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Case Report

Physiotherapy Section

Three Weeks of Extracorporeal Therapy and Telerehabilitation for Supraspinatus Calcific Tendinosis: A Case Report

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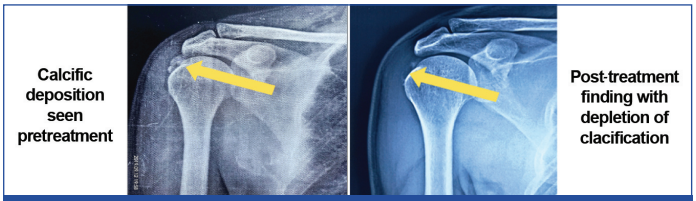
ABSTRACT

This case report presents the treatment of a patient with shoulder calcification and reduced Range of Motion (ROM) using a combination of Extracorporeal Shockwave Therapy (ESWT) and telerehabilitation. The patient received three sessions of ESWT, once per week, followed by daily guided shoulder exercises delivered via telerehabilitation for three weeks. Pre- and post-treatment assessments included goniometry for ROM, the Shoulder Pain and Disability Index (SPADI) score for shoulder function and X-ray imaging. The results demonstrated significant improvements in pain, function and ROM suggesting the potential benefits of this combined approach in reducing patient burden and promoting sustainability in physiotherapy.

Keywords: Extracorporeal shockwave therapy, Physical therapy, Range of motion, Shoulder pain

CASE REPORT

A 45-year-old male was referred to the outpatient physical therapy department with a three months history of right shoulder pain and stiffness, leading to a decreased range of shoulder movements. He denied any prior injury and reported significant pain (7/10 on the Numerical Pain Rating Scale) that was impacting his daily life. Goniometry revealed limitations in all shoulder movements (flexion: 70-80°, abduction: 60-65°, internal rotation: 40°, external rotation: 30-35°). X-rays showed a calcific deposit in the supraspinatus tendon. His SPADI [1] score (45) indicated moderate functional limitations [2,3]. He reported no past medical history. A pretreatment assessment was conducted on the day of his first visit to the physical therapy Outpatient Department (OPD), which included X-ray findings [Table/Fig-1], a Numerical Pain Rating Score (NPRS), shoulder ROM measured with a handheld goniometer, and SPADI score [Table/Fig-2,3]. The patient received three sessions of ESWT [Table/Fig-4], one per week, targeting the calcification site. The first session involved 1000 shocks per session at an energy density of 0.25 mJ/cm^2 and a frequency of 8-10 Hz, while the second and third sessions involved 2000 shocks per session at an energy density of 0.25 mJ/cm^2 and a frequency of 12 Hz [4,5].



[Table/Fig-1]: Pretreatment X-ray showed a calcific deposit in the supraspinatus tendon and post-treatment X-ray revealed a noticeable reduction in the size of the calcification deposit.

Additionally, he participated in a daily telerehabilitation programme [Table/Fig-5] for three weeks, divided into three phases. Phase I consisted of a 35-minute exercise protocol followed by 20 minutes of cryotherapy; Phase II consisted of 35 minutes of exercise; and Phase III consisted of 25 minutes of exercise [6-8]. The programme, delivered through a secure video platform, included therapist-guided exercises focused on pain management, ROM improvement and rotator cuff strengthening. The exercises were adjusted and progressed based on weekly virtual consultations with the therapist. The patient was reassessed after three weeks at the physical therapy OPD, which included an X-ray [Table/Fig-1], NPRS, shoulder ROM measured with a handheld goniometer, and a SPADI score [Table/Fig-2,3].

Outcome measures	Pretreatment			Post-treatment after three weeks	
NPRS	7/10			2/10	
Range of Motion (ROM) using Universal Goniometer		Active (°)	Passive (°)	Active (°)	Passive (°)
	Flexion	70	80	160	170
	Abduction	60	65	165	170
	Internal rotation	40	45	70	75
	External rotation	30	35	70	75
SPADI score	45 points			20 points	

[Table/Fig-2]: Pre- and post-treatment findings.
NPRS: Numerical pain rating scale; SPADI: Shoulder pain and disability index

[Table/Fig-3]: Pre- and post-treatment ROM difference.
[Table/Fig-4]: Extracorporeal Shockwave Therapy (ESWT). (Images from left to right)

DISCUSSION

Supraspinatus calcific tendinosis is a common condition that causes pain and limited shoulder movement due to calcium deposits in the tendons [8,9]. Traditional treatment involves managing pain, physical therapy and sometimes injections or shockwave therapy [10]. [Table/Fig-6] shows a comparison of different modalities for supraspinatus calcific tendinosis, highlighting their advantages and disadvantages [11-20]. However, frequent clinic visits and exercise programmes can be inconvenient for patients and strain healthcare systems. This discussion explores telerehabilitation, where physical therapy is delivered remotely using online platforms. It offers a potential solution to these challenges and promotes long-term treatment success [21,22].

Phase I - Active rest phase				
	Frequency	**Intensity**	**Time**	**Type**
Posture, positioning, ergonomics education/training	Twice a day for one week	Moderate	5 mins	-
Neck and shoulder isometrics	Once a day for six days with one day recovery period for one week	Moderate to high	10 minutes per session. 10 seconds hold. Relax. Repeat five times	Type: Progressive isometric neck strength exercises in flexion, extension, and rotation, performed in a sitting position
Passive range of motion	One week	Moderate	5 minutes per session. Thrice a day	Progressive
Posterior capsular stretches	Daily for one week	Mild to moderate	5 minutes. Holding each stretch for an adequate duration to improve flexibility. 30 seconds and repeated three times	Static stretching
Pendulum exercises	Six days a week with one day recovery period for one week	Moderate to high	10 minutes per session. All exercises performed for 10 repetition with the help of 1 liter water bottle	Progressive Flexion, extension, rotations and abduction
Physical agent	Cold packs ice (wrapped in a towel) to the affected shoulder [8]	Doses:	Maintained at -5°C	
		Duration	20 minutes on and 20 minutes off, three times at the beginning and end of the day for first two days of intervention	
		Position	Supine lying	
Phase II - Strengthening and stability				
	Frequency	**Intensity**	**Time**	**Type**
Posture, positioning, ergonomics education/training	Twice a day for one week	Moderate	5 mins	-
Neck and shoulder isometrics	Once a day for six days with one day recovery period for one week	Moderate to high	10 minutes per session. 10 seconds hold. Relax. Repeat five times	Type: Progressive isometric neck strength exercises in flexion, extension, and rotation, performed in a sitting position
Active assisted range of motion	For one week	Moderate	5 minutes per session. Thrice a day	Progressive
Progressive Resisted Exercise (Pre)	Five days a week with two days recovery period for one week	Moderate to high	10 mins/session 10 repetition/day targeting each muscle	Progressive- Resistance bands and weights
Posterior capsular stretches	One week	Mild to moderate	5 minutes. Holding each stretch for an adequate duration to improve flexibility. 30 seconds and repeated three times	Static stretching
Phase III: Functional return				
	Frequency	**Intensity**	**Time**	**Type**
Posture, positioning, ergonomics education/training	Twice a day for one week	Moderate	5 mins	-
Active Range of Motion	One week	Moderate	5 minutes per session. Thrice a day	Progressive
Progressive Resisted Exercise (Pre)	Five days a week with two days recovery period for one week	Moderate to high	10 mins/session 10 repetition/day targeting each muscle	Progressive- Resistance bands and weights
Posterior capsular stretches	Daily	Mild to moderate	5 minutes. Holding each stretch for an adequate duration to improve flexibility. 30 seconds and repeated three times	Static stretching

[Table/Fig-5]: Phase-wise designed telerehabilitation protocol for supraspinatus calcific tendinosis using Frequency Intensity Time Type (FITTs) principle [8].

S. No.	Treatment modality	Advantages	Disadvantages
1	Extracorporeal Shockwave Therapy (ESWT)	Effective in reducing shoulder pain and improving function; high success rates in symptom relief. Non invasive and stimulates the body's natural healing process [11]	May cause discomfort during treatment and does not provide added benefits when combined with eccentric training [12,13].
2	Ultrasound-Guided Percutaneous Intervention (UGPL)	Effectively reduces calcium deposits and provides significant pain improvement with a low rate of minor complications [14]	Requires skilled practitioners and responses to treatment may vary among individuals [14].
3	Corticosteroid injections	Provides rapid pain relief and improves function; helpful for acute inflammation [15,16]	Relief is often temporary; potential for long-term tissue harm; may increase the risk of tendon rupture [15,16].
4	Therapeutic ultrasound	Helps resolve calcifications and offers short-term symptomatic relief with significant clinical improvement reported compared to sham treatments [17]	Limited long-term efficacy evaluations; variability in individual responses [17].
5	Therapeutic laser (LLLT)	Non invasive, promotes faster healing and may alleviate pain associated with tendinopathy [18]	Evidence regarding its efficacy is mixed; not always effective in addressing root causes [18].
6	Matrix rhythm therapy	More effective than therapeutic exercise alone in reducing pain, enhancing range of motion and decreasing disability [19]	Limited evidence on its long-term efficacy and potential cost involved in treatment sessions [19].
7	Physical therapy	Increases shoulder mobility and restores muscle strength; a Non invasive treatment option [20]	May take time to see significant results; some patients may require additional treatments, such as corticosteroid injections or surgery [20].

[Table/Fig-6]: Comparison of different modalities on supraspinatus calcific tendinosis and its advantages as well as disadvantages [11-20].

This case report highlights the benefits of combining shockwave therapy with telerehabilitation for shoulder calcification. The patient experienced significant pain relief, improved function and increased movement with this approach. A study conducted by Gava V et al., highlighted that telerehabilitation is more effective than home-based exercise in improving ROM, functional outcomes and quality of life for patients with shoulder disorders [23]. Furthermore, shockwave therapy equipment is reusable and requires less maintenance compared to surgery, reducing waste and resource consumption [24].

The implementation of telerehabilitation in this case aligns with the growing emphasis on sustainability in physiotherapy. A systematic review found that telerehabilitation, or physical therapy delivered online, may be just as effective as traditional in-person therapy or home exercises for shoulder pain. While the evidence for this

is weak, telerehabilitation appears to be more beneficial than simply receiving advice for shoulder pain, potentially reducing pain and improving function [24]. Sustainability in healthcare refers to practices that meet current needs without compromising future generations' ability to meet their own needs [25]. In the context of physiotherapy, sustainability involves optimising resource utilisation, improving access to care and minimising environmental impact.

Telerehabilitation offers a sustainable approach to healthcare delivery by leveraging technology to optimise resources and improve patient outcomes. Beyond the individual benefits, telerehabilitation aligns with the growing emphasis on sustainability in healthcare [26]. A study suggested that telerehabilitation can be as effective as traditional methods, particularly for those in remote areas or with mobility limitations [27]. This improves access to care while reducing travel and associated emissions. By delivering care remotely, telerehabilitation reduces the need for dedicated clinic space and equipment. This translates to a more efficient use of healthcare resources, as discussed in the benefits of telerehabilitation.

Telerehabilitation sessions often involve patient education and self-management techniques, empowering patients to take charge of their recovery and potentially reducing their reliance on frequent therapist interventions, thus promoting the long-term sustainability of care.

CONCLUSION(S)

This case report demonstrates the promising potential of combining ESWT with telerehabilitation for managing shoulder calcification. The significant improvements in pain, function and ROM, coupled with the patient's positive experience and the advantages of telerehabilitation in promoting sustainability, suggest that this combined approach warrants further investigation and clinical application. Integrating sustainable practices like telerehabilitation into physical therapy can optimise resource utilisation, improve access to care and create a more patient-centred healthcare system.

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