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Comparison of Kinesiotaping and Rigid Taping on Trapezitis Induced due to Rounded Shoulder Posture in Desk Job Workers

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ABSTRACT

Background and purpose: Kinesio-taping and Rigid taping technique both have been showed improvement in trapezitis induced due to rounded shoulder posture. The objective of the study was to find out the comparative effectiveness of kinesio-taping and rigid taping in trapezitis induced due to rounded shoulder posture in desk job workers.
Method: This study was an Experimental study design. The samples were selected on the basis of Convenient sampling with random allocation of samples. 50 subjects were selected, in the age ranging from 20-50 years were assigned into two groups; Group A kinesio taping technique (25 subjects) and Group B rigid taping technique (25 subjects) for 2 weeks with 3 days per week, Pain was measured using Numerical pain rating scale (NPRS) and neck disability was assessed using Neck disability index (NDI). Both scales were taken pre intervention and post intervention at the end of two week.
Results: Result of the present study demonstrated that both the interventions in group-A and group-B were found to be individually effective in treating subjects having Trapezitis induced due to rounded shoulder posture in reducing pain and disability.
Conclusion: The present study concludes that both the interventions of Kinesio taping and rigid taping was individually effective in trapezitis induce due to rounded shoulder posture in desk job workers. It is also concluded that both the intervention techniques effective in decreasing the pain and disability. however, while compared the post test outcomes in between the groups, there was no much difference in reduction of pain and disability of the subjects.
Implication: kinesio taping and rigid taping is effective in improving pain, disability in trapezitis induced due to rounded shoulder posture.

Keywords: kinesio taping, rigid taping, neck disability index, numerical pain rating scale

INTRODUCTION

The rounded shoulder posture (RSP) is protracted, downwardly rotated and anteriorly tipped scapula position with increasing cervical lordosis and upper thoracic kyphosis[1]. It is common postural alteration seen in asymptomatic individuals[2]. It is caused by abnormal scapular kinematics and muscular imbalance. The abnormal changes in muscle length of peri-scapular muscle altered the orientation of scapulae[1].The pattern of imbalance is associated with the shoulder as well as neck pain[2].
Rounded shoulder is risk factor leading upper quarter pain[3].There are various causative factors of upper quarter dysfunction are static contraction of neck and shoulder to counteract the weight of head, so that if there is greater the angle of neck flexion then there will be greater the load of muscle and joints. It is poor habitual neck posture occurs upto 73% of healthy individuals and 60% of

shoulder abnormalities[2].In that habitual and excessive trunk flexion which fixes shoulder in forward position so the pectoral muscle goes into shortening[4.]

In physical therapy evaluation of musculoskeletal disorders among desk workers, the prevalence rate of shoulder posture is 15.2%. About 75% of jobs worsen the posture by end of the day due to poor postural habbit[2]. Many traumatic and non-traumatic musculoskeletal pain is associated with neck pain. The prevalence of highest rate of neck pain is in middle of age[5], and common in women respectively[6]

Trapezitis is inflammatory pain arising from trapezius muscle of upper, middle and lower fibers[5,] which undergoes severe neck spasm and trigger point development around neck[7]. It is highly disabling condition, which affects individual's normal life. If trapezius muscle goes into shorten state for long time without rest then fibres get shortened and leads the abnormalities and limited the range of motion of neck[6] . Neck pain is commonly involved with the upper trapezius muscle[6]. The prevalence varies with different studies, mean point prevalence is 13% (range 5.9%-38.7%) and mean lifetime prevalence of 50% (range 14.2%-71.0%). Upper trapezius found low level activity during sitting and standing. Trapezius is a major muscle which experience a lot of tension[7] and neck pain especially in people who work at desk and computers in entire day[6,7].

There are various intervention used to treat trapezitis, those are pharmacological interventions and physiotherapy interventions. In physiotherapy interventions various approaches used, like manual therapies such as stretching, ischemic compression techniques, transverse friction massage, myofascial release, muscle energy techniques, positional release techniques, spray and stretch techniques. Various modalities used like cryotherapy in acute cases, hydro-collateral pack in chronic cases, transcutaneous electrical nerve stimulation[6], laser and kinesio taping used to relieve pain over trigger points and studies have proved that they are effective modes of treatment[7].

Kinesio tape used for postural correction as well as treatment of musculoskeletal disorders for athletes and in general population, increasing proprioceptive awareness, improve posture stability, provide stability to joint and improve muscle strength[18]. Previous study shows that taping is effective in postural correction and improve proprioception[19]. Various taping techniques like kinesio-taping and rigid taping proven the immediate effect on rounded shoulder posture. In sub-acromial impingement McConnell described the 1st application of scapular taping is rigid tape[2]. Previous studies showed that scapular realignment by rigid taping was found effective in shoulder dysfunction[20]. Various studies described taping is also beneficial to treat trapezitis in that they said taping is applied in a way that muscle is held in a shortened position, tape is applied firmly across muscle fibres which is proposed to decrease the activity of muscle. It also helps in treating trigger points associated with trapezitis.

In some study, researchers mention that taping is not a substitute for treatment and rehabilitation, but it is an adjunct to it. It is continued significant part of a stages of rehabilitation after injury. Indeed, Physiotherapist perform taping conscientiously[6]. There was a study done on comparison of immediate and carry over effect on both kinesio taping and rigid taping on pain due to latent trigger points of upper trapezius in individuals with forward shoulder posture shows the beneficial effect on pain and pressure sensitivity of latent trigger points associated with forward shoulder posture[2].

So, limited studies have compared the effectiveness of both kinesio taping and rigid taping in trapezitis with pain parameter and neck disability index with subject having rounded shoulder posture. So, not many studies have found the comparative the effectiveness of kinesio taping and rigid taping on trapezitis induced due to rounded shoulder posture in desk job workers. Hence a need arises to find out whether kinesio

taping and rigid taping will show any effect in outcome measures trapezitis induced due to rounded shoulder posture in desk job workers.

METHODOLOGY

Subjects were randomly allocated and assigned either to group A or group B with 25 subjects in each group respectively. 50 small chits were used with 25 pieces having the words group A and the treatment allocated to them was kinesio taping, 25 pieces having the words as group B and the treatment allocated to them was rigid taping. As the study includes human subjects, ethical clearance is obtained from ethical committee of K.T.G. College of physiotherapy and KTG Hospital, Bangalore as per the ethical guidelines for Bio-Medical research on human subjects, 2000 ICMR, New Delhi. A total of six sessions were given for three days per weeks for 2 weeks.

Informed written consent was taken from each subject.

Subjects with age group between 20 to 50 years, both male and female having neck pain and B/L forward shoulder posture (acromion to plinth distance more than 1 inch) were included in this study. Those having any history of previous surgery or trauma, fracture around shoulder complex, history of allergy to tape, hypersensitivity skin, neurological deficit in upper extremity, surgical intervention affecting thorax and scapula, recent fall, osteoporosis was excluded from the study.

The participants were assessed for rounded shoulder posture in supine lying. Outcome measures of NPRS and NDI were taken for each participant pre and post study.

Before the intervention, assessment of rounded shoulder posture in supine lying were checked by using straight ruler. The participants in group A, First, the kinesio-tape was applied on side which is more affected. So it was applied on upper trapezius muscle using the approximation technique, for that participant has to sit on chair with a relaxed position with arms by the side. Both scapulae were maximally retracted and held in the position while the applicant were cut the tape and was applied directly over the painful myofascial trigger point of upper trapezius muscle using 30% of tension. Participants has to kept the tape for at least six hours and for a maximum of 24 hours. Then the tape was re-applied every 48 hours. A total of six sessions were given for three days per weeks for 2 weeks.

1 (a). Kinesio tape application on upper trapezius muscle

1 (b). Kinesio tape application on upper trapezius muscle. by approximation method

The participants in group B, Rigid -tape were applied on side which is more affected. Patient has to sit in relaxed position on chair with shoulder retracted position. Therapist has to stand behind the patient. Both the scapula was in neutral position. First, Underwrap tape were applied without tension extending from middle of the clavicle anteriorly to the T8-T9 spinous process

posteriorly. Participants were asked to retract both scapulae maximally and hold.

Fig 2. Therapist applied hypoallergic or under-wrap on upper trapezius muscle

Second, the rigid tape was applied by holding the bulk of upper trapezius with the left hand, while the applicant were apply the tape with the right hand. Patient has to sit in relaxed position on chair with shoulder retracted position. Participants has to kept the tape for at least six hours and for a maximum of 24 hours. Then the tape was re-applied every 48 hours. A total of six sessions were given for three days per weeks for 2 weeks.

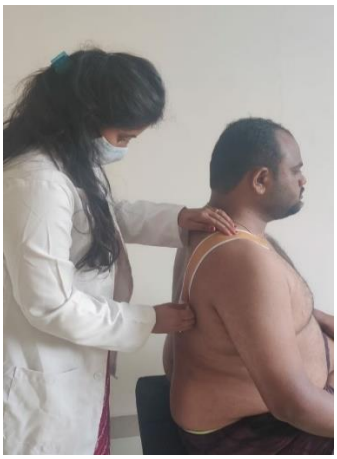

Fig 3. Therapist applied rigid tape on upper trapezius muscle

Fig 4. Anterior view

Fig 5. Posterior view

Outcome measurements (NPRS and NDI) were taken at the beginning and after 2 weeks of study for the both groups. The differences of pre and post test values were compared between the groups using statistical analysis.

OUTCOME MEASUREMENTS

1. Numerical Pain Rating Scale [13,14,15]:

Pain intensity is measured on an 11-point pain intensity numerical rating scale, from 0-10, where 0 = no pain and 10 = worst possible pain. The number that the participant indicates on the scale to rate their pain intensity is recorded.

2. Neck disability index [10,11,12] :

The NDI has become a standard instrument for measuring self-rated disability due to neck pain and is used by both clinicians and researchers. Each of the 10 items scores from 0 to 5. The maximum score is 50. The obtained score can be multiplied by two to produce a percentage score.

The total score was expressed a percentage (total possible score, 100%), Higher score corresponds to greater disability. Subjects has to mark in each section only the one box which is applied to their condition.

RESULTS

Data was analysed using the Statistical software of SPSS 21.0 version. Both

descriptive and inferential analyses have been carried out in the present study. Outcome measurements are measured for trapezitis induced due to rounded shoulder posture by NPRS and NDI and presented as mean±SD. Significance is assessed at 5 % level of significance with p value 0.05 less than this is considered as statistically significant difference. Unpaired t test used between the groups, Wilcoxon test used in both group analysis, Between the group comparisons: Mann- Whitney U test used.

Table-1: Range, mean and SD of age of the subjects having Trepezitis induced due to rounded shoulder posture in both the groups.

Sno	Variable	Group-A: Kinesio taping		Group-B: Rigid taping		Unpaired t-test
		Range	Mean ± SD	Range	Mean ± SD	
1	Age in years	34-50	45.44±5.01	29-50	43.42±6.23	t=1.247, p>0.05, NS

NS-Not significant. ie.,p>0.05.

The table 1 presents the outcomes of age in years of the subjects having Trapezitis induced due to rounded shoulder posture in both the groups. In group-A, the subjects were ranging within the age of 34-50 with mean and SD of 45.44±5.01. In group-B,, the subjects were ranging within the age of 29-50 with mean and SD of 43.42±6.23. The unpaired t-test was carried to compare the means, which was found to be not significant at 5% level (ie., p>0.05). It revealed that the baseline characteristic of age was similar in both the groups.

Table-2: Distribution of subjects having Trapezitis induced due to rounded shoulder posture according to gender in both groups.

Sno	Gender	Group	
		Group-A: Experimental	Group-B: Control
1	Male	12(48.0%)	11(44.0%)
2	Female	13(52.0 %)	14(56%)
		Chi-Square value=0.081 df=1, p>0.05,NS	

NS-Not significant. ie.,p>0.05.

The above table-2 shows the proportion of subjects having Trapezitis induced due to rounded shoulder posture according to gender. In group-A, the subjects with Subjects having Trapezitis induced due to rounded shoulder posture 12(48.0%) of them were males and 13(52.0 %) of them were females. In group-B, more or less same gender proportion of 11(44.0%) and 14(56%) of subjects was found. The Chi-square test was worked out and it was found to be not significant at 5% level (p>0.05). It evidenced the baseline characteristic of gender is homogeneous in both the groups. The following pie diagrams depicted the proportion of subjects having Trapezitis induced due to rounded shoulder posture according to gender.

The above table-3 shows the proportion of subjects having Trapezitis induced due to rounded shoulder posture according to dominance. In group-A, the subjects with Subjects having Trapezitis induced due to rounded shoulder posture 5(20.0%) of them were left dominance and 20(80.0%) of them were right dominance. In group-B, more or less same proportion of 3(12.0%) left dominance and 22(88.0%) of right dominance subjects was found. The Chi-square test was worked out and it was found to be not significant at 5% level (p>0.05). It evidenced the baseline characteristic of gender is homogeneous in both the groups. The following pie diagrams depicted the proportion of subjects having Trapezitis induced due to rounded shoulder posture according to gender.

Table-3: Distribution of subjects having Trapezitis induced due to rounded shoulder posture according to dominance in both groups.

Sno	Dominance	Group	
		Group-A	Group-B
1	Left	5(20.0%)	3(12.0%)
2	Right	20(80.0 %)	22(88.0%)
		Chi-Square value=0.595 df=1, p>0.05,NS	

NS-Not significant. ie.,p>0.05.

Table-4: Range, mean and SD of outcome measures of subjects having Trapezitis induced due to rounded shoulder posture in group-A

Sno	Outcome measures	Group-A : Kinesio taping				Wilcoxon test	p-value
		Pre test		Post test			
		Range	Mean ±SD	Range	Mean ±SD		
1	NPRS	5-9	6.72±1.37	2-6	3.40 ± 1.11	z=4.586*	p<0.001
2	NDI	17-39	27.20±1.11	6-34	16.00±8.63	z=4.377*	p<0.001

Note; * denotes –Significant (p<0.05), z- Wilcoxon test

The above table-4 shows the pre and post test outcomes of outcome measures among the subjects with subjects having Trapezitis induced due to rounded shoulder posture in group-A. In pre test, the pain (NPRS) was ranging within 5-9 with mean and SD of 6.72±1.37. But in post test, it was found to be decreased to the range 2-6 with mean and SD of 3.40 ± 1.11.. The Non parametric test for significance of dependent outcomes and ordinal the Wilcoxon test was carried out and it was found to be significant (p<0.001).

Table-5: Range, mean and SD of outcome measures of subjects having Trapezitis induced due to rounded shoulder posture in group-B

Sno	Outcome measures	Group-B : Rigid taping				Wilcoxon test	p-value
		Pre test		Post test			
		Range	Mean ±SD	Range	Mean ±SD		
1	NPRS	5-9	7.00±1.22	2-6	3.60 ± 1.04	z=4.443*	p<0.001
2	NDI	25-38	29.88±3.46	10-32	18.20±6.07	z=4.377*	p<0.001

Note; * denotes –Significant (p<0.05), z- Wilcoxon test

The above table-5 shows the pre and post test outcomes of outcome measures among the subjects with subjects having Trapezitis induced due to rounded shoulder posture in group-A. In pre test, the pain (NPRS) was ranging within 5-9 with mean and SD of 7.00±1.22. But in post test, it was found to be decreased to the range 2-6 with mean and SD of 3.60 ± 1.04.. The Non parametric test for significance of dependent outcomes and ordinal the Wilcoxon test was carried out and it was found to be significant (p<0.001).

Table-6: Comparison of pre and post test outcome measures of subjects having Trapezitis induced due to rounded shoulder posture in between the groups.

Sr.no	Outcome measures	Pre test		Post test	
		Group-A	Group-B	Group-A	Group-B
		Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD
1	NPRS	6.72±1.37	7.00±1.22	3.40 ± 1.11	3.60 ± 1.04
2	NDI	27.20±1.11	29.88±3.46	16.00±8.63	18.20±6.07
Between group comparisons: Mann- Whitney U test		NPRS: z=0.784, p>0.05, NS NDI z=0.737 p>0.05, NS		NPRS: z=1.769, p>0.05, NS NDI, z=1.799 p>0.05, NS	

S-denotes significant (p<0.05); NS – not significant (p>0.05).

DISCUSSION

The purpose of this study was to compare the effectiveness of kinesio-taping and rigid taping on trapezitis induced due to rounded shoulder posture in desk job workers. In the present study an experimental study design of 50 subjects with trapezitis induced due to rounded shoulder posture were randomized into two groups: Group A (n=25) and Group B (n=25). Subjects in group A received kinesio taping for two weeks and Subjects in group B received rigid taping for two weeks. Subjects were assessed pre and post intervention for pain, disability using Numerical pain rating scale (NPRS), and Neck disability index (NDI).

It was found that, Both the interventions in group-A and group-B were found to be individually effective in treating subjects having Trapezitis induced due to rounded shoulder posture in reducing pain and disability. But, while compared the post test outcomes in between the groups, there was no much difference in reduction of pain and disability of the subjects.

Significant relief of pain and disability was noted in both groups over sessions for 2 weeks. The kinesio taping and the rigid taping individually effective in both groups.

In group A, with kinesio taping there exist a significant difference which was seen on comparing the pre session and post session values between the groups, which suggests that kinesio taping in trapezitis induced due to rounded shoulder posture are effective in reducing pain, disability.

The previous study was done on Comparison of the Short-Term Outcomes after Post isometric Muscle Relaxation or Kinesio Taping Application for Normalization of the Upper Trapezius Muscle Tone and the Pain Relief On using the post isometric muscle relaxation technique there was decrease in tonus which may be due to desensitization of the muscle fibers within the muscle, but it had no role in relieving pain. On the other hand Kinesio taping had a beneficial effect in alleviating pain and increasing pain sensitivity and also proved to be effective in reducing bioelectrical activity which happened to be due to the analgesic effect its application across the involved muscle[6,21].

Another researcher studied on Short-Term Effects of Kinesio Taping and Cross Taping Application in the Treatment of Latent Upper Trapezius Trigger Points: A Prospective, Single-Blind, Randomized, Sham-Controlled Trial. In this study they stated that the KT taping worked so as to reduce the pain significantly but not improve range of motion Taping has been an effective conservative modality for relieving pain[2,22]. The main result of kinesio taping is contributing to application of tape with tension. This allows pulling force, triggering the mechanoreceptors in subdermal soft tissue and fascia[26].

Another study has shown, kinesio tape helped in the reducing pain with increasing blood and lymphatic fluid circulation and increasing the oxygen supply to the area and removed the accumulated metabolic waste products[7]. They also suggested that, kinesio tape activated the cutaneous the stretch stimulation which can interfere with nociceptive stimuli reaching the central nervous system and inhibit pain[2,64]. It may be attributed to the presynaptic inhibition of pain via the pain gate mechanism, as taping stimulates neuromuscular pathways by inducing a greater sensory feedback. The gate control theory also explains that an increase the Aβ fibre activity can mitigate the nociceptor input and thereby reduce pain[2,23]. In fact, that experimental group showed a significantly greater improvement in pain intensity immediately after kinesio tape. Kinesio taping provide facilitation of lower trapezius, inhibition of the deltoid and upper trapezius and mechanical correction affecting the subacromial space[24].

In pre test, the pain (NPRS) was ranging within 5-9 with mean and SD of (6.72±1.37). But in post test, it was found to be decreased to the range 2-6 with mean and SD of (3.40 ± 1.1). In other hand, NDI in pre test the was ranging within 17-39 with mean and SD of (27.20±1.11). But in post test, the scores were found to be decreased to the range of 6-34 with mean and SD of (16.00±8.63). This shows there is a significant reduction in pain and disability in subjects having Trapezitis induced due to rounded shoulder posture in group-A (Table no. 4).

Regarding NDI in pre test, the scores were ranging within 17.-39 with mean and SD of 27.20±1.11. But in post test, the scores were found to be decreased to the range of 6-34 with mean and SD of 16.00±8.63. The Non parametric test for significance of dependent outcomes and ordinal the Wilcoxon test was carried out and it was found to be significant ($p<0.001$)

It evidences the there is a significant reduction in pain and disability in subjects having Trapezitis induced due to rounded shoulder posture in group-A.

In group B, with rigid taping there exist a significant difference which was seen on comparing the pre session and post session values between the groups, which suggests that kinesio taping in trapezitis induced due to rounded shoulder posture are effective in reducing pain, disability.

The preliminary study done on the effect of offloading using rigid tape in unilateral trapezitis. In this study the numerical pain rating scale (NPRS), algometer and goniometer were used as a outcome

measures. This study stated that there was highly significant improvement in pain, tenderness and cervical range of motion in patients with unilateral trapezitis with the use of offloading of upper trapezius muscle by using rigid tape[6].

The pain arising from trapezius muscle due to inflammation which cause severe muscle spasm is known as trapezitis[2]. It causes stiffness around neck, shoulder, and upper back[2,17]. It also affects patients daily activities[2,6,17]. Different taping techniques like kinesio taping and rigid taping are proven to have an immediate beneficial effect in rounded shoulders[2].

The Comparison of Immediate and Carry Over Effects of Kinesio taping and Rigid Taping on Pain due to Latent Trigger Points of Upper Trapezius in Individuals with Forward Shoulder Posture: A Randomized Control Trial, this study done on 52 individuals with bilateral forward shoulder posture having latent trigger points in upper trapezius were randomly divided into two taping groups – kinesio taping and rigid taping. Pain was assessed by using Numerical Pain Rating Scale (NPRS), and Pain pressure threshold (PPT) were assessed using a pressure algometer. So this study concluded that Both Kinesio taping and rigid taping have a beneficial effect on pain and pressure sensitivity of latent trigger points associated with forward shoulder posture[2].

Another study done on Effect of Rigid Taping on Scapular Re-Alignment in Shoulder Dysfunction. This study stated that Scapular re-alignment by rigid taping was found effective in shoulder dysfunction[20].

In the present study, pre test, the pain (NPRS) was ranging within 5-9 with mean and SD of (7.00±1.22). But in post test, it was found to be decreased to the range 2-6 with mean and SD of (3.60 ± 1.04). In other hand, NDI in pre test, the scores were ranging within 25-38 with mean and SD of 29.88±3.46. But in post test, the scores were found to be decreased to the range of 10-32 with mean and SD of 18.20±6.07. This shows there is a significant reduction in pain and disability in subjects having Trapezitis induced due to rounded shoulder posture in group-B (Table no. 5).

Regarding NDI in pre test, the scores were ranging within 25-38 with mean and SD of 29.88±3.46. But in post test, the scores were found to be decreased to the range of 10-32 with mean and SD of 18.20±6.07. The Non parametric test for significance of dependent outcomes and ordinal the Wilcoxon test was carried out and it was found to be significant ($p<0.001$)

It evidences the there is a significant reduction in pain and disability in subjects having Trapezitis induced due to rounded shoulder posture in group-B

So Comparison of pre and post-test outcome measures of subjects having Trapezitis induced due to rounded shoulder posture in between the groups mentioned in the (table 6) stated that Both the interventions in group-A and group-B were found to be individually effective in treating subjects having Trapezitis induced due to rounded shoulder posture in reducing pain and disability.

But, while compared the post test outcomes in between the groups, there was no much difference in reduction of pain and disability of the subjects.

CONCLUSION

The present study concludes that both the interventions of Kinesio taping and rigid taping was individually effective in trapezitis induce due to rounded shoulder posture in desk job workers. It is also concluded that both the intervention techniques effective in decreasing the pain and disability. however, while compared the post test outcomes in between the groups, there was no much difference in reduction of pain and disability of the subjects.

Limitation

- Small Sample Size. And fixed population
- Short duration study only for 2 weeks intervention.
- Findings are based on only NPRS and NDI scale only.
- Subjects with small range group between 20-50 years of age were considered for

study thus, results cannot be generalized to individual age.

- There is limited evidence exploring effect of kinesio taping and rigid taping on cervical extrinsic muscles (upper trapezius and levator scapulae) to correct trapezitis induced due to rounded shoulder posture in desk job workers

Recommendations for future research

- Future studies with long-term follow-up can be undertaken
- Further study is needed to compare the effect of other techniques or combination therapies except kinesio taping and rigid taping technique.
- Further study can be done measuring effect on other outcome measures

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