

CASE REPORT**Case Study: Successful Rehabilitation of a Torn Rotator Cuff through Physical Therapy for Positive Functional Recovery**MUHAMMADA MAHNOOR¹, MUHAMMAD WASEEM AKHTAR², QURATULAIN MAQSOOD³, MUHAMMAD MAHMOOD ALAM⁴, RABIYA NOOR⁵^{1,2,4}Department of Rehabilitation Sciences, Akhtar Saeed Medical and Dental College Lahore Pakistan,³Centre for Applied Molecular Biology, University of the Punjab, Lahore Pakistan,⁵Riphah college of Rehabilitation and Allied Health Sciences, Riphah International UniversityCorrespondence to Quratulain Maqsood, Email: qmacb160403473@gmail.com, Phone +923249475770**SUMMARY**

Older adults often suffer from shoulder pain. Rotator cuff problems are typically responsible for shoulder pain. The majority of rotator cuff disorders can be treated conservatively. Shoulder issues are rather common. More than 30% of people have shoulder pain at some time in their lives. Shoulder discomfort is one of the most frequent musculoskeletal problems in people over the age of 65. The rotator cuffs are four muscles that connect the top arm bone (humerus) to the upper shoulder blade (scapula). If the rotator cuff is injured, every motion on the affected shoulder, including flexion, extension, abduction, adduction, and internal and external rotation, may be difficult. Having a rotator cuff tear restricts movement of the shoulder, which makes it difficult for the patient to do everyday tasks such as getting dressed or washing their hair. They may also find it difficult to remove something from their back pockets. patient was completely immobile when injured. Treatment was provided for up to three months, and almost 30 rehabilitation sessions were conducted during this time. In each rehabilitation session, patients were treated with electrotherapeutic modalities, dry cupping, and manual therapy exercises. The rehabilitation session lasted up to an hour. After one month of rehabilitation, the shoulder pain was noticeably reduced and nearly gone. Following the treatment, she achieved the most improvement in her functional capacity. For instance, she is now able to put on clothes without any assistance. Now she can comb her hair on her own. It was proven that exercise treatment significantly reduced pain and improved function in individuals with fully ruptured or torn supraspinatus and infraspinatus tendons.

Keywords: Rotator cuff, full thickness tear, disability, surgery, shoulder pain, physical therapy.**INTRODUCTION**

Shoulder issues are rather common. More than 30% of people have shoulder pain at some time in their lives. Shoulder discomfort is one of the most frequent musculoskeletal problems among those over the age of 65. The rotator cuffs are a collection of four muscles that link the upper arm bone (humerus) to the top of the shoulder blade (scapula)¹. When the rotator cuff is torn, moving the afflicted shoulder in any direction, including flexion, extension, abduction, adduction, internal rotation, and external rotation, may be very difficult. Due to these mobility restrictions, a patient may find it difficult to do even simple everyday chores such as dressing, washing their hair, or reaching into their back pocket. Einsteinier upload of, even if the rotator cuff muscles are damaged, symptoms may not manifest themselves for many weeks. In this case, the suffering may last for many weeks before appearing as physical signs. When the rotator cuff is injured, it is unable to stabilise the humerus properly. Doing everyday duties (ADLs) may be difficult due to the discomfort and weakness². When the rotator cuff is injured, it can no longer do its job of stabilizing the humerus. It may be difficult to carry out regular activities due to the discomfort and weakness (ADLs). supraspinatus (which is one of the rotator cuff muscle) located under the acromion process of scapula so because of its anatomical location it is on high risk to get injured. So comparatively with other rotator cuff muscles supraspinatus tear is reported most frequently³. In first instance, there are two types of rotator cuff injuries: partial and full-thickness tears. Depending on the location and size of the tear, there are a variety of treatment options⁴. Tables 1 & 2 depict a partial thickness rotator cuff tear and a complete thickness rotator cuff tear, respectively. Third, full-thick tears are classified according to diameter.

Partial Thickness Tears		Table 2. Classification of Full Thickness Tears	
Grade 1	<3 mm deep	Small	<1 cm
Grade 2	3-6 mm deep	Medium	1-3 cm
Grade 3	>6 mm deep	Large	3-5 cm
		Massive	>5 cm

It is common to experience shoulder pain due to the rotator cuff injury, pain due to the rotator cuff tear is persistent and recurrent; 54% of patients who were suffering from rotator cuff tear report continued symptoms after 3 years of injury. Most shoulder pain and symptoms are caused by the rotator cuff and the subacromial bursa. The most concerning aspect of shoulder illness is its association with severe functional disability and morbidity⁵ if comes to non-operative treatments for subacromial shoulder discomfort or for rotator cuff tear it may include exercise therapy, nonsteroidal anti-inflammatory medications (NSAIDs), electrotherapy, corticosteroid injections, and various treatments for rotator cuff injury and shoulder pain⁶. Several well-designed randomized controlled trials have suggested that exercise could help in the treatment of rotator cuff tears⁷.

Conservative treatments are very beneficial to treat the rotator cuff injury it is observed in different research that if patient's is treated with physical therapy rehabilitation treatments protocols they are respond magnificently to the treatment and gain there almost all pain free ROM, s or range of motions and should be able to perform all task after treatment which was near to impossible before treatment. Conservative or non-surgical, treatment methods can include rest, activity moderation, Physical therapy, nonsteroidal anti-inflammatory drugs (NSAIDs), electro therapy, and steroid injections are treatment options⁸. These conservative methods are intended to minimize discomfort and enhance function. We are able to treat rotator cuff tear through conservative treatment by Using range-of-motion exercises, strengthening the scapulothoracic muscles, and treating pain with therapeutic modalities are examples of conservative treatment⁹. If conservative treatment fails to relieve your symptoms, surgery may be recommended. If the symptoms have remained for an extended length of time, there is severe weakening or loss of function, or the symptoms have persisted for an extended period of time, surgery may be indicated.

CASE REPORT

A 65-year-old woman was experiencing severe pain during performing the heavy task like lugging a heavy object and even during performing simple task by her effected shoulder, at that time when patients was trying to perform any movement task like comb

Received on 09-11-2022

Accepted on 19-04-2023

hairs or wearing clothes which involves her effected shoulder during movement her right shoulder was in great discomfort because of pain due to injury. The patient's medical history was reviewed. She was involved in an automobile accident 20 years ago (RTA). As a result of the RTA accident, she suffered a fracture on the middle shaft of her humerus¹⁰. She then had surgery to replace a tendon in her finger and wrist extensors. Her condition was entirely cured after all of these procedures, and she was able to live a normal, active life. Her most recent tear began when she heard what sounded like a pop coming from her shoulder one day while brushing her hair. We used a visual analogue scale to assess the patient's discomfort and pain after the incident, and she reported significant pain in her right shoulder. Participants rated or scored their pain (VAS = 9/10), indicating that they were in a lot of agony as a result of their injuries, which had severely impeded their ability to go about their daily lives. Main scale which is used to evaluate the patient throughout the study either to evaluate per status of patient or post treatment status of patient is SPADI. At the time of the injury, when we evaluate the patient through SPADI for check or score shoulder disability, after the evaluation of patient on SPADI patient score was 120/130, or 93%, which means patient was on her maximum disability. Using a goniometer, the right shoulder painfully and jerkily moved 30 degrees away from the body and 50 degrees forward. Internal rotation rendered goniometer readings unappealing. Because of the muscle injury, there was almost no lateral rotation, and elbow flexion was jerky and weak. During the evaluation of this patient's posture, the thoracic spines were kyphotic, with a forward head position, right-side winging of the scapula, and tension in the upper trapezius and levator scapulae muscles. The MRI revealed a complete supraspinatus rupture, an infraspinatus tear, a degenerative tear of the superior labrum, biceps tendon displacement from the bicipital groove, and moderate acromioclavicular joint arthropathy.

Treatment: Patient was treated by the combination of different physical therapy treatment protocols including electrotherapy in which we use different kind of therapeutic modalities like therapeutic ultrasound and tens for reducing the pain along with manual therapy techniques like strength and endurance training and dry cupping, treatment include dry cupping treatment method along all above mentioned electrotherapy and manual therapy techniques this is quite unique idea for treatment of rotator cuff tear which is included in treatment protocol and the outcomes after using dry cupping was very satisfactory treatment should be start with modalities first part was began with Electrotherapy treatment session, by apply intermittent Ultrasound for 10 minutes on patient effected shoulder, after the interpreted ultrasound therapy we apply TENS for 10 minutes on right shoulder and in last dry cupping therapy for 10 minutes on effected shoulder we apply all these treatment protocols for pain management after pain management. We start exercise therapy program was under the supervision of senior physical therapist we were started exercise program with ROM exercises including active assisted and passive ROMS to maintain Range of motion (ROM) and prevent possible secondary complication of frozen shoulder. During the first month of therapy, we began with supervised passive and active-assisted exercises three times per week on patients with afflicted right shoulders. We train the patient and patients' family as well for home plans which include different exercises for patient which patient have to perform at home, we guide the patient and his family that how to do exercises at home daily. The patient was extremely cooperative and performed her exercises with pinpoint accuracy throughout the three months of treatment. The patient saw two orthopedic surgeons during the first few weeks of the exercise regimen, and both recommended rotator cuff tendon surgery. Due to her concerns like patient's fear regards surgical procedure, she decided to take part in a 6-month training program in case if her conservative treatment flops then she may considers or undergoes through surgical procedure.

Throughout the first three days of training, only ten minutes of cupping therapy were administered. We apply interrupted

ultrasound for ten minutes and TENS for 10 minutes. This therapy was given for a month, coupled with passive and active assistance. A number of ROM exercises was performed, including forward flexion, internal rotation, and external rotation. Also conducted during this period were pendular exercises, pulley workouts, isometric shoulder exercises, back extensions, and shrugging motions¹². Five times a day, all these exercises were performed. Stretching exercises were done twice a day for the trapezius, inferior capsule, and posterior capsule. Each repetition consisted of 20 repetitions. When the patient had difficulty performing the exercises, the necessary advice was given.

After achieving full passive range of motion in the afflicted shoulder and reducing pain, the second phase of therapy began with rotator cuff strength training¹³. As part of the treatment, cupping, ultrasonography with breaks for 10 minutes, and active assisted movements were all used. These protocols were followed for four weeks with the inclusion of additional exercises such as shoulder flexion, extension, abduction, range-of-motion activities, and external rotation exercises. Eccentric exercises for the biceps, scapular mobilizers, and scapular stabilisers. Each exercise was performed twenty times. We cease utilising the modalities after two months of treatment since the discomfort is under control, and we continue eccentric shoulder, shoulder girdle, and biceps strengthening activities. Concentric exercises were also included in the therapy programme at this time. In the third month of therapy, functional activities such as wall pushups with medicine balls, and other exercises were performed daily as three sets of 20 repetitions. Within the next few months, the level of strength training for the cuff gradually increased to three sets of 20 repetitions, and the abduction angles were increased. Exercises with a medicine ball included push-ups and quadrupled exercises. At the end of three months of exercise, treatment or rehabilitation processes resulted in the patient being able to accomplish all of her daily tasks without facing any difficulty and without any kind of assistance. The patient's pain was reduced considerably at the conclusion of the three-month exercise program. At the time of her accident, she had a SPADI score of 120/130. Despite this, she had a SPADI score of 49/130 after our therapy. This is a significant step forward. After a short period of time, we witnessed a 61 percent improvement in shoulder functionality and pain. An MRI of the shoulder after three months of therapy showed no difference between the before and after images. Once the patient completed the training, she resumed all of her regular activities.

RESULTS

Despite the variations in para-clinical data, the results show a very good reduction in shoulder pain and impairment. The MRI of the shoulder remains unchanged before and after conservative treatment but there is huge recovery is seen in the functional disability of the shoulder. According to the Researchers, conservative treatment has a good impact on shoulder discomfort and rehabilitation processes not only improves shoulder discomfort and pain but also improves or gain full range of motion which was restricted because of injury. before and after treatment results, which are measured through SPADI mentioned below.

Before the treatment: Even though the paraclinical data has changed, the results of our study show a very nice improvement in shoulder pain and function. The Shoulder Discomfort and Disability Index was used to measure patients' shoulder pain and improvement outcomes, and the results show that conservative therapy is effective (SPADI). The following information depicts the results prior to treatment. When we assessed the patient's suffering during the sale, it was at its peak. Her account of her pain received an 8 out of 10. She couldn't lie on the afflicted side, but when she did, she rated it an 8 out of 10. She gave us a 9/10 and expressed great difficulty when we asked her to carry items from a height. She received an 8/10 on the SPADI despite finding it difficult to touch the back of her neck and push the wall on the affected arm due to soreness and muscular weakness. With one

damaged arm, she was unable to wash her hair, apply her own cosmetics, or handle some heavy things. She was also unable to pull anything from her back pocket or put on her undershirt and sweater on her own when we asked her to. When the accident happened, she was absolutely unable to undertake any of these responsibilities with the wounded arm; in other words, she couldn't do any of them on her own. At the time of the occurrence, she had a disability score of 120/130 (93.2%) on the SPADI, reflecting 10/10 complete agony.

Fig.1: The SPADI score summary illustrates the per-treatment condition.



After physical therapy: Even though the non-clinical results were different, the data showed a very good decrease in shoulder pain and disability. The study's findings support the effects of conservative treatment. The (SPADI) is used to measure patients' shoulder pain and progress. We found the following results after physical therapy.

Even though the shoulder on the affected side hasn't changed in the way it looks, the patients' functional status has improved a lot. She couldn't lay on her wounded side before because of the wound, but she can now. Figure 2 shows her score of 4/10 for this question. The pain has significantly decreased. It had been almost impossible for her to reach the shelf before our treatment. She can dress herself, put on her own clothes, wash and comb her hair, and push anything with the arm that is involved. She can also take numerous objects from her back pocket. She can now do a number of tasks that were before difficult for her. The patient's suffering had been greatly lessened by the conclusion of the three-month exercise plan. At the time of her accident, she had a SPADI score of 120/130. Despite this, she had a SPADI score of 49/130 after our therapy. This is a significant step forward. After a short period of time, we witnessed a 61 percent improvement in shoulder functionality and pain.

Fig. 2: The SPADI score summary illustrates the progress in patients after physical therapy treatment.



DISCUSSION

It is evident that the results of physical therapy treatment imply a very satisfactory improvement in a patients of rotator cuff tear there is massive improvement shown in patients shoulder pain and incapacity due to the treatment pain ROM is increase massively patient should be able to initiate any kind of movement without pain. Despite changes in para-clinical outcomes patients MRI results are remains unchanged. Even with these results, conservative treatment is still a good way to treat full-thickness tears in the rotator cuff. Based on what has been learned in the past, it seems that exercise may help a complete rotator cuff lesion heal. The majority of studies have underlined the need for more studies to back up the conclusions¹⁵.

It is shown that when different studies compare physical therapy and surgical treatment results for rotator cuff tear After 1-5 months, and some studies compare results even after 2 years of treatments, that similar results were documented or recorded with both kinds of treatment weather patients were treated with physical therapy treatment or goes through the surgical procedure both treatment shows nearly same results infect patients whose are treated with physical therapy treatment shows more positive results then surgery.it is documented in different authentic studies that by Using of conservative therapeutic approaches, for treatment of rotator cuff tear the effectiveness rate of treatment varies between 33 and 92%¹⁶.

After six months of supportive treatment like exercises, nonsteroidal anti-inflammatory drugs (NSAIDs), and physical therapy, 55% of patients got better and 45 percent got better. After a one- to three-year period following therapy, the researchers looked at subjective and objective improvements in pain and function¹⁷. In our case, the patient was checked three months after he started physical therapy¹⁸. By that time, he had stopped complaining about shoulder pain. Minutes of cupping, a brief ultrasonic rest, and then intensive activities with support performed on the producing side¹⁹.

To investigate the long-term consequences of conservative therapy it is recommended that the patient be followed for two years following therapy. Both the patient's flat and the treatment center were within walking distance²⁰. She was quite helpful, and since she was retired, she was able to attend all therapy and monitoring appointments. As a result of her treatment, we can conclude that the patient's familiarity with and history of exercise, as well as his rigorous execution of learned patterns, were quite beneficial. According to the therapist, one of the most important aspects of exercise therapy is the patient's participation in the proper execution of the exercises²¹.

CONCLUSION

The results of the next study show that patients who are treated with conservative methods often get better quickly. Anti-inflammatory medicines, changes in physical activity, workouts, strengthening exercises, and/or cortisone injections are all non-invasive ways to treat this condition. Two to three sessions each week for up to twelve weeks are normal. The case study demonstrated that the patient's rehabilitation objectives were fulfilled. The patient was completely incapacitated when the accident happened. At the time of her accident, she had a SPADI score of 120/130. Despite this, she had a SPADI score of 49/130 after our therapy. This is a significant step forward. We were able to improve her shoulder dysfunction by up to 61 percent in just three months of physical treatment. The study strongly recommends avoiding surgery as the first-line treatment for those with a completely torn rotator cuff and a full-thickness tear of the supraspinatus and infraspinatus or a rotator cuff tear since it is non-invasive and has a lower cost effect.

Acknowledgement: We really thank to Dr. Aleena Sumrin to help us in formatting of article.

Disclaimer: This article is not submitted or under consideration in any other journal for publication.

Conflict of interest: All authors have no conflict of interest.

Funding disclosure: No funding agency or institute supports us.

REFERENCE

- Baverel L, Boutsidiadis A, Reynolds RJ, Saffarini M, Barthélémy R, Barth J. Do corticosteroid injections compromise rotator cuff tendon healing after arthroscopic repair? JSES open access. 2018;2(1):54-9.
- Benson B. Physical Therapy Rehabilitation of Arthroscopic Rotator Cuff Repair: A Case Study. 2018.
- Brindisino F, Salomon M, Giagio S, Pastore C, Innocenti T. Rotator cuff repair versus nonoperative treatment: a systematic review with meta-analysis. Journal of Shoulder and Elbow Surgery. 2021.
- Carver TJ, Kraeutler MJ, Smith JR, Bravman JT, McCarty EC. Nonarthroplasty surgical treatment options for massive, irreparable rotator cuff tears. Orthopaedic journal of sports medicine. 2018;6(11):2325967118805385.
- Centeno C, Fausel Z, Stemper I, Azuik U, Dodson E. A randomized controlled trial of the treatment of rotator cuff tears with bone marrow concentrate and platelet products compared to exercise therapy: A midterm analysis. Stem cells international. 2020;2020.
- Chebbi P. Functional outcome of non-operative management in chronic supraspinatus tear among geriatric population: A prospective study. International Journal of Orthopaedics. 2020;6(2):416-9.
- Gallo RA. Conservative care or surgery for rotator cuff tears? THE JOURNAL OF FAMILY PRACTICE. 2020;69(2).
- Garibaldi R, Altomare D, Sconza C, Kon E, Castagna A, Marcacci M, et al. Conservative management vs. surgical repair in degenerative rotator cuff tears: a systematic review and meta-analysis. European Review for Medical and Pharmacological Sciences. 2021;25(2):609-19.
- GUO A, MA L. Progress in diagnosis and treatment of massive rotator cuff tears. International Journal of Surgery. 2020:437-40.
- He J, Ping S, Yu F, Yuan X, Wang J, Qi J. Mesenchymal stem cell-derived exosomes: therapeutic implications for rotator cuff injury. Regenerative Medicine. 2021;16(08):803-15.
- Jeanfavre M, Husted S, Leff G. Exercise therapy in the non-operative treatment of full-thickness rotator cuff tears: a systematic review. International journal of sports physical therapy. 2018;13(3):335.
- Kennedy NI, Sanchez G, Mannava S, Ferrari MB, Frangiamore SJ, Provencher MT. Arthroscopic rotator cuff repair with mini-open subpectoral biceps tenodesis. Arthroscopy techniques. 2017;6(5):e1667-e74.
- Longo UG, Rizzello G, Petrillo S, Loppini M, Maffulli N, Denaro V. Conservative rehabilitation provides superior clinical results compared to early aggressive rehabilitation for rotator cuff repair: A retrospective comparative study. Medicina. 2019;55(8):402.
- Mannava S, Samborski SA, Kenney RJ, Maloney MD, Voloshin I. Options for failed rotator cuff repair. Sports medicine and arthroscopy review. 2018;26(3):134-8.
- Moriyama T, Kida Y, Furukawa R, Sukenari T, Kabuto Y, Kurokawa M, et al. Therapeutic outcomes of muscular advancement by an arthroscopic-assisted modified DeBeyre-Patte procedure for irreparable large and massive rotator cuff tears. Journal of Orthopaedic Science. 2018;23(3):495-503.
- Piekaar R, Bouman I, van Kampen P, van Eijk F, Huijsmans P. Early promising outcome following arthroscopic implantation of the subacromial balloon spacer for treating massive rotator cuff tear. Musculoskeletal surgery. 2018;102(3):247-55.
- Piper CC, Hughes AJ, Ma Y, Wang H, Neviasser AS. Operative versus nonoperative treatment for the management of full-thickness rotator cuff tears: a systematic review and meta-analysis. Journal of shoulder and elbow surgery. 2018;27(3):572-6.
- Ranebo MC, Hallgren HCB, Holmgren T, Adolfsson LE. Surgery and physiotherapy were both successful in the treatment of small, acute, traumatic rotator cuff tears: a prospective randomized trial. Journal of shoulder and elbow surgery. 2020;29(3):459-70.
- Sekiguchi T, Hamada J, Hagiwara Y, Ando A, Watanabe T, Yamaguchi M, et al. Prognostic Factors for Conservative Treatments of Atraumatic Rotator Cuff Tears. The Open Orthopaedics Journal. 2019;13(1).
- Vogler T, Andreou D, Gosheger G, Kurpiers N, Velms C, Ameziane Y, et al. Long-term outcome of arthroscopic debridement of massive irreparable rotator cuff tears. PloS one. 2020;15(11):e0241277.
- Yoo JC, Lim TK, Kim DH, Koh K-H. Comparison between the patients with surgery and without surgery after recommendation of surgical repair for symptomatic rotator cuff tear. Journal of Orthopaedic Science. 2018;23(1):64-9.