Effect of Movement with Mobilization in Supraspinatus Tendinitis

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Abstract: *Introduction: Supraspinatus Tendinitis is an inflammation of tendon of supraspinatus muscle. It is overuse injury leads to improper functioning and muscle weakness. Manualmobilization techniques are beneficial likewise movement with mobilization (MWM) can be beneficial. Objectives: To determine the effect of MWM in patients with supraspinatus tendinitis and to compare the effect of MWM and conventional therapy in patients with supraspinatus tendinitis. Conclusion: 28 subjects of >30 years age, having Supraspinatus Tendinitis were recruited. They were allocated into 2 groups and treated with ultrasound (US), Transcutaneous Electrical Nerve Stimulation (TENS) exercises, MWM for 5 sessions in a week for 4 weeks. Daily assessment was done; pre and post intervention outcomes were measured using Goniometry and Shoulder Pain and Disability Index (SPADI) Result: Both the groups showed improvement but there was significant improvement on SPADI Scale and ROM in group treated with MWM, US, TENS and exercises. Conclusion: MWM, Ultrasound, TENS and exercises are effective in management of Supraspinatus Tendinitis.*

Keywords: Supraspinatus Tendinitis, Movement with Mobilization, Shoulder Pain and Disability Index, Range of motion, Ultrasound, TENS

1. Introduction

Supraspinatus tendinitis is an inflammation of tendon of supraspinatus muscle. It is a common condition that becomes more prevalent after middle age and common cause of shoulder pain [1],[2]

Improper functioning and muscle weakness permit the humeral head to migrate superiorly, resulting in supraspinatus tendon impingement. Hypo-vascularity in the region proximal to the insertion of the supraspinatus tendon also may have implication in rotator cuff tendinopathy [3].

2. Review of Literature

Pamela Teys et al in July (2006)[5].The Initial Effect of Mulligan Mobilization with Movement Technique on Range of Movement and Pressure Pain Threshold in Pain – Limited Shoulder

This study was done to find out effect of shoulder MWM on ROM and PPT. This study was concluded that shoulder MWM may be useful manual therapy technique to apply for participant with a painful limitation of shoulder elevation in order to predominantly gain in initial improvement in ROM and PPT.

Jing - Ian Yang et al in(2007)[9]. Mobilization Technique in Subject with Frozen Shoulder Syndrome: Randomized Multiple – Treatment Trial. This study was done to find out to comparing the effectiveness of ERM, MWM and MRM in subjects with frozen shoulder. Comparison of three different form of mobilization in two different groups and application of two or more treatment in single subject it is used to compare the effect of two or more treatment. This study was concluded that ERM and MWM were more effective than MRM in increase mobility and functional ability.

3. Material and Methodology

Subjects who diagnosed as supraspinatus tendinitis were selected. Further they were screened clinically using various tests and diagnosis and were put in either of the groups Group A (Ice pack, Ultrasound, TENS, Mobility exercise, exercises) and Group B (Ice pack, Ultrasound, TENS, exercise and MWM) by simple random sampling using lottery method. Before proceeding to intervention a written consent was taken from subject. Ethical clearance was obtained from university's inional review board.
Inclusion criteriawere both male and female, Age above 30 years.

Exclusion criteria were subject having any other pathology other than supraspinatus tendinitis, Subjects undergone any shoulder surgery. Both groups were treated withUltrasound therapy, frequency-1MHz, intensity – $0.8W/cm^2$, for 7min, Cryotherapy for 10 min, Exercises, Codmans pendular exercises 10 repetitions each, Capsular Stretches30 sec hold, 5 repetitions, Shoulder mobility exercises[4]. Movement with Mobilization was used[5] as part of the evaluation to assess the effects it has on symptoms. If the MWM relieves or reduces the symptoms then only MWM was given.

Pre-treatment outcome measure of functional disability using shoulder pain and disability index and shoulder range of motion using goniometer was recorded. Participants were divided into two groups by random allocation; Group A and group B, both groups was receive a baseline treatment (ultrasound therapy, cryotherapy, Capsular stretches and Codman pendular exercises).

4. Outcome Measure

Subjects in both the Groups were evaluated pre and post treatment program using SPADI Scale and Range of Motion.

4.1 SPADI Scale

The SPADI (Shoulder Pain and Disability Index) index is used to assess patients with supraspinatus tendinitis of shoulder 13 items.

4.2 ROM

Goniometry is used to assess shoulder range of motion.

5. Statistical Analysis

Statistical analysis for the present study was done by using the INSTAT. Various statistical measures such as Mann Whitney test, Wilcoxon matched pair test, Paired 't' test and Unpaired 't' test were used for this purpose. Intra Group comparison (within Group) was analyzed statistically using Wilcoxon matched pairs test for SPADI Scale Score, inter Group comparison (between Group) was analyzed statistically using Mann Whitney test and ROM Score assessment was statistically analyzed by using paired 't' test and unpaired 't' test. Probability values less than 0.05 were considered statistically significant and probability values less than 0.0001 were considered statistically extremely significant.

6. Results

Total 30 subjects were taken for study. The gender ratio of Group A was 11:3 (11 males and 3 females) and Group B was 9:5 (9 males and 5 females) and was statistically not significant. Therefore both the groups are matched with respect to gender. 5.1 Age of the participants in the study was between 30to 80 years. The mean age of the participants in group A was 53.357 years ±15.219 and the mean age of participants in group B was 52.236 years ± 10.353. The difference in mean age of two groups was statistically not significant (p= 0.1705). Therefore both the groups are matched with respect to age (Table No.1)

Table 1: Baseline characteristics of participants

Variables	Group A	Group B
Gender	M 11 & F3	M 9 & F5
Age	53.357± 15.219	52.236± 10.353

5.2 In the present study pre interventional mean SPADI score was 93.785±7.688 in Group A and 92.142 ± 7.326 in Group B whereas post-interventional mean of SPADI score was37.214 ± 17.647 in Group A and12.692± 5.513   in Group B respectively.

Intra group analysis of SPADI score revealed statistically reduction in pain and functional disability scores post interventional for both the groups. This was done by using Wilcoxon matched pairs test Group A (p0.0001), Group B (p0.0002). Pre intervention analysis showed no significant differences (p0.4614)

Inter group analysis of SPADI score was done by using Mann-Whitney test. Post intervention analysis showed significant difference between Group A and Group B (p0.0047)

Table 2: Comparison of SPADI scale

Groups	Pre Mean ± SD	Post Mean ± SD	P value
A	93.785 ± 7.688	37.214 ± 17.647	0.0001
B	92.142 ± 7.326	12.692± 5.513	0.0002
P	0.4614	0.0047	

5.3In the present study pre interventional means of shoulder flexion range score was 112.85 ± 25.246 in Group A and120 ± 18.397 in Group B whereas post-interventional means shoulder flexion range was 147.85 ± 14.769 in Group A and 120 ± 18.397 in Group B respectively. Inter group analysis of shoulder flexion range was done by using unpaired t test.

Pre interventional analysis showed no significant difference between group A and group B (p=0.4001). Post intervention analysis showed very significant difference between Group A and Group B (p=0.0002)

Table 3: Comparison of shoulder flexion ROM

Groups	Pre Mean ± SD	Post Mean ± SD	P value
A	112.85± 25.246	147.85± 14.769	<0.0001
B	120± 18.397	120 ± 18.397	<0.0001
P	0.4001	0.0002	

5.4In the present study pre interventional mean shoulder extension range was35 ± 8.086 in Group A and38.214 ± 3.725 in Group B whereas post-interventional mean of shoulder extension range was 58.928± 2.895 in Group A and59.285± 1.816 in Group B respectively.

Intra group statistical analysis revealed statistically extremely significant increase in shoulder extension range post interventional for both the groups. This was done by using paired t test Group A (t_{14}=711.718, p<0.0001), Group B (t_{14}=19.667, p<0.0001).

Inter group analysis of shoulder extension range was done by using unpaired t test. Pre (p=0.1884) and post (p=0.6989) interventional analysis showed no significant difference between Group A and Group B.

Table 4: Comparison of should extension ROM

Groups	Pre Mean ± SD	Post Mean ± SD	P value
A	35 ± 8.086	58.928± 2.895	<0.0001
B	38.214 ± 3.725	59.285± 1.816	<0.0001
P	0.2633	0.2484	

5.5 In the present study pre interventional mean shoulder abduction range was 94.28 ± 30.310 in Group A and 106.42 ±24.371in Group B whereas post-interventional mean of shoulder abduction range was 134.64 ± 26.052 in Group A and143.57 ±13.506 in Group B respectively.

Intra group statistical analysis revealed statistically extremely significant increase in shoulder abduction range post interventional for both the groups. This was done by using paired t test Group A (t_{14}=11.718, p<0.0001), Group B (t_{14}=7.132, p<0.0001)

Post intervention analysis showed no significant difference between Group A and Group B (p0.2653).

Table 5: Comparison of shoulder abduction ROM

Groups	Pre Mean ± SD	Post Mean ± SD	P value
A	94.28 ± 30.310	134.64 ± 26.052	<0.0001
B	106.42 ±24.371	143.57 ±13.506	<0.0001
P	0.2533	1.138	

5.6 In the present study pre interventional mean shoulder adduction range was36.071± 9.643 in Group A and38.928 ± 5.609 in Group B whereas post-interventional mean of shoulder adduction range was57.5± 7.003 in Group A and61.428 ± 7.703 in Group B respectively.

Intra group statistical analysis revealed statistically extremely significant increase in shoulder adduction range post interventional for both the groups. This was done by using paired t test Group A (t_{14}=11.597, p<0.0001), Group B (t_{14}=11.5777, p<0.0001).

Inter group analysis of shoulder extension range was done by using unpaired t test. Pre (p=0.3467) and post (p=0.1698) interventional analysis showed no significant difference between group A and group B.

Table 6: Comparison of shoulder adduction ROM

Groups	Pre Mean ± SD	Post Mean ± SD	P value
A	36.071± 9.643	57.5± 7.003	<0.0001
B	38.928 ± 5.609	61.428 ± 7.703	<0.0001
P	0.3467	0.3467	

5.7In the present study pre interventional mean shoulder external rotation range was55 ± 11.602 in Group A and40.714 ± 9.37 in Group B whereas post-interventional mean of shoulder external rotation range was84.428± 6.630 in Group A and66.785 ± 12.650 in Group B respectively. Intra group statistical analysis revealed statistically extremely significant increase shoulder external rotation range post interventional for both the groups. This was done by using paired t test Group A (t_{14}=9.808, p<0.0001), Group B (t_{14}=13.760, p<0.0001).

Inter group analysis of shoulder external rotation range was done by using unpaired t test. Pre interventional analysis showed no significant difference between group A and group B (p=00.3223). Post intervention analysis showed no difference between Group A and Group B (p=0.1048).

Table 7: Comparison of shoulder external rotation ROM

Groups	Pre Mean ± SD	Post Mean ± SD	P value
A	55 ± 11.602	84.428± 6.630	<0.0001
B	40.714 ± 9.37	66.785 ± 12.650	<0.0001
P	0.3223	0.1048	

5.8In the present study pre interventional mean shoulder internal rotation range was 32.5 ± 6.723 in Group Aand40.714 ± 9.376in Group B whereas post-interventional mean of shoulder internal range was 58.214 ± 5.409 in Group A and66.785 ± 12.650 in Group B respectively.

Intra group statistical analysis revealed statistically extremely significant increase in shoulder internal range post interventional for both the groups. This was done by using paired t test Group A (t_{14}=12.728, p<0.0001), Group B (t_{14}=13.210, p<0.0001).

Inter group analysis of shoulder flexion range was done by using unpaired t test. Pre interventional analysis showed no significant difference between group A and group B (p=0.0131). Post intervention analysis showed very significant difference between Group A and Group B (p=0.0278).

Table 8: Comparison of shoulder internal rotation ROM

Groups	Pre Mean ± SD	Post Mean ± SD	P value
A	32.5 ± 6.723	58.214 ± 5.409	<0.0001
B	40.714 ± 9.376	66.785 ± 12.650	<0.0001
P	0.0131	0.0278	

7. Discussions

In Supraspinatus tendinitis the altered Gleno-humeral joint mechanics and muscle weakness permit the humeral head to migrate superiorly, resulting in supraspinatus tendon impingement. The supraspinatus complex occupies a narrow space, with light contact between the supraspinatus and the coracoacromial arch during normal abduction. Repeated impingement of coracoacromial arch onto the supraspinatus tendon has been implicated as the likely mechanism of tendon injury.

Movement with mobilization technique produces its effect by correcting positional faults of joint that occur following injury, stain [5]. The intent of MWM is to restore painfree motion at joints that have painful limitation of range of movement.

The average mean age participants in Group A was 53.357±15.219and Group B was 46.230±10.353, which showed there is no significant differences in age of subjects in both groups (t=1.411, p=0.1705).

The baseline treatment of Ice pack, ultrasound, TENS, capsular stretch, Codman pendular exercise and mobility exercise was common for both groups. Ultrasound for heal the tissue. TENS modulate pain by blocking pain gate mechanism and increasing blood supply. All this intervention was common in both groups. The effect of ultrasound on supraspinatus tendinitis demonstrated that the treatment resulted in a fully regenerated supraspinatus tendon. At the same time, the shoulder pain slowly gaits subsided, and the active range of motion was restored [6]

Wilcoxon matched pairs test were used to analyses the effect of conventional treatment on pain and functional disability which showed that there was significant reduction in pain and functional disability (p= 0.0001) post treatment.

Paired't' test was used to analyses the effect of conventional treatment on shoulder ROM which showed that there was significant improvement in flexion(t=6.455, p=<0.0001), extension(t=11.718, p= <0.0001),abduction(t=8.479, p=<0.0001), adduction (t=11.597, p=<0.0001),external rotation (t=9.808, p=<0.0001), internal rotation (t=12.728, p=<0.0001) post treatment.

Wilcoxon matched pairs test used to analyses the effect of movement with mobilization on pain and functional

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disability which showed that there was significant reduction in pain (p=0.0002) post treatment. Paired t test was used to analyses the effect of movement with mobilization on shoulder ROM which showed that there was significant improvement in flexion (t=6.702, p=<0.0001), extension (t=19.667, p=<0.0001), abduction(t=7.132,p=<0.0001), adduction (t=11.577, p=<0.0001), external rotation (t=13.760,p=<0.0001), internal rotation (t=13.210,p=<0.0001)post treatment.

Mulligan's peripheral MWM techniques are commonly used within musculoskeletal physiotherapy. MWM involves a sustained passive joint glide while the patient actively moves the joint. MWM is a manual therapy technique that has been designed to address positional faults for restoration of normal arthrokinematic and osteokinematic motion. [7], [8]

Comparison of pain and functional disability between two groups was done byusing Mann-Whitney test. The statistical analyses revealed that there was a significant difference in pain and functional disability in both groups. The Group B was more efficient in reduction of pain (p=0.0047) than Group A post treatment.

Comparison of shoulder ROM between two groups was done using Unpaired t test to find the effectiveness between two groups.

The statistical analysis revealed that there was significant difference in certain shoulder ROM in both groups. The Group B was more efficient in improving shoulder flexion (t=4.418, p=0.0002) and internal rotation (t=2.331, p=0.0278) post treatment. There is no significant improvement in shoulder extension (t=0.3911, p=0.6989), abduction (t=1.138, p=0.2653), adduction (t=1.141, p=0.169), external rotation (t=1.680, p=0.1048) .post treatment.

Hence based on the results of the present study it can be concluded that both groups showed significant decrease in pain and functional disability score by SPADI and improved shoulder ROM. Group B showed extremely significant reduction in Shoulder Pain and Disability Index score whereas significant improvement in shoulder flexion and internal rotation ROM than Group A in subjects with supraspinatus tendinitis.

8. Conclusions

This study concluded that ,the present study provided evidence to support the use of both manual therapy technique that are conventional and MWM in relieving pain and functional disability and improving range of motion in subjects with supraspinatus tendinitis. In addition, results supported that movement with mobilization technique was more effectivethan conventional therapy in reducing pain and functional disability and improving shoulder flexion and internal rotation in subjects with supraspinatus tendinitis.

9. Future Scopes

Studies with long term follow up are recommended for generalized result. In future studies Pre-treatment and post-

treatment Ultrasonography(USG) or Mangetic resonance imaging(MRI) investigations can be used for better understanding of treatment effectiveness.

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