that pain and disability measures were improved in SIS-patients in the study group. The treatment given to the participants of treatment group included KT application and conventional PT therefore it might show that the improvement in pain and disability found in our study was due to the simultaneous application of KT and conventional PT. On the other hand, the control group was treated with conventional PT alone. Conventional physical therapy included mobilizations, exercise, various physical therapy modalities and home-based instructions. Although the control group showed improvement in SIS symptoms, this improvement was less significant than that found in control group. Further study needs to be done to find out the effect of KT and conventional Physical therapy separately on pain and disability score in patients with SIS.

An author claims that taping effects are in response to proprioceptive and sensorimotor feedback mechanisms (Simoneau et al., 1997).The sensorimotor feedback provided by taping helps relieve patients' symptoms and improve their comfort level and joint stability (Kaya et al., 2011). Our study agrees with these authors' findings

as participants of treatment group were found to have improved comfort level and decreased pain after receiving treatment for one month.

Another study explains taping as an adjunct treatment option for increasing functional recovery during rehabilitation programs. Taping was used in the treatment of anterior shoulder impingement, providing scapular stability. Scapular taping is used in conjunction with home exercise programs to reduce shoulder pain and improve ROM which is comparable to our study (Host, 1995) .

This study shows post-therapy improvement in SPADI and VAS scale in the treatment group . On the contrary, there was no significant difference in the pain and the disability measures between the groups of a study after applying taping (Kaya et al., 2011). According to a theory pain modulation occurs through gait control mechanism as taping enhances neuromuscular feedback through increased sensory feedback (Kneeshaw, 2002). The gait control theory says that increased afferent stimulus from nerve fibers of large diameter has reduced the input from smaller diameter nerve fibers that conduct nociceptive stimulus (Thelen et al., 2008) .

Frazier et al performed a study on five patients having different shoulder problems. The study showed significant improvement in pain and DASH score when KT and PT were applied simultaneously (Kneeshaw, 2002). This is comparable to our study that finds a significant reduction in pain and disability in the treatment group participants after applying KT and conventional physical therapy simultaneously for one month.

A study found no improvement in muscle activity by tape application (Kase et al., 2003). Another study provided evidence of improved lower trapezius and reduced upper trapezius electromyography activity due to scapular taping in patients of shoulder impingement during functional overhead activities. The study also showed decreased upper trapezius activity in scapular plane abduction (Selkowitz et al., 2007). Taping is found to reduce activity in upper trapezius (Smith et al., 2009).

Since collagenous tissues and muscles are adaptable, two studies have found increased effectiveness of long duration low load stretching as compared to vigorous short duration stretching (Kottke et al., 1966, Williams et al., 2012).Taping is found to be an effective way to achieve this stretching (Kumar et al., 2012). This study was performed for a duration of one month which is not enough to evaluate the long-term efficacy of KT on muscles and other soft tissues, hence a longer duration study is recommended to find out the long-term effects of Kinesio tape application on adaptability of muscles and soft tissues. The literature depicts that immediate effect of KT can be due to improvement in the arc of the gleno-humeral joint motion, that ultimately lessens the mechanical stress and irritation of surrounding soft-tissue structures (Thelen et al., 2008).

CONCLUSION

This study concludes that SIS treatment can be affected by various factors. Improving scapular alignment by using Kinesio tapping taping helps increase the sub acromial space and reduces excessive tension on various structures. Thus, the study advocates the effectiveness and usefulness of therapeutic KT plus conventional PT on reducing the pain and decreasing disability in patients with SIS when compared to only conventional physical therapy for the management of SIS.

Conflict of interest

All the authors declare that there is no conflict of interest.

Ethical approval

Ethical and other necessary approvals were taken from the Ethical Review Board of the Khyber Medical University, Peshawar, Pakistan.

Consent for Publication

All authors approved the manuscript for publication.

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