

# Optimising Physiotherapy Management of Rotator Cuff Related Shoulder Pain: A Case Study

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**Abstract:** ***Background and Purpose:** More than 70% of patients undergo tests for the rotator cuff - related shoulder pain (RCRSP). Symptomatic partial and full thickness, rotator cuff tendinopathy, subacromial discomfort, and impingement syndrome are a few of the shoulder conditions that are included in the general category of RCRSP. This study was done to know how evidence based practice will cut down the rehabilitation time if patient approaches to physiotherapy department appropriately. **Case Description:** A patient in her 60s came to the physiotherapy department with the chief complaint of sudden pain and unable to move her left shoulder with no strength, which was impeding her activity of daily living. Before she came to physiotherapy department, she consulted an orthopedic doctor, and was suspected to be a case of brachial neuritis, the doctor advised for investigation, where an MRI of the shoulder showed mild joint effusion associated with synovial thickening, moderate to severe AC joint arthrosis, and supraspinatus tendon showed mild tendinosis with interstitial tears but the rotator cuff configuration signal was within normal limits. The consultant doctor advised physiotherapy. While she was examined in physiotherapy department, the patient had no active range in the left shoulder with no strength and motor control in shoulder muscles. Pain on NPRS was 7 on movement in the left shoulder. However, the diagnosis was complex as the patient's presenting signs made it difficult to diagnose without investigations. In investigation reports correlation was more towards age related degenerative changes. A clinical prediction rule was used where the score was 5/5 which suggested a partial or large rotator cuff tear along with a drop arm test positive. The treatment program was framed using clinical practice guidelines. Outcomes were evaluated with NPRS, Active ROM, and strength with a hand - held dynamometer on day 1 and day 30 with regular follow - ups with the consultant doctor. **Outcome:** NPRS, Handheld dynamometer – fitmust. **Discussion:** A case study of Rotator cuff related shoulder pain where the patient presentation and reports were not merely matching, Evidence - based physical therapy management in rehab program made her regain her functional activities within a span of 30 days and did not required any surgery as mentioned by the surgeon. More than 70% of patients experiencing shoulder pain undergo testing for shoulder pain related to the rotator cuff (RCRSP). using the clinical prediction rules and clinical practice guidelines the diagnosis and treatment protocol was tailored made.*

**Keywords:** rotator cuff - related shoulder pain, RCRSP, rotator cuff disorders

## 1. Introduction

One of the most prevalent musculoskeletal complaints is shoulder discomfort, which affects 15% to 30% of people on average at any given moment. Moreover, over 70% of patients with shoulder discomfort have an evaluation for rotator cuff - related shoulder pain (RCRSP). Subacromial pain, (impingement) syndrome, rotator cuff tendinopathy, and symptomatic partial and full thickness are among the various shoulder diseases that fall under the broad term RCRSP. Experts have suggested that because it is still nearly impossible to pinpoint a specific structure as the major cause of a patient's shoulder discomfort, the name RCRSP is more relevant than more traditional diagnoses that were associated with pathoanatomic and structural disorders.1

One of the main reasons of chronic RCRSP has been proposed to be a dynamic constriction of the subacromial space with compression of the subacromial soft tissues, but RCRSP is probably complex. Shoulder neuromuscular control is affected by an inability of the rotator cuff and scapulothoracic muscles to coordinate, which could account for the constriction (measured by the acromiohumeral distance - AHD) and restricted shoulder range of motion observed in the population.2

The subscapularis tendon, the supraspinatus, the infraspinatus, and the teres minor muscles form the shoulder's rotator cuff (RC). A significant portion of the population, especially the elderly, suffers from rotator cuff disease. Patients may have diminished function and crippling discomfort. There is still much to learn about the molecular pathophysiology and natural history of cuff disease. Intrinsic and extrinsic tendon mechanics have been studied and discussed historically. In degenerative illness and pain, failure of cuff homeostasis is a process involving several different biomolecules.3

Despite the description of the nociception histology and molecular pathway, the reason for the wide range of pain experiences across patients with the same macroscopic tendon disease remains unclear. RC tendinopathy and tear have been associated with inflammatory and angiogenic cytokines because the inflammatory process in these tissues is regulated by interleukins upstream. Because matrix metalloproteinases (MMPs) can break down extracellular matrix proteins and increase the release of cytokines and chemokines, they may also be connected to inflammation and tendon deterioration.3

The complicated illness known as metabolic syndrome (MetS) has a high mortality rate and expense to society. It is a collection of interrelated physiological, biochemical, and

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clinical variables linked to the risk of type II diabetes mellitus (DM) and cardiovascular disease (CVD). MetS has been linked to all - cause mortality, cancer, depression, and health - related quality of life. The five main components of MetS are higher fasting glucose, low high - density lipoprotein cholesterol (HDL - C), elevated triglycerides, hypertension, and central obesity. This appearance is a symptom of systemic inflammation, oxidative stress, and underlying cellular malfunction. This review shows there is low - to - moderate quality evidence points to a connection between MetS and RCRSP.4

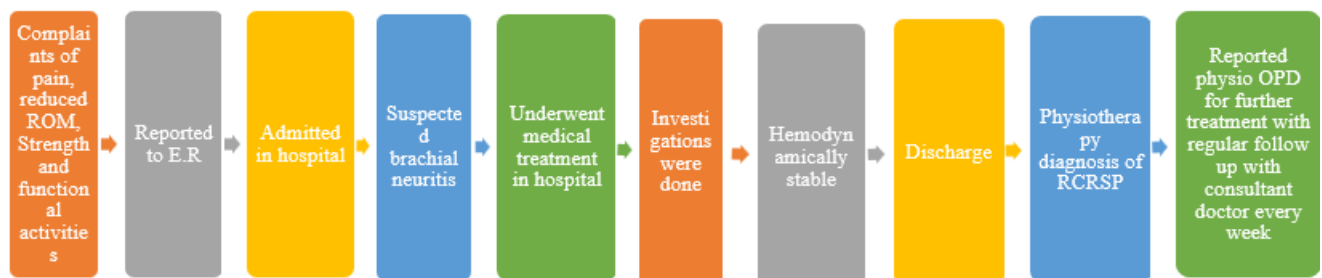
Strengthening, stretching and mobility exercises for the shoulder, thoracic, and cervical spines are all part of the conservative care of RCRSP. With multiple systematic studies demonstrating the statistical and clinical superiority of exercise interventions for reducing pain and improving function, exercise is regarded as the cornerstone of the management of shoulder disease.1 Evidence - based protocol has been incorporated in the patient rehab protocol and the outcome like pain score, Muscle strength and functional outcome in the treatment of RCRSP.

## 2. Background

The case suspected to be brachial neuritis which had similar presentations of rotator cuff tear remained a challenge in the

initial diagnosis during her visit to orthopaedic doctor. The patient had reported to physiotherapy out - patient department after a week of diagnosis of hospital care in In - Patient. The possibility of the neural symptoms disappearing could be possible. However, the physiotherapy diagnosis was made using the clinical predictions rule and special tests like the drop arm test, which was positive and the possibility of the case being considered rotator cuff - related pain was high. With older age, stress, and environmental factors the occurrence of rotator cuff - related shoulder pain has been a common issue in recent times.

Case history of a patient presenting with sudden complaint of pain and no active range of motion along with no muscle strength in the left shoulder. On investigation, MRI showed interstitial tears of supraspinatus, synovial thickening, and AC joint arthrosis with normal configuration of rotator cuff muscle. The aim was to undergo conservative treatment to avoid surgery and the treatment protocol was based on clinical practice guidelines which is the highest level of evidence in the clinical field. In most of the cases, we see patients getting operated and undergoing post - operative rehabilitation. Now it was a challenge in such a patient who had no active range of motion and strength in her left shoulder with a sudden onset. Hence the use of highest evidence was used i. e., clinical practice guidelines which are formed by systematic review and meta - analysis



Schematic Presentation of History of Present Illness

## 3. Case Presentation

A female in her 60s came to the physiotherapy department with the chief complaint of pain in her left shoulder, unable to move it actively, and unable to perform activities of daily life like combing her hair, bathing, cooking, and dressing.

The patient was alright one day back and after waking up from sleep she could not move her shoulder actively. She was immediately rushed to the hospital and was admitted for a day. The doctor suspected the case of brachial neuritis, during the hospital stay all the relevant investigations were done along with treatment with Intravenous (I. V) fluids, I. V analgesics, I. V PPI, and other supportive care given. When the patient was claimed to be hemodynamically stable discharge was advised along with continuation of physiotherapy treatment. She reported to the physiotherapy department post 5 days of hospital stay.

The patient had a history of peri - arthritis of the right shoulder 5 years back which was treated with physiotherapy management and is not a known case of diabetes mellitus or hypertension. She did not undergo any surgical procedures and had any history of trauma in her past.

While assessing with the biopsychosocial model of pain, the patient acknowledged the death of her close one and was upset regarding it. On interviewing it, she stated her issue started immediately after that incident. With this we can state that fear, anxiety, and stress can flare up symptoms and emotional imbalances leading to functional disability due to which she was socially inactive for days.

On pain assessment, the pain was diffused at the shoulder joint line anterior and superior with sudden onset, the nature was dull aching with intermittent type, night pain was predominant - NPRS rating the pain was 7 on first day of assessment, irritability was severe, aggravating while trying to lift arm - flexion and abduction, relieving was with rest in supine and with analgesics.

On a general observation, built was mesomorphic, the left shoulder was hiked and on local observation swelling and muscle wasting were not noted. On palpation, tenderness was absent over the pectoralis and subscapularis region and was present over trapezius grade 2. Sensory evaluation was intact where the dermatomes were assessed.

With examination - Range of motion

Shoulder joint	Rt active	Rt passive	Left active	Left passive
Flexion	0 - 180°	0 - 180°	0°	0 - 180°
Extension	0 - 45°	0 - 45°	0 - 20°	0 - 45°
Abduction	0 - 180°	0 - 180°	0°	0 - 180°
Adduction	180 - 0°	180 - 0°	0°	180 - 0°
External rotation	0 - 70°	0 - 75°	0 - 40°	0 - 70°
Internal rotation	0 - 70°	0 - 75°	0 - 50°	0 - 70°
Elbow flexion	0 - 125°	0 - 125°	0 - 90°	0 - 125°
Elbow extension	125 - 0°	125 - 0°	90 - 0°	125 - 0°

An empty end field was noted in the left shoulder during the passive range of motion

**Resisted Isometrics**

- Left shoulder – flexors, extensors, abductors, and rotators were weak and painful
- Right shoulder - flexors, extensors, abductors, and rotators were strong and painless
- Left elbow – flexors and extensors were weak and painful
- Right elbow – flexors and extensors were strong and painless

**Deep Tendon Reflexes**

	Right	Left
Biceps	++	++
Triceps	++	++
Brachioradialis	++	++

Functional assessment using SPADI was done and disability was rated to be 83.8%

With 30 days of follow - up with prescribed exercises mentioned in treatment protocol.

**4. Investigations**

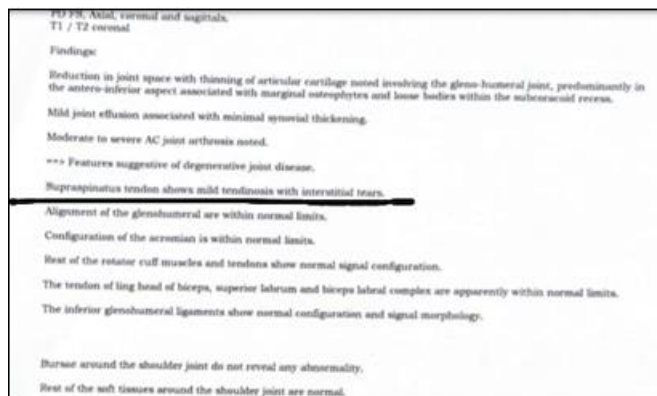
- MRI Screening of Cervical Spine Findings reverse cervical lordosis, diffuse disc bulge at C2 - C7, posterior disc osteophyte complex C3/C4 level
- MRI shoulder – 3 TESLA MR IMAGING, 3T TECHNIQUE FINDINGS

Reduction in joint space with thinning of articular cartilage was noted involving the glenohumeral joint, predominantly in the antero - inferior aspect associated with marginal osteophytes and loose bodies in sub - coracoid recess.

Mild joint effusion associated with minimal synovial thickening

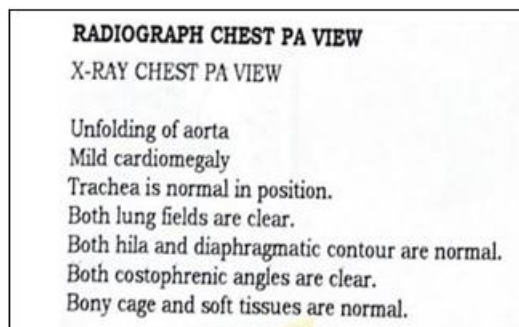
Moderate to severe AC joint arthrosis noted

Supraspinatus tendon shows mild tendinosis with interstitial tears



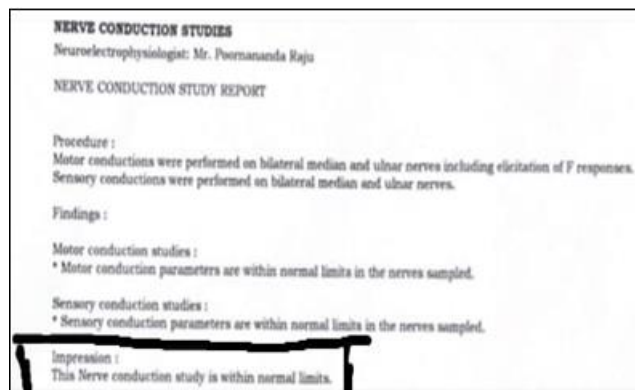
**Radiograph chest PA view**

Unfolding of aorta, mild cardiomegaly,



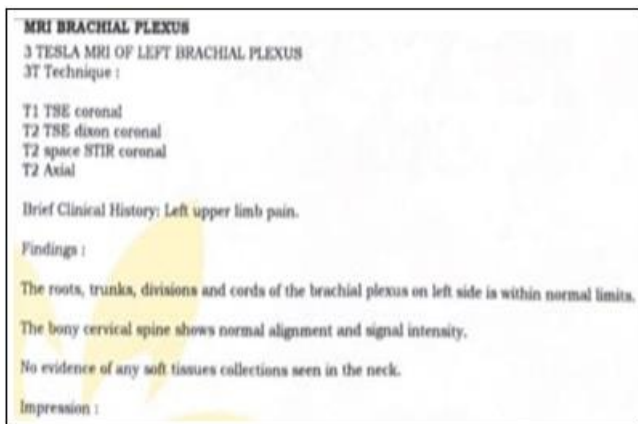
**NCV**

Motor and sensory conduction studies within normal limits



**MRI brachial plexus**

The roots, trunks divisions, and cords of the brachial plexus on the left side are within normal limits, the bony cervical spine shows normal alignment and signal intensity, and no evidence of any soft tissue collections is seen in the neck



**MRI Brain**

No significant abnormality was noted in the evaluated brain parenchyma

**Differential Diagnosis**

- 1) Brachial neuritis
- 2) Cervical radiculopathy

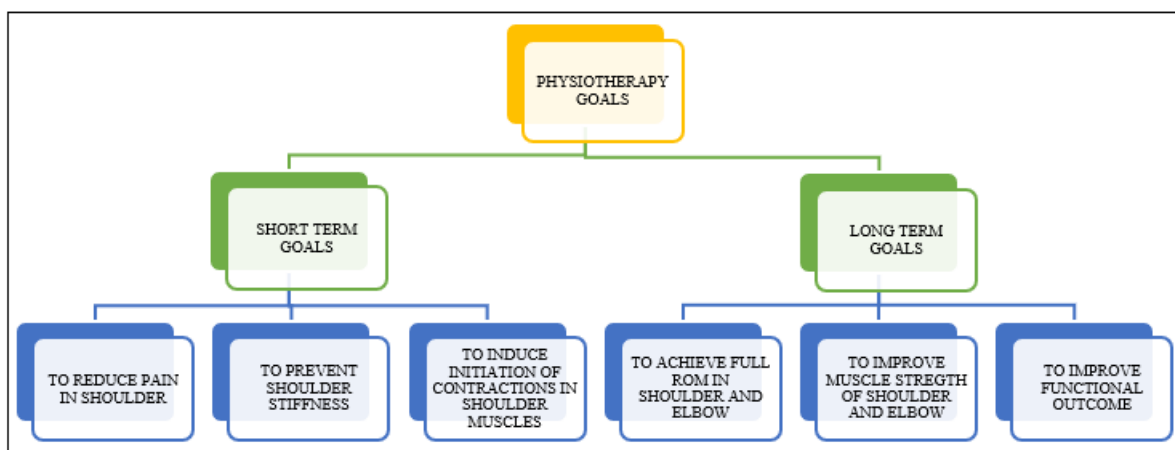
- 3) Glenohumeral instability
- 4) Osteoarthritis
- 5) Inflammatory arthritis
- 6) Referred pain
- 7) Adhesive capsulitis

**Special Tests**

- 1) Drop arm test - positive sensitivity – 73%, specificity 77%<sup>7</sup>
- 2) Internal rotation strength was more than external rotation IR>ER, denotes absence of intraarticular pathology, sensitivity – 88%, specificity 96%
- 3) Clinical Prediction Rules – variables of rotator cuff tears– 5/5 - (+ve LR - 9.8)
  - a) Weakness on external rotation - 2 points
  - b) Age >65 – 2 points
  - c) Presence of night pain - 1 point.8

**Physiotherapy Treatment**

**Goals of the treatment**



Flow Chart of Goals of Physiotherapy Treatment

**Physiotherapy Treatment Protocol**

	PASSIVE TREATMENT	ACTIVE TREATMENT
Day 1 - 7	NMES to rotator cuff + CRYOTHERAPY	Isometrics to shoulders muscles with physio fit ball, slow sustained controlled movement with light resistance theraband - eccentric loading - flexors, abductors at 90 degrees hold, neck stretching exercises
Day 7 - 14	NMES	Medium resistance band eccentric load, proprioceptive exercise at varying angles Scapular muscle strengthening exercises
DAY 15 - 20	NMES	High resistance band eccentric load to shoulder, proprioceptive training varying angles, biceps strengthening with dumbbells, humeral head depression exercises, scapular muscle strengthening exercises
DAY 20 - 30	NMES	Resistance training for overhead activities, slow sustained controlled eccentric loading exercises, biceps strengthening scapular strengthening exercises and humeral head depression exercises

NMES was given for 15 minutes and ultrasound for 6 minutes, 10 reps in 2 sets of exercises with rest intervals in between and when the pain was aggravated was given

**Outcome and Follow - Up**

**Pain Scale Evaluation on Day 1 and Day 30**

Outcome	DAY 1	DAY 30
NPRS	7	0

**Range of Motion Evaluation on Day 30**

ROM	Rt ACTIVE	Lt ACTIVE
Shoulder flexion	0 - 180°	0 - 180°
Extension	0 - 45°	0 - 45°
Abduction	0 - 180°	0 - 180°
Adduction	180 - 0°	180 - 0°
External rotation	0 - 70°	0 - 70°
Internal rotation	0 - 75°	0 - 75°
Elbow flexion	0 - 125°	0 - 125°
Elbow extension	125 - 0°	125 - 0°

### Muscle Strength of Using Hand - Held Dynamometer on Day 30 (Left)

MUSCLES	Pre Test	Post Test
Shoulder flexors	-	2.5kg
Shoulder extensors	0.8KG	2.2 kg
Shoulder abductors	-	2.4kg
Shoulder adductors	0.5 Kg	2.5kg
Shoulder external rotators	0.7 Kg	2.1kg
Shoulder internal rotators	1 Kg	2.3kg

The patient had a follow - up of 30 days with weekly follow - ups with the orthopedic doctor, in initial phase shoulder flexors and abductors testing was difficult to perform with hand - held dynamometer.

### SPADI – Shoulder Pain and Disability Index

DAY 1	83.8 %
DAY 15	56.2%
DAY 30	13.1%

## 5. Discussion

In this case study, a 60's female underwent aggressive physiotherapy rehabilitation for rotator cuff - related shoulder pain in the OPD department for 30 days, initially, she was diagnosed with brachial neuritis and when an MRI and NCV were obtained it showed normal reports. When assessment was done using clinical prediction rules, Clinical Prediction Rules – variables of rotator cuff tears– 5/5 - (+ve LR - 9.8), Weakness on external rotation - 2 points, Age >65 – 2 points, presence of night pain - 1 point and Drop arm test – positive. Hence diagnosed to be Rotator - related shoulder pain. Pre and post - test assessment using NPRS, muscle strength using a handheld dynamometer, functional outcome using SPADI - (shoulder pain and disability index) and range was also checked.

In the rehabilitation of Rotator cuff related disorders, general tendinopathy management concepts such as education, controlled unloading and reloading are helpful. The range of clinical manifestations associated with Rotator Cuff Related Disorder calls for person - centered, individualized therapy. Rehabilitation should promote self - efficacy, hence active modalities are preferred over passive ones. If patient don't perform exercises as planned, a shared decision - making strategy should be applied to continue conservative management.<sup>5</sup>

The treatment sessions included – NMES, isometrics of shoulder muscles, Neuromuscular control, eccentric muscle strengthening, and interscapular muscle strengthening - Short - term pain and function in RCRSP may be improved with scapular targeted workouts<sup>5</sup>, using therabands, biceps resistance training, and proprioceptive training for the shoulder. Hiking of shoulder was noted when patient achieved 80 degrees in flexion and abduction. Hence, humeral depression exercises were performed at different angles.

Along with inducing strength in the shoulder muscles, there was improvement in the range of motion. Slow, controlled eccentric muscle contraction was performed using theraband. Evidence supports a more of active regime compared to a passive regime as the study conducted by Hassane Zouhal et al.,<sup>6</sup> hence use of passive modality was used less compared

to the active regime in her 1.5 - hour of daily session of physiotherapy rehabilitation.

### Patient Perspective

On day 15 when the shoulder range was approx.90 degrees, had a positive attitude towards physiotherapy treatment as she was anxious and thought she could not lift her hand again for her functional activities. The video below shows the shoulder's flexion and abduction ranges sent by the patient herself to show the available range.

**https://youtube.com/shorts/0cbUxU\_E1r0?si=B1DBihbe0zA7RgMh**

### Video 1

Then further as the progression of rehabilitation occurred the eccentric resistance training also progressed with light resistance band to high resistance

Finally on day 30, the range was full and was optimal along with induced strength in the muscles.

**https://youtu.be/ggA4XPvGkMY?si=yUV4DdAC - j0 - BE1W**

### Video 2

The elbow range with was less also increased, initially holding ½ kg dumbbell was difficult now training with 1.5 kg was easy.

**https://youtu.be/9VwMclSPxHA?si=JoBebEymyEriM0Sx**

### Video 3

The patient could not believe that her hand was near normal with full range and optimal strength in her shoulder and elbow. All the above videos were sent by patient herself as a gratitude towards her treatment sessions. Prior consent is taken for the above videos.

### Ethical Consideration

Informed consent was obtained from patient.

### Acknowledgment

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### Authors Conflict of Interest

Authors have no conflict of interest.

### References

- [1] Paraskevopoulos E, Plakoutsis G, Chronopoulos E, Maria P. Effectiveness of a combined program of manual therapy and exercise vs exercise only in patients with rotator cuff - related shoulder pain: A systematic review and meta - analysis. Sports Health.2023 Sep; 15 (5): 727 - 35.

- [2] de Oliveira FC, Pairot de Fontenay B, Bouyer LJ, Desmeules F, Roy JS. Kinesiotaping for the rehabilitation of rotator cuff-related shoulder pain: a randomized clinical trial. *Sports Health*.2021 Mar; 13 (2): 161 - 72.
- [3] Sachinis NP, Yiannakopoulos CK, Chalidis B, Kitridis D, Givissis P. Biomolecules related to rotator cuff pain: a scoping review. *Biomolecules*.2022 Jul 22; 12 (8): 1016.
- [4] Burne G, Mansfield M, Gaida JE, Lewis JS. Is there an association between metabolic syndrome and rotator cuff - related shoulder pain? A systematic review. *BMJ open sport & exercise medicine*.2019 Dec 1; 5 (1): e000544.
- [5] Boland K, Smith C, Bond H, Briggs S, Walton J. Current concepts in the rehabilitation of rotator cuff related disorders. *Journal of clinical orthopaedics and trauma*.2021 Jul 1; 18: 13 - 9.
- [6] Zouhal H, Abderrahman AB, Jayavel A, Hackney AC, Laher I, Saeidi A, Rhibi F, Granacher U. Effects of passive or active recovery regimes applied during long - term interval training on physical fitness in healthy trained and untrained individuals: a systematic review. *Sports medicine - open*.2024 Mar 5; 10 (1): 21.
- [7] Sgroi M, Loitsch T, Reichel H, Kappe T. Diagnostic value of clinical tests for infraspinatus tendon tears. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*.2019 May 1; 35 (5): 1339 - 47.
- [8] Glynn P, Weisbach C. *Clinical prediction rules: a physical therapy reference manual*. Jones & Bartlett Learning; 2011.