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Effect of rigid taping in swimmers with shoulder impingement syndrome

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ABSTRACT

Introduction

The present study is a comparative study conducted on swimmers in order to check the effect of rigid taping on swimmers with shoulder impingement syndrome.

Procedure

In order to test the hypothesis, the samples were collected from various swimming clubs across Pune and were then randomly divided into two groups, i.e. a control group which was given a set of core rehabilitation for shoulder and the experimental group was given rigid taping in addition to the exercise programme. For the analyses purpose paired t-test was used for assessing the effect of rigid taping on swimmers with shoulder impingement syndrome. For measuring the effectiveness of rigid taping on swimmers, the functional assessment scale, manual muscle testing and numerical pain rating scale were used.

Result

The study showed that swimmers with shoulder impingement syndrome when treated with core exercises along with rigid taping showed marked improvement in the score of functional assessment scale (p 0.0001), manual muscle testing (p 0.0035) and significant reduction in the score of numerical pain rating scale (p 0.0001), as compared to that of the control group.

Conclusion

The study therefore concluded that rigid taping along with an exercise programme shows better results for treating shoulder impingement syndrome in swimmers.

Keywords: Swimmer, Shoulder Impingement, Rigid taping, FAS, Numerical pain rating.

INTRODUCTION

Shoulder disorders are among the most common of all peripheral joint complaints [16-17]. The cumulative incidence of shoulder problems in general medical practice is estimated to be 1 1.2/1000 patients per year ⁽¹⁸⁾. Impingement in the shoulder occurs when the soft tissues occupying the sub-acromial space are encroached upon by the coraco-acromial arch [19] Shoulder impingement disorders are currently classified as either primary or secondary [23] Secondary impingement is reported in athletes who participate in sports that require frequent over- head activity [20, 21, 22] Swimmers spend up to 80% of their time swimming freestyle, no matter what stroke is used. Swimmers average 8,000-20,000 m a day and may practice up to twice a day, 5-7 days a week [2, 6, 14]. The number of revolutions of each shoulder tends to be greater in swimming than any other sport [14] **If the average swimmer swims 10,000 m daily, estimating 10 cycles for every 25 m, there would be 4,000 repetitions per shoulder on a daily basis** [13]

Phases of swimming

Swimming is a sport in which speed is equated with forward propulsion of the body over the arm in the water. [3, 19, 15] The portion of time that the hand is maintained in the water is referred to as pull through, and the time during which the arm is above the water is called the recovery period. [13, 15] Pull-through is the most complex and technique dependent of the two phases. The pull through is further divided into early mid and late pull through phase.

The highest incidence of pain was reported during mid-pull through. [1, 3, 14] Swimmers who cross the hand past the midline of the body may have a greater chance of impingement. [12] Horizontal adduction and internal rotation is a position similar to the Hawkin's test used in diagnosis of impingement syndrome. [5,7,10,11]

In summary, during mid pull through, there is risk of mechanical impingement due to the positioning of the joint in adduction and internal rotation. [8] During late pull through, the shoulder is adducted, possibly "wringing out" the supraspinatus tendon [4, 1], therefore during recovery, the shoulder may be at risk for primary impingement due to the positioning or secondary impingement due to anterior laxity and rotator cuff fatigue. There are a few literatures on rigid taping which have shown effective results of taping on shoulder impingement, but no such study was conducted on swimmers, where in post swimming session, the subject was taped with an interval gap of one day, hence to study the effect of rigid taping in swimmers with shoulder impingement syndrome.

METHODS AND APPROACH

Study design

It is a pre test post test randomized controlled experimental design study. Following assessment of functional activity scale, manual muscle testing and numerical pain rating scale in swimmers with shoulder impingement syndrome, where swimmers were randomly sampled in two groups, where the control group was given a set of core exercises for shoulder and the experimental group was given rigid taping in addition to the exercise programme.

Procedure

The research sites will have 1 research team consisting of a tester and a treater. The testers will be responsible for measurement of all dependent variables and were blinded to the group assignment for each subject.

Thirty swimmers with mean age group (21.3 ± 3.63) years, were randomly selected from various swimming clubs across Pune.

The subjects were made to sign a consent form and by random sampling were divided into two groups. Treatment for both groups consisted of a standardized flexibility and strengthening program

that was performed in the clinic under the direct supervision of a physical therapist

The rigid taping group additionally received rigid taping treatment directed at relevant movement limitations found in the upper quarter. Both groups were treated in the physical therapy clinic twice weekly for 3 weeks for a total of 6 visits.

Both groups received 1- hour initial examinations with an additional half hour for testing of the dependent variables. All treatment sessions for both groups were one-half hour in length. The flexibility program consisted of 2 passive stretching exercises, one for the anterior shoulder musculature and the other for the posterior

shoulder capsule and surrounding musculature. Each stretch was held for 30 seconds and performed 3 times with a 10 second rest period between each stretch. They were performed once daily at home. On days that they were treated in the clinic, the exercise group subjects performed their stretches in the clinic as part of the supervised exercise program. The rigid taping group performed their stretches at home. This procedure was used to equalize the length of the treatment sessions between the 2 groups. There were 6 strengthening exercises, all of which have been recommended as the essential "core exercises" of any shoulder rehabilitation programme

Following were the criteria’s for the subjects

Groups	Pre treatment	Post treatment	P value
Group A(EXERCISE)	3.5 ±0.6	4.1 ±0.7	0.0002
Group B(EX.+TAPING)	3.1 ±0.3	4.7 ±0.4	0.0001

Inclusion criteria

- Subjects in the age group of 20-40 years
- Subjects eliciting at least two symptoms of impingement.
- Positive Neer impingement test
- Swimming for a span of more than one year.

Exclusion criteria

- Subjects failing to fulfill the inclusion criteria’s.
- Subjects with other shoulder pathology.

Outcome measures

- Functional assessment scale
- Manual muscle testing
- Numerical pain rating scale

Statistical analysis

Statistical analysis was done by trial version of graph pad instat (v3.06 SOFTWARE) the data was entered into an excel spread sheet, tabulated and subjected to statistical analysis. Paired t-test was used. The results were concluded to be statistically significant.

RESULTS

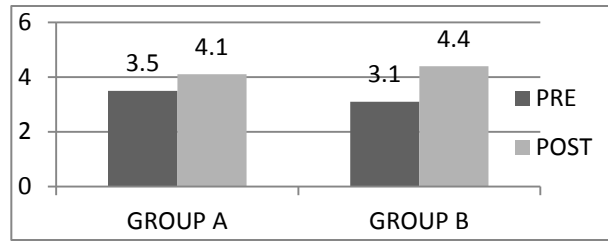
Statistical analysis using the paired t-test revealed a statistically significant improvement in the post session values of functional assessment scale, manual muscle testing and numerical pain rating scale in the experimental group compared to that of the control group

Functional assessment scale

Pre readings of the functional assessment scale was taken for group A and B, followed by the treatment followed by post readings.

The results obtained are-
 GROUP A (EXERCISE THERAPY GROUP/ CONTROL GROUP)
 GROUP B (RIGID TAPING+EXERCISE THERAPY GROUP/EXPERIMENTAL GROUP)

The MEAN reading were obtained by using `the paired T test, Are-



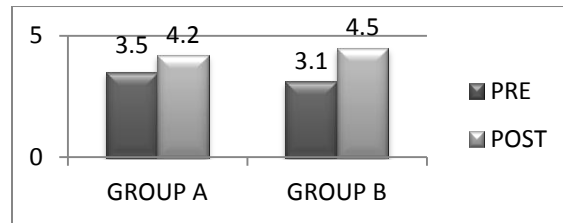
The MEAN reading were obtained by using the paired T test, Are-

The above graph clearly shows **group B** shows better mean results as compared to **group A**, which is statistically significant. Thereby proving exercises along with rigid taping gives a better result on FAS scale.

Abduction (MMT)

MMT for abduction, internal rotation and external rotation

Similarly Pre and post treatment results for MMT of shoulder abduction, internal rotation and external rotation were taken, which was followed by calculating the mean results of the pre and post results by using the paired T test. The results are as follows-

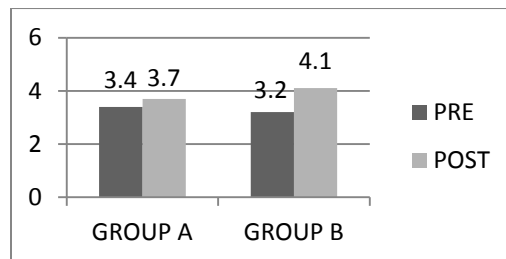


The MEAN results obtained by using paired T test are as follows-

Groups	Pre treatment	Post treatment	P value
GROUP A	3.5 ±0.5	4.2 0.7	± 0.0001
GROUP B	3.1 ±0.3	4.5 ±0.5	0.0001

The above graph clearly shows that **group B** shows better mean results as compared to that of **group A**, Thereby proving that exercises with rigid taping provide better results for improving strength of the abductors.

Internal rotators (MMT)



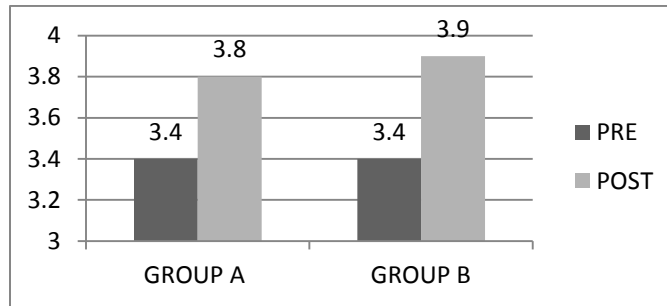
The MEAN results obtained using paired T test are-

Groups	Pre treatment	Post treatment	P value
GROUP A	3.4 ±0.5	3.7 ±0.8	0.0186
GROUP B	3.2 ±0.4	4.1 ±0.3	0.0001

The above graph clearly shows that **group B** shows better mean results as compared to that of **group A**, Thereby proving that exercises with rigid

taping provide better results for improving strength of the internal rotators

External rotators



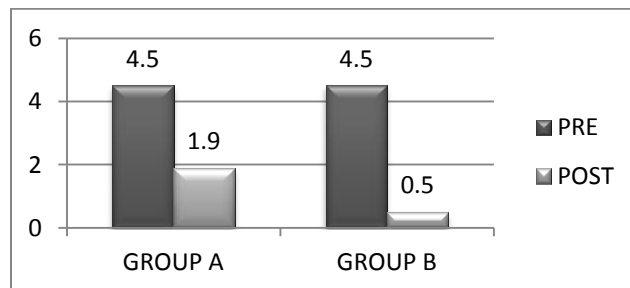
The MEAN results obtained using paired T test are-

Groups	Pre treatment	Post treatment	P value
GROUP A	3.4 ±0.5	3.8 ±0.7	0.0081
GROUP B	3.4 ±0.5	3.9 ±0.59	0.0035

The above graph clearly shows that **group B** shows better mean results as compared to that of **group A**, Thereby proving that exercises with rigid taping provide better results for improving strength of the external rotators.

Numerical pain rating scale

The numerical pain rating scale was used as a measure to check the intensity of the pain pre and post the treatment for **group A** and **group B** post which the mean of the numerical pain rating scale was calculated for group A and group B pre and post the treatment using paired T test



The MEAN results obtained by using paired T test are as follows-

Group	Pre treatment		Post treatment		P value
GROUP A	4.5	±0.8	1.9	±1.6	0.0001
GROUP B	4.5	±0.7	0.5	±1.1	0.0001

The above graph clearly shows that the mean reading on the numerical pain rating scale in the group B reduces considerably as compared to that of group A proving exercise with rigid taping as a better measure for reducing pain.

Therefore it clearly shows that GROUP B had better results, by showing a marked increase in the improvement of muscle strength, higher score on the functional assessment scale and marked reduction of pain on the numerical rating scale. Therefore group B i.e. exercise along with rigid taping proves to be a better treatment than group A which was only exercising.

DISCUSSION

50 swimmers were screened based on the inclusion and exclusion criteria, out of which 30 swimmers were randomly selected. In this study, supervised shoulder exercise combined with rigid taping proved to be superior to shoulder exercise alone for decreasing pain, increasing strength, and improving function in subjects with shoulder impingement syndrome.

Statistically significant decreases in pain and increases in strength were measured in the manual therapy group after completing only 6 physical therapy visits over a period that varied from 21-27 days.

According to the outcome measures, For group B (EXERCISES WITH RIGID TAPING) and A (EXERCISE GROUP ONLY)

The results obtained were as follows-

On the functional assessment scale the mean value for group B post treatment obtained was 4.7 with a P value of 0.0002 which proves the study to be extremely significant, where in for group A the mean value achieved was 4.1 with a P value of 0.0002. On comparing the two means, it clearly shows that group B shows a significant rise in the functional assessment scale.

On the MMT scale, we checked the strength of the internal rotators, abductors and external rotators

of the shoulder as these are the three major moves performed by the shoulder during any given stroke of swimming. On statistically analyzing, we recorded that group B showed better results for improvised strength as compared to group A

In group A the mean MMT for shoulder abduction was 4.2 with a p value of 0.0001, the mean MMT for shoulder internal rotation was 3.7 with a p value of 0.0186 and the mean MMT for shoulder external rotation was 3.8 with a p value of 0.0001, post treatment, whereas for group B, the mean MMT for shoulder abduction was 4.5, with a p value of 0.0001, mean MMT for shoulder internal rotation was 4.1 with a p value of 0.0035, and mean MMT for shoulder external rotation was 3.9 with a p value of 0.0001, there by showing that group B showed significant improvement in the muscle strength as compared to that of group A, hence proving that rigid taping along with supervised exercises shows better results as compared to that of given with exercise alone.

A study was conducted by MICHAEL.D BANG, on Comparison of Supervised Exercise With and Without manual Physical Therapy for Patients With Shoulder Impingement Syndrome, which states that significant improvement in strength is demonstrated by the rigid taping group (manual therapy group) was clearly related to the application of rigid tape in the clinic and the home exercises combined with exercise given to both groups, where in the exercise group did not improve significantly despite performing the identical flexibility and strengthening program.

The numerical pain rating scale-we checked for pain pre and post the treatment. The mean reading on the numerical pain rating scale post treatment for group B was 0.5 and that for group A was 1.9, there by clearly showing that subjects in group B had a significant reduction in the pain as compared to that of group A

A similar study was conducted by Yu Eli. Et al. on The effects of rigid taping on scapular kinematics and muscle performance in baseball players with shoulder impingement syndrome

Which stated that based on the significant improvement in strength in the rigid taping group, the application of rigid tape appeared to optimize conditions for performing the strengthening exercises. These optimum conditions may be due to the significant pain reduction in the rigid taping group. Subjects in the rigid taping group were frequently observed to have increased pain-free ROM immediately following the application of rigid tape.

Therefore proving that my study on effect of rigid taping on swimmers with shoulder impingement syndrome shows supervised shoulder exercise combined with rigid taping proved to be superior to shoulder exercise alone for decreasing pain, increasing strength, and improving function in subjects with shoulder impingement syndrome. . Our study also provides evidence that effective outcomes are attainable after relatively few physical therapy visits

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CONCLUSION

Rigid taping combined with supervised shoulder exercise is superior to supervised shoulder exercise alone for enhancing strength and function and reducing pain in patients with shoulder impingement syndrome. Our study also provides evidence that effective outcomes are attainable after relatively few physical therapy visits.

Future scope and limitations

Future scope

A similar study can be conducted comparing the different strokes in swimming and the effect of rigid taping on the same.

Limitations

Small sample size

Non adherence to treatment.

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