

# Case Report: Focused Shock Waves as a Treatment Option in Failed Rotator Cuff Calcification Surgery

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## Abstract

**Introduction:** Focused extracorporeal shock wave treatment has emerged as an alternative therapy before invasive procedures when conservative treatment has failed in rotator cuff calcifications. It can also be used when surgery has failed.

**Case Report:** We report a case of failed surgery in which focused shock waves were used for treatment. We applied three sessions of focused electromagnetic waves (Dornier Compact Alpha) with an energy level of 0.20 mJ/mm<sup>2</sup>, 2000 pulses per sesión, every 2 weeks. The pain gradually disappeared and mobility was regaining. The radiographic control 2 months after the last session showed the total disappearance of the calcification. The end result was the complete disappearance of the symptoms.

**Conclusión:** The effectiveness of shock waves, their non-invasiveness, safety, and cost efficiency justify their use both as an option before an invasive technique and when surgery has failed in the treatment of rotator cuff calcifications.

**Keywords:** Rotator cuff calcifications, Shock waves, Failed surgery

## Introduction

The presence of calcium deposits in the rotator cuff tendons is a relatively common condition. The prevalence of rotator cuff calcifications in an asymptomatic population has been reported between 2.7% [1] and 20% [2].

Codman [3] suggested that hypoxia could be responsible for the initiation of the process, but other authors have referred to genetic predisposition [4, 5, 6, 7, 8], microtrauma [9], metabolic [10], and hormonal factors [11].

Uththoff [12] described a progression in local histological changes that coincide with clinical and radiographic findings.

Regarding the treatment of calcific rotator cuff tendonitis, decisions will be made in light of the evolutionary stage, the degree of symptoms, and the response to initial treatments. Although the natural history of the disorder tends towards its spontaneous resolution, the cycle can stagnate in any of its stages. It is in these situations that it is necessary to intervene in the process to calm the symptoms or even accelerate it's the

resorption process.

Conservative treatment is the initial choice. When conservative treatment failed, the usual indication was invasive treatment, either mini-invasive or by surgery. Focused extracorporeal shock wave treatment (F-ESWT) has emerged as an alternative therapy prior to invasive procedures when conservative treatment has failed [13].

F-ESWT can also be used when surgery has failed. We present a failed case of surgery in which focused shock waves were used for treatment.

## Case Presentation

A 43-year-old male presented with intense pain and limited mobility of his left shoulder. His profession as a dentist further complicated the situation, preventing him from working.

He initially consulte done year ago complaining moderate intermittent pain and limited range of motion. A calcification of the rotator cuff located in the supraspinatus was diagnosed (Fig. 1). Arthroscopic surgery was performed to remove the calcification with poor results.

I first met him 8 months after surgery reporting that the pain had not only not calmed down but had increased markedly. He had moderate deltoid atrophy. Active mobility was 90 degrees of anterior flexion, 10 degrees of external rotation, and internal rotation at L5 level. Passive mobility was limited by pain.

X-rays showed that the calcification not only had not diminished with surgery, it appeared to be larger (Fig. 2).

It was decided to try with F-ESWT. We applied 3 sessions of focused electromagnetic waves (Dornier Compact Alpha) with an energy level of 0.20 mJ/mm<sup>2</sup>, 2000 pulses per-sesión, every 2 weeks.

In parallel, the patient was treated with Paracetamol 1 g up to every 6 h according to pain level, and a gentle and progressive program of home-based exercises.

The pain gradually disappeared and mobility was regaining. The radiographic control 2 months after the last session showed the total disappearance of the calcification (Fig. 3).

The end result was the complete disappearance of the symptoms.

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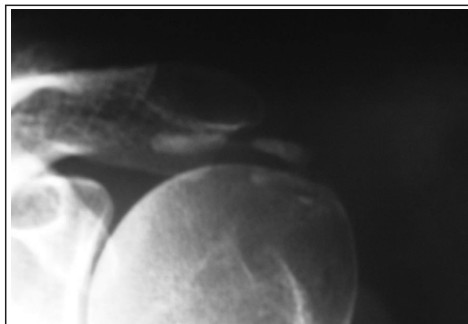


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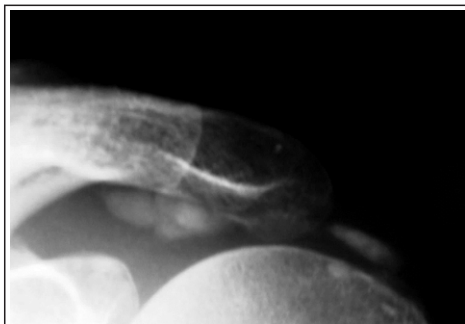
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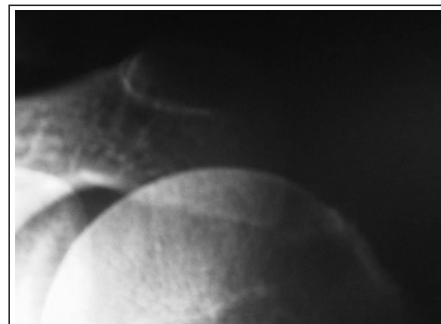
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**Figure 1:** Preoperative X-ray showing Gärtner stage I calcium deposits located in the supraspinatus tendon.



**Figure 2:** Image 8 months after surgery showing an increase in the size of the calcification.



**Figure 3:** X-ray control after the application of shock waves. The calcifications have disappeared.

## Discussion

Codman [3] published a detailed description of the surgical procedure made by Painter. Both authors recommend surgery. Neer [14] mentioned that during his 1st years in surgical practice the most frequent shoulder procedure was the excision of calcium deposits, on the other hand, during the past years of his practice he operated one or two cases per year despite dedicating himself only to shoulder surgery. Gschwend et al. [15] described three precise indications for surgery when treating rotator cuff calcifications: (a) symptomatic progression, (b) constant and unmanageable pain, and (c) failure of conservative treatment.

Surgery has a high rate of good results [16, 17] but is not without complications, slow recovery, and poor results [14, 18, 19, 20, 21, 22, 23, 24]. The patient we present is a good example of this.

Neer [14] cautions that the postoperative recovery period in chronic cases is much longer than would be expected for a seemingly simple surgical gesture. McKendry et al. [19] reported 30% persistence of pain at 12 postoperative weeks. Other authors [22, 23, 24] agree with this and have reported that several months must pass after surgery for the patient to be totally asymptomatic.

Controversy exists regarding management of rotator cuff defects after calcific deposit removal [25, 26, 27, 28, 29]. Initially, it was not sutured but lately recognized authors recommended its closure in both open [27] and arthroscopic procedures [28]. Verhaegen et al. [25], reported persistent rotator cuff defects at 1 year on after arthroscopic needling of rotator cuff calcific deposits.

Performing or not acromioplasty is another controversial factor. Ellman [30] reported a reoperation rate of 19% in patients in whom

acromioplasty was not performed in the first procedure. On the other hand, Maier [31] stated that arthroscopic removal of calcific deposits of the supraspinatus tendon without acromioplasty yielded favorable outcomes and determined fast remission of pain regardless of acromial morphology.

Treatment by F-ESWT has emerged as an alternative when conservative treatment fails and prior to invasive procedures [13, 32]. Gerdesmeyer et al. [33], in a multicenter randomized controlled trial, reported significantly better results in patients treated with F-ESWT, both low and high energy, compared with placebo, resulting in significant improvement with respect to pain, shoulder function, and calcium resorption in 86% in the high-energy group at 1 year compared with 37% in the low-energy group and 25% in the placebo ESWT group. Cosentino et al. [34], reported a significant increase in shoulder function, a decrease in pain compared with placebo, and calcium resorption of 71% by using F-ESWT, at 6 months. Hsu et al. [35], achieved good or excellent results in 87.9% of patients treated with high-energy F-ESWT.

Louwerens et al. [36] in a systematic review and meta-analysis about chronic calcific tendinopathies of the rotator cuff, concluded that “high-energy extracorporeal shock wave therapy is the most thoroughly investigated minimally invasive treatment option in the short-term to midterm and has proven to be a safe and effective treatment.”

Rompe et al. [37] and Rebuzzi et al. [38] compared F-ESWT with open and arthroscopic surgery in CTS, respectively. They concluded that the results are comparable and that high-energy F-ESWT should be the first choice when conservative treatment has failed, because of its noninvasiveness.

Dubs [39] compared the costs and effectiveness of shock wave therapy and standard treatments in Switzerland. Shock wave therapy was more effective and also saved an average of U\$S 2,500. The direct cost of arthroscopic treatment was 6.4 times higher than that of shock wave therapy, in a study carried out in Brazil by Eid [40].

The results of cost analysis presented by us at the 13th International Congress of Shoulder and Elbow Surgery in 2016 [41], also showed that shock waves costs were 5 to 7 times lower, representing savings around 2.000 € per patient when compared to arthroscopic surgery.

It has also been shown that the correct application of shock waves does not generate damage [42] and even when the desired therapeutic result is not obtained, its use does not alter the results of future surgery [43].

The use of F-ESWT in rotator cuff calcifications has been shown to have an A grade of recommendation [13]. This implies that based on published information, surgeons should change their practice [44].

Our case shows that focused shock waves might be a valid alternative in patients with rotator cuff injuries in whom the calcium deposit has not been completely removed with surgery. Associated injuries, complications of surgery ranging from infection to lack of healing of the rotator cuff and the need for acromioplasty should be ruled out.

## Conclusion

The effectiveness of shock waves, their non-invasiveness, safety, and cost efficiency justify their use both as a rescue procedure and as an option before an invasive technique in the treatment of rotator cuff calcifications.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

**Conflicts of Interest:** Nil. **Source of Support:** None.

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