

## Case Report

# Extracorporeal Shock Waves Therapy (Eswt) In Calcific Tenosynovitis Post Acute Injury

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### Abstract

**Aim:** The aim of this study is to assess the effect of ESWT in the treatment of acute post traumatic tendovaginitis.

**Introduction:** Calcific tendonitis can occur in different joints of the body; frequently it is the inflammation reaction to repetitive micro-trauma to the area. Extracorporeal Shock Waves Therapy (ESWT) shows great therapeutic potential for the treatment of different musculoskeletal disorders. We reported a case of 17-year-old male affected with a calcific tenosynovitis resulted of sport trauma. Patient suffered from pain sensation and increased clumsiness of the fourth finger in his right hand. ESWT improved pain sensation and clumsiness in six weeks. We considered a follow up three months after the last ESWT session.

**Conclusion:** ESWT shows great therapeutic potential for the treatment of unusual location of post traumatic musculoskeletal disorder.

**Keywords:** Tenosynovitis; Extracorporeal Shock Waves Therapy (ESWT); Trauma

### Introduction

Tenosynovitis is an inflammation that affects the synovial sheath, the anatomical structure that covers the tendon and reduce friction along its course. Acute calcific tendinitis is an inflammatory condition characterized by calcium hydroxyapatite deposition in tendons and its sheath. The aetiopathogenesis of CT is still unclear. It is possible that acute injury or repetitive microtrauma may cause damage to the

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tendon and start a pathologic combination of sequential change of natural healing process.

Calcium deposition in the hand is unusual location, on the contrary supraspinatus tendon and rotator cuff tendon are the typical damaged areas. Clinical signs of the calcific process within the tendon include tenderness, pain, local edema, and decreased range of motion (ROM).

While the effects of shock waves on wound healing, [1], bone regeneration [2, 3], and the integration of skin grafts [4] have been extensively studied, very little is known as concerns its effects on post traumatic musculoskeletal hand disorders [5].

### Case Report

A 17-year-old right-handed male presenting with a case of tenosynovitis following trauma of right hand during football game. Onset is believed to be due to the patient's arm position in full abduction and external rotation during the physical confrontation with one player. The medical doctor who examined him noted the decreased co-ordination of the right fourth and fifth digits. During examination the doctor imprinted passive movements on the joints with his fingers to perceive any painful nodules. Patient reported pain sensation and increased clumsiness in his right hand. Musculotendinous ultrasound two months after the trauma showed chronic tenosynovitis of the flexor tendons with calcification inside. In particular a diffuse thickening of the flexor tendons sheath of the fifth finger with a thickness of 2 mm inside. A calcification of 7 mm was observed at the level of the third distal shaft of the fifth metacarpal. The ultrasound allowed to detect the edema, the diffuse tendon alteration and the effusion that may surround the tendon itself (Figure 1).

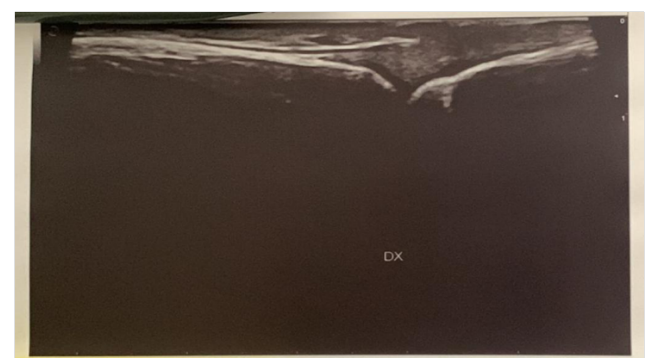


Figure 1: Chronic tenosynovitis of case report.

Patient was treated six times with ESWT. [6] The application method of each ESWT session responded to the indications of the Guidelines of the International Society for Musculoskeletal Shockwaves Therapy (I.S.M.S.T) with a weekly frequency and Piezowave 1 device. The parameters that indicates the effectiveness of the treatment are: energy intensity of shock waves in a unit area (EFD), penetration depth (EPD), number of pulses and frequency (Hz). ESWT should be classified into low (<0.08 ml/mm<sup>2</sup>), medium (<0.28 ml/mm<sup>2</sup>) and high (< 0,60 ml/mm<sup>2</sup>) energy value of EFD. [7] Patient

give his written consent to the ESWT. The treatment is carried out by a medical doctor. The shock waves are introduced with an applicator with contrast gel through the skin. Usually 1000-2000 single shocks (1-5 impulses per second) are applied during a treatment. The probe of ESWT was placed perpendicularly on the ulnar nerve.

The subjective pain intensity was measured with the Visual Analogue Scale (VAS) [8]. The numerical value of 0 indicating no pain and 10 strongest disabled pain.

VAS was evaluated at: Baseline T0, Week 1(T1), Week 2 (T2), Week 3 (T3), Week4 (T4), Week 5 (T5) and Week 6 (T6).

In absolute values VAS decreased over time. No adverse effects occurred during or after each session. The treatment data are recorded precisely (Table 1).

Parameters	Session T1	Session T2	Session T3	Session T4	Session T5	Session T6
Impulses (Number)	2000	2000	2000	2000	2000	2000
Frequency (HZ)	5	5	5	5	5	5
Energy (EFD)	0,22	0,22	0,22	0,22	0,22	0,22
Penetration (EPD)	5	5	5	5	5	5
VAS	7	5	3	2	1	0

**Table 1:** Parameters of the treatment.

## Discussion

Our study evidenced that ESWT improved pain sensation and clumsiness in the right hand. At the time of the first visit the intensity level of *pain* was 7.0; after the second treatment session VAS scores significantly *decreased* to 5 value (39%) Multiple sessions of ESWT produced a cumulative therapeutic effect. ESWT showed good - short term treatment efficacy. Patient reported that the movements of his fingers were freer after the third treatment.

Nowadays the physiology of tendovaginitis are better understood but the biological and regenerative effect of ESWT in tendon degree are still unclear. ESWT induced neovascularization and improvement of blood flow and reduce the pain sensation [9, 10]. The combination of these effects can lead to tissue regeneration and significant alleviation of pain, improving functional outcomes in injured tissue. Considering these facts, ESWT shows great potential as a useful conservative method to the treatment of musculoskeletal disorders. Calcific tendinopathies of the hand are little described while the calcific tendinopathy of supraspinatus or commonly of the entire rotator cuff are more frequently affected areas. Some works described the efficacy of shock waves treatment in trigger finger [11, 12] or rhizarthrosis. [13] Post-traumatic stenosing flexor tenosynovitis is a condition rarely-described in the medical literature. [14] The Case report manifested acute onset sport injury tenosynovitis of his fifth finger. Tendovaginitis is the swelling of both a tendon and its sheath. Ultrasound examination allows to make a differential diagnosis between tendonitis and tenosynovitis.

Conservative treatment of acute tenosynovitis of the hand includes different therapeutic options: splint that allows the tendon to rest, ultrasound treatment, massage, application of anti-inflammatory gel. Patient can decide to receive a cortisone injection when the physiotherapist program give no positive results. Sometimes a surgical procedure could be necessary.

ESWT represents an alternative choice to the traditional treatments of musculoskeletal disorders. The parameters that indicates the effectiveness of the treatment are: Energy intensity of shock waves in a unit area (EFD), penetration depth (EPD). Patient was treated with six times ESWT using EFD values in medium range (0.22 ml/mm<sup>2</sup>).

VAS scores and clumsiness were significantly decreased after the third treatment; this result confirmed the possibility of a cumulative therapeutic effect of ESWT [15].

The medium-energy used during the treatment session reduced the severity of pain and improved physical function of the hand.

No standardized parameters are available for the treatment of tendinopathies when using ESWT. The most widespread thought is that high energy ESWT are a potential damage to the tendon, therefore this argumentation involve a choice between low and medium energy [16, 17].

Follow-up evaluation started two and three months after the last ESWT session. We investigated 2 types of outcome over a 3-month follow-up: pain and clumsiness in the right hand. Both parameters remained stable over time, this outcome guaranteed a better quality of the right hand movements.

In our study, the successful results at a mean *follow-up of 3* months emphasize that ESWT gives the opportunity to improve little described musculoskeletal disorders.

## Conclusion

ESWT shows great therapeutic potential for the treatment of different musculoskeletal disorders. Acute calcific tenosynovitis is an inflammatory condition characterized by calcium hydroxyapatite deposition in tendons. Case report suffered from unusual location of post traumatic musculoskeletal disorders. The effectiveness of ESWT in little described dysfunction represents an initial starting point for formulate *standard operating procedure* that will help to understand how to improve the therapeutic outcomes.

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## Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research authorship and/or publication of this article.

## Patient Consent

Obtained.

## Ethical Approval

The study was approved by the Ethics Committee of our Centre and all patients provided written informed consent before study treatment.

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