Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

Analyzing Immediate Effects of First Rib and Acromioclavicular Joint Primal Reflex Release in Individuals with Shoulder Pain and Mobility Dysfunction

Pooja Rawat[1], Dr Sarvjeet Saini[2], Dr Ankita Saxena[*3], Dr Avinash Ruhela[4]

[1] PG MPT Musculoskeletal, Department of Physiotherapy, Swami Rama Himalayan University, Dehradun

[2] Assistant Professor, Department of Physiotherapy, Swami Rama Himalayan University, Dehradun

[3*] Assistant Professor, Department of Physiotherapy, Swami Rama Himalayan University, Dehradun

[4]Assistant Professor, Department of Physiotherapy, Swami Rama Himalayan University, Dehradun

Corresponding Author: Dr Ankita Saxena, Assistant Professor, Department of Physiotherapy, Swami Rama Himalayan University, Dehradun

(Received: 04 February 2024 Revised: 11 March 2024 Accepted: 08 April 2024)

KEYWORDS

AC: acromioclavicular; PRRT: primal reflex release technique; NPRS: numeric pain rating scale; ROM: range of motion; Flex: flexion; Abd: abduction; IR: internal rotation; ER: external rotation.

ABSTRACT:

Background: Shoulder pain along with decrease range of motion is one of the most common musculoskeletal conditions seen in clinical practice. Although clinical practice in shoulder conditions describes only physical therapy study treatment directed to shoulder.

Objectives: The present study has aimed to find out the immediate effects of first rib and AC joint release in individuals with shoulder pain and mobility dysfunction.

Methods: Fifty participants were taken , reporting of shoulder pain and checked for the presence of first rib and AC joint dysfunction. Based on which two groups with twenty-five subjects were taken in each and received a single session of PRRT for the patients in experimental group whereas the control group was followed by conventional protocol of shoulder exercises. Outcome measures used were NPRS and ROM (flex.; Abd.; IR; ER). Pre and post intervention readings were taken in both the groups.

Results: on comparing between groups, experimental group was better than the control group which was statistically significant (Þ< 0.005)

Conclusions: The use of PRRT resulted in decreasing pain, increasing ROM & shoulder function. The PRRT concluded to be very useful in decreasing symptoms as an immediate effect. However, future research on multiple sessions should be done on a large sample size.

Introduction:

Shoulder pain affects approximately 16% to 21% of the population and is second only to low back pain in prevalence of musculoskeletal conditions [1]. Shoulder complaints are characterized by disability, usually due to pain during shoulder movement and restricted range of motion. Complaints of the neck and/or dysfunction of the joints of the cervical spine, the upper thoracic spine, and the adjacent upper ribs (shoulder girdle) often accompany shoulder complaints and are an important factor in duration and/or recurrence of shoulder complaints [2].

The selection of a single and reasonable definition of shoulder pain is important. For the purposes of this review, "shoulder pain" is characterized by the presence of pain in the anterior, lateral, or posterior aspects of the shoulder including the lower cervical spine and shoulder blade region. This type of definition has been cited in the literature and is recommended for use in epidemiological and shoulder related clinical studies[3].

Shoulder impingement is a common condition believed to contribute to the development or progression of rotator cuff disease. A few impingement categories have been identified including subacromial impingement or "external

Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

impingement" , internal impingement which can be further divided into anterior or posterior, and coracoid impingement [4].

There are multiple mechanisms by which impingement may occur, including excess or reduced motion and abnormal patterns of motion at portions of the range of motion (Michener et al. 2003) [2].

In other words, even if rotator cuff disease or tearing did not initiate from impingement or abnormal motion, impingement and abnormal motion are likely to contribute to disease progression [4].

Regional interdependence relates to the concept that dysfunction in one area or system of the body may result in perceived pain or deficiency in another region of the body [5]. Three of these studies have investigated the effects of including cervicothoracic spine and rib manual physical therapy into an overall treatment approach for patients with shoulder pain [6].

A regional interdependence approach to treatment is based on the concept that resolving impairments in inter- related segments may yield benefits for the symptomatic area. Pragmatic application of a treatment approach is person-centered in that treatment choices are determined by individual patient presentation. A pragmatic application of a regional interdependence approach to treatment for frozen shoulder has not been studied [5].

First rib dysfunction is considered as one condition that can cause neck and shoulder pain. However, its prevalence is unknown [7] .

Acromioclavicular joint (ACJ) disease is reported to be present in 31% of all patients with shoulder pain. Pain and dysfunction of ACJ origin may lead to an inability to perform manual labor tasks and sports and difficulty with activities of daily living[4].

ACJ pain commonly presents with localized superior shoulder pain, tenderness to palpation at the ACJ, the ACJ may be overlooked when treating common pathology of the shoulder girdle. There are no reported negative effects of manual therapy directed to the ACJ in the literature [4].

Primal Reflex Release Technique (PRRT) is a treatment paradigm that falls under the regional interdependent approach to patient care and involves downregulating an overstimulated autonomic nervous system in order to reduce patterns of pain. The paradigm is designed to address the neural system by resetting (recalibrating) hyper-aroused primal reflexes within the body [8,9]. Primal reflexes controls unlearned movement patterns and are triggered as protective defense mechanisms for the body. The withdrawal reflex and the startle reflex are two examples of primal reflexes [8].

The treatment involves providing 12 seconds of light, swift sensation in the form of repetitive deep tendon reflexes (DTR) that tap or stimulate the skin to inhibit painful areas. These reflex stimulations are generally performed lightly (as to not initiate a pain response) with several repetitions.

A potential explanatory theory is that these repetitive reflex stimulations send many impulses to the spinal cord, which may cause the spinal cord and brain to temporarily "overload" and "reset". When this happens, the brain may evaluate the situation and determine the current circumstances [8,9].

Nprs (Numeric Pain Rating Scale)

Pain ratings are used to evaluate the effects of treatment, and pain intensity at baseline & can predict treatment outcome in patients with shoulder pain. Pain is commonly assessed in outpatient rehabilitation in patients with shoulder pain using various patient-rated numeric pain-rating scales (NPRSs). An NPRS is described as an 11-point scale with scores from 0 to 10 and anchors of 0 = no pain and 10 = worst possible pain. The 11-point NPRS has been used to assess shoulder pain under various conditions such as pain at rest, pain with normal activities, average pain, best pain, and worst pain [10].

Range Of Motion

Goniometric measurements are used by physical therapists to quantify baseline limitations of motion, decide on appropriate therapeutic interventions, and document the effectiveness of these interventions. Probably most widely used evaluation procedure, goniometry, can be considered a fundamental part of the "basic science" of physical therapy for our understanding of the objective instrumentation and standardized clinical procedures for measuring ROM [11].

As per our knowledge, no studies have been carried out to provide research-based evidence that indicates the correlation of first rib and acromioclavicular joint reflex release in individuals with shoulder pain and shoulder dysfunction. Therefore , this study intends to determine whether PRRT treatment can produce effects to lower shoulder pain and improve shoulder range of motion and function.

Methodology:

This study was carried out with sample size of 50 subjects.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

Inclusion criteria:

- Patients complaining of shoulder pain
- Patients complaining of decreased range of motion of shoulder joint
- Age 20-60 years
- Both male and female

Exclusion criteria:

- Trauma to neck/shoulder
- Neck or shoulder surgery
- Bilateral frozen shoulder
- Thoracic outlet syndrome
- Spine pathology

Outcome Measures:

- Numeric pain rating scale (NPRS)
- Range of motion (ROM) of shoulder joint

Protocol

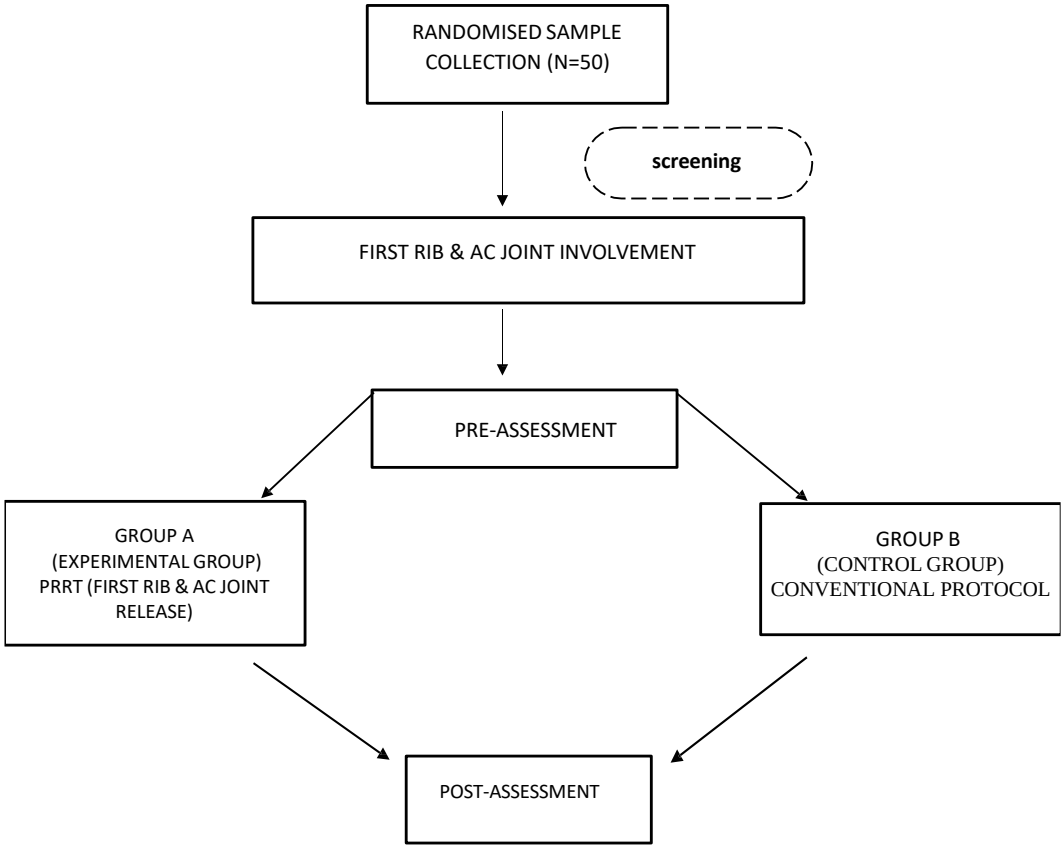
PROCEDURE:

Individuals were selected based on inclusion and exclusion criteria. Pre-assessment was

Done & NPRS score and ROM of shoulder joint was taken.

Patient being in supine position, therapist had first palpated at the base of the neck to check the tissue texture and tenderness; and a superior to inferior pressure by the thumb was applied by the therapist. If tenderness was present along with spasm or tender points in trapezius muscle, then the involvement of first rib with its decreased mobility was confirmed. Therapist then palpated across the course of the first rib and if tenderness persisted throughout the course that confirmed the dysfunction of 1st rib.

For the assessment of AC joint, the affected side shoulder was taken into horizontal adduction and springing motion at the end range was performed. If the AC joint was normal it was going to yield and give way for the springing motion without any pain but, if AC joint was involved there was restriction in the springing motion and there was pain and discomfort in that region.



Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

Data Analysis And Results :

- Statistics were performed by using SPSS software for windows.
- Normality was checked by using Shapiro wilk test <0.05 .
- Descriptive statistics was performed to find out mean, standard deviation, median for demographic variable and outcome variables.
- Based on normality,
- Paired t test & Wilcoxon signed rank test was used to find out significant differences within the group .
- Mann Whitney U test & paired t test was used to find out significant differences among variables in between the groups.
- Wilcoxon signed rank test was used to find differences among variables NPRS, ROM.

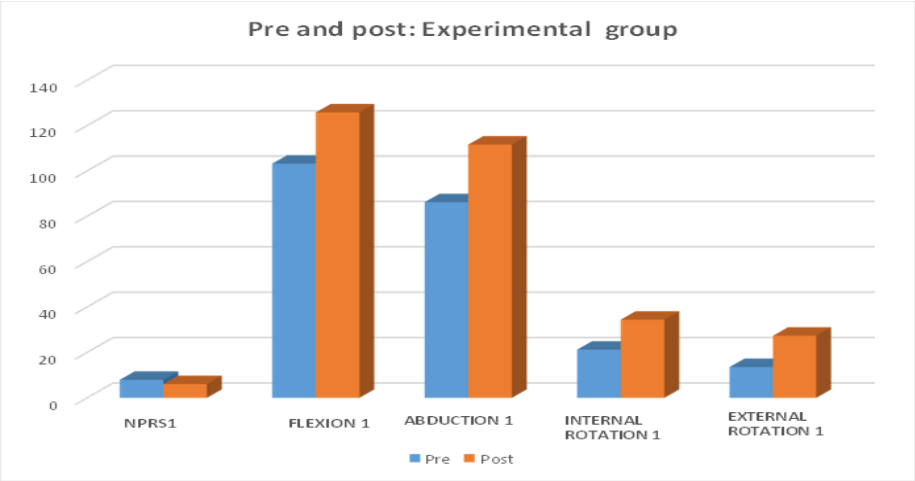
Difference within the groups

Table 1: Pre-post intervention comparison within group A

S. No.	Variables	Group A (PRE)	Group A (POST)	p-value
1	NPRS	7.92±1.222 (8.00)	6.04±1.369 (6.00)	<.000
2	FLEXION	103.20±10.512 (100.10)	125.80±12.965 (130.00)	<.008
3	ABDUCTION	86.20±10.924 (85.00)	111.60±14.486 (110.00)	<.000
4	INTERNAL ROTATION	21.20±22.835 (15.00)	34.40±22.653 (25.00)	<.000
5	EXTERNAL ROTATION	13.56±18.056 (8.00)	27.32±20.379 (20.00)	<.000

Table 1 shows pre and post intervention comparison within group A among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for all the variables.

Graph 1: Pre-post intervention comparison within group A



Graph 1 shows pre and post intervention comparison within group A among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for all the variables.

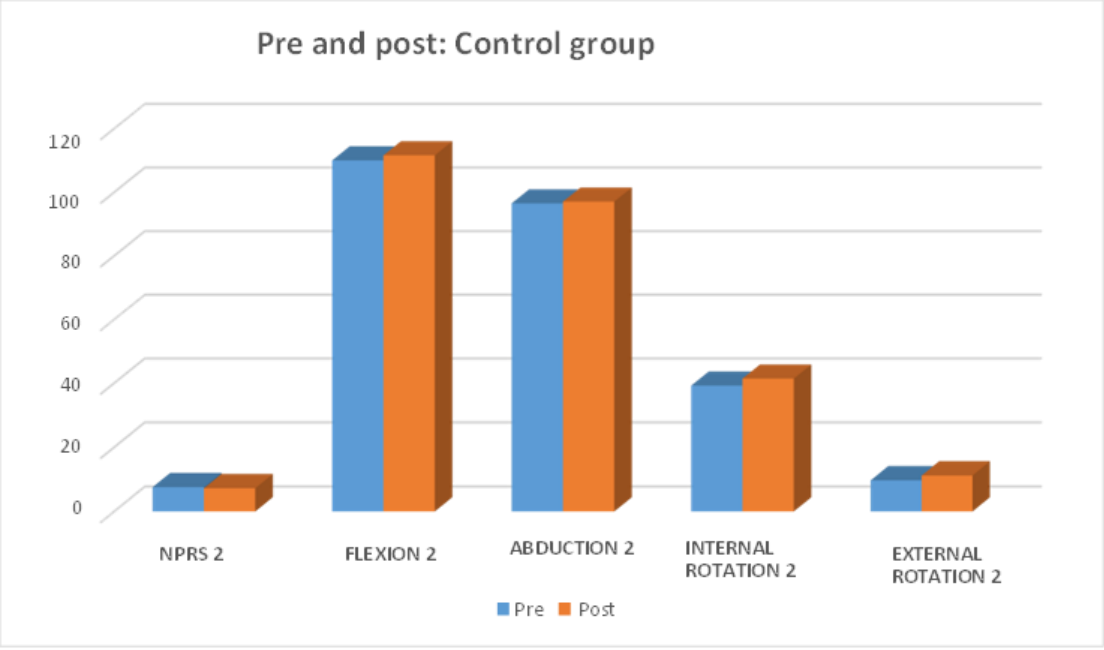
Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

Table 2: Pre-post intervention comparison within group B

S. No.	Variables	Group B (PRE)	Group B (POST)	p-value
1	NPRS	7.56±1.003 (8.00)	7.24±1.268 (7.00)	<.011
2	FLEXION	110.00±13.919 (110.00)	111.60±13.898 (110.00)	>.203
3	ABDUCTION	96.48±7.995 (100.00)	97.04±8.193 (100.00)	>.490
4	INTERNAL ROTATION	39.20±35.901 (20.00)	41.40±35.075 (20.00)	>.196
5	EXTERNAL ROTATION	9.68±5.250 (10.00)	11.20±6.557 (10.60)	<.010

Table 2 shows pre and post intervention comparison within group B among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for NPRS and External Rotation and for other variables, it was statistically insignificant.

Graph 2: Pre-post intervention comparison within group B



Graph 2 shows pre and post intervention comparison within group B among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for NPRS and External Rotation and for other variables, it was statistically insignificant.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

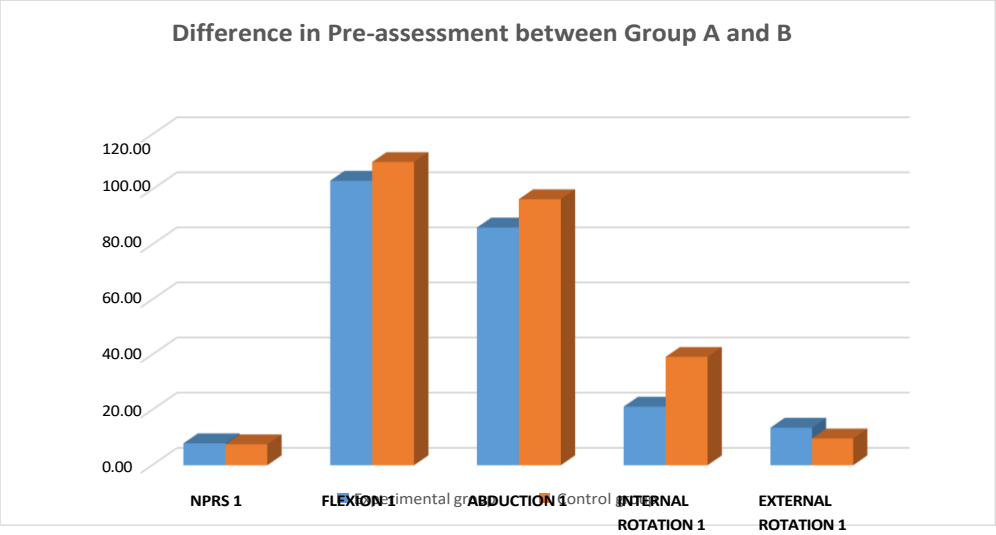
❖ **Difference in between groups**

Table 3: Difference between Pre assessment of group A & group B

S. No.	Variables	Group A	Group B	Þ-value
1	NPRS	7.92±1.222 (8.00)	7.56±1.003 (8.00)	>.212
2	FLEXION	103.20±10.512 (100.10)	110.00±13.919 (110.00)	<.079
3	ABDUCTION	86.20±10.924 (85.00)	96.48±7.995 (100.00)	<.000
4	INTERNAL ROTATION	21.20±22.835 (15.00)	39.20±35.901 (20.00)	<.053
5	EXTERNAL ROTATION	13.56±18.056 (8.00)	9.68±5.250 (10.00)	<.001

Table 3 shows the difference between Pre-assessment within Group A and B among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for all the variables except NPRS which was statistically insignificant.

Graph 3: Difference between Pre assessment of group A & group B



Graph 3 shows the difference between Pre-assessment within Group A and B among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for all the variables except NPRS which was statistically insignificant

.

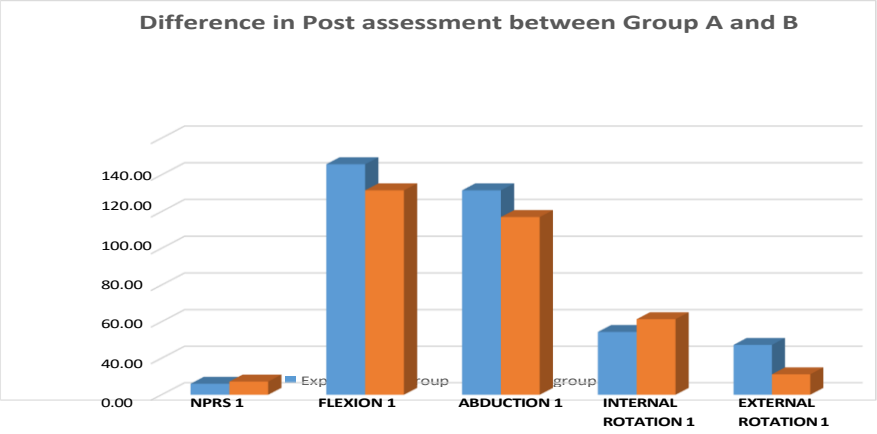
Journal of Chemical Health Risks
www.jchr.org
JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

Table 4: Difference between Post assessment of group A & group B

S. No.	Variables	Group A	Group B	Þ-value
1	NPRS	6.04±1.369 (6.00)	7.24±1.268 (7.00)	<.004
2	FLEXION	125.80±12.965 (130.00)	111.60±13.898 (110.00)	<.000
3	ABDUCTION	111.60±14.486 (110.00)	97.04±8.193 (100.00)	<.000
4	INTERNAL ROTATION	34.40±22.653 (25.00)	41.40±35.075 (20.00)	>.403
5	EXTERNAL ROTATION	27.32±20.379 (20.00)	11.20±6.557 (10.60)	<.000

Table 4 shows the difference between Post-assessment within Group A and B among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for all the variables except for Internal rotation which was statistically insignificant.

Graph 4: Difference between Post assessment of group A & group BGraph 4 shows the difference between Post-assessment within Group A and B among different variables which included NPRS and ROM (Flexion, Abduction, Internal Rotation and External Rotation). The p-value was statistically significant for all the variables except for Internal rotation which was statistically insignificant.



Conclusion:

This study was conducted to analyze immediate effects of first rib and AC joint primal reflex release technique in individuals with shoulder pain and mobility dysfunction. From the statistical results it can be concluded that primal reflex release technique when performed at first rib and AC joint does reflects an immediate effect to decrease pain and improve shoulder range of motions.

Discussion:

The current research was performed to analyze the immediate

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

effects of first rib and AC joint PRRT in individuals with shoulder pain and shoulder mobility dysfunction. As per our knowledge, only few studies have been performed in regional interdependence in relation with shoulder pain and decreased shoulder ROM. Our study investigates the immediate effect of PRRT in decrease in pain and increase in shoulder mobility whilst working on first rib and AC joint.

The analysis was done on 50 subjects including both males and females [2]. All the patients with shoulder pain and/or decreased shoulder ROM were assessed and checked. NPRS score and shoulder ROM were taken.

For the involvement of first rib, the mobility of first rib was tested and tenderness and/or spasm of the surrounding muscles by palpation was done and for the AC joint, springing motion was performed at the end range while shoulder being in horizontal adduction.

The subjects in experimental group (i.e. group A) were given PRRT for a single session whereas for control group (i.e. group B) conventional protocol were taught and explained.

Results of this study showed that the pain was reduced and ROM was improved in the experimental group which was statistically significant when compared to control group.

The present study is supported by Erica S. Albertin et al (2020) [1] who aimed to analyze the use of PRRT to improve signs and symptoms of hamstring strain. They suggested that PRRT is useful in decreasing pain and increasing function in patients with hamstring strain in short term.

The PRRT is a treatment paradigm theorized to decreased pain and muscle spasm by targeting, resting reflexes, and using reciprocal inhibition to "down regulate" the autonomic nervous system[1].

James May et al (2015) in a case series, the use of PRRT produced positive changes in terms of improvements in reported pain and dysfunction and a shorter time to resolution in comparison to traditional treatment methods for plantar fasciitis reported in literature [4].

Future research scope:

- The result of the present study should be confirmed on a large sample size.
- Follow ups can be added to find out carry over effects of the session.
- Repeated or multiple sessions could show much bigger results.

Limitations:

- The study group has small size
- The study did not include follow up

References:

[1] Albertin, E. S.; Walters, M.; May, J.; Baker, R. T.; Nasypany, A.; Cheatham, S. AN EXPLORATORY CASE SERIES ANALYSIS of the USE of PRIMAL REFLEX RELEASE TECHNIQUE™ to IMPROVE SIGNS and SYMPTOMS of HAMSTRING STRAIN. *International Journal of Sports Physical Therapy* 2020, *15* (2), 263–273. https://doi.org/10.26603/ijspt20200263.

[2] Tate, A. R.; McClure, P. W.; Young, I. A.; Salvatori, R.; Michener, L. A. Comprehensive Impairment-Based Exercise and Manual Therapy Intervention for Patients with Subacromial Impingement Syndrome: A Case Series. *Journal of Orthopaedic & Sports Physical Therapy* 2010, *40* (8), 474–493. https://doi.org/10.2519/jospt.2010.3223.

[3] Wainner, R. S.; Whitman, J. M.; Cleland, J. A.; Flynn, T. W. Regional Interdependence: A Musculoskeletal Examination Model Whose Time Has Come. *Journal of Orthopaedic & Sports Physical Therapy* 2007, *37* (11), 658–660. https://doi.org/10.2519/jospt.2007.0110.

[4] Hansberger, B. L.; Baker, R. T.; May, J.; Nasypany, A. A NOVEL APPROACH to TREATING PLANTAR FASCIITIS - EFFECTS of PRIMAL REFLEX RELEASE TECHNIQUE: A CASE SERIES. *PubMed* 2015, *10* (5), 690–699.

[5] Ho, C.-Y. C.; Sole, G.; Munn, J. The Effectiveness of Manual Therapy in the Management of Musculoskeletal Disorders of the Shoulder: A Systematic Review. *Manual Therapy* 2009, *14* (5), 463–474. https://doi.org/10.1016/j.math.2009.03.008.

[6] Azar Moezy; Saeed Sepehrifar; Masoud Solaymani Dodaran. The Effects of Scapular Stabilization Based Exercise Therapy on Pain, Posture, Flexibility and Shoulder Mobility in Patients with Shoulder Impingement Syndrome: A Controlled Randomized Clinical Trial. *PubMed* 2014, *28*, 87–87.

[7] Strunce, J. B.; Walker, M. J.; Boyles, R. E.; Young, B. A. The Immediate Effects of Thoracic Spine and Rib Manipulation on Subjects with Primary Complaints of Shoulder Pain. Journal of Manual & Manipulative Therapy 2009, 17 (4), 230–236. https://doi.org/10.1179/106698109791352102.

[8] Ludewig, P. M.; Braman, J. P. Shoulder Impingement:

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(3), 1907-1915 | ISSN:2251-6727

Biomechanical Considerations in Rehabilitation. *Manual Therapy* 2011, *16* (1), 33–39. https://doi.org/10.1016/j.math.2010.08.004.

[9] Ahmad, I.; Riaz, S.; Faiz, U.; Sulaman, M.; Zeeshan, M.; Manzoor, T. Effects of Mulligan's Mobilization with Movement on First Rib to Reduce Pain and Improve Cervical Rotation in Mechanical Neck Dysfunction. *Pakistan BioMedical Journal* 2021, *4* (2). https://doi.org/10.54393/pbmj.v4i2.99.

[10] Williamson, A.; Hoggart, B. Pain: A Review of Three Commonly Used Pain Rating Scales. *Journal of Clinical Nursing* 2005, *14* (7), 798–804. https://doi.org/10.1111/j.1365-2702.2005.01121.x. https://doi.org/10.1186/s41512-019-0061-x.

[11] Albertin, E. S.; Walters, M.; May, J.; Baker, R. T.; Nasypany, A.; Cheatham, S. AN EXPLORATORY CASE SERIES ANALYSIS of the USE of PRIMAL REFLEX RELEASE TECHNIQUE™ to IMPROVE SIGNS and SYMPTOMS of HAMSTRING STRAIN. *International journal of sports physical therapy* 2020, *15* (2), 263–273.