

Diagnosis and treatment of frozen shoulder with shock-wave therapy

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Abstract

Introduction: Adhesive capsulitis is pathology of the gleno-humeral joint that causes joint pain and immobility. The cause in most cases is unknown. Conservative treatment is good but still unclear, ESWT is an adjunctive and effective therapy for treatment.

Objectives: To analyze the effectiveness of Shock-Wave therapy (ESWT) in the treatment of pain and ROM in frozen shoulder.

Method: We based on 7 studies, taken from medical websites (PubMed, Medline, WebMD, MedScope). Patients diagnosed with adhesive capsulitis in all studies taken in reference were randomly divided into two groups.

In studies [1], Extracorporeal shockwave therapy improves short-term functional outcomes of shoulder adhesive capsulitis and [3], Extracorporeal Shockwave Therapy Improves Functional Outcomes of Adhesive Capsulitis of the Shoulder in Patients With Diabetes one group was treated with ESWT, the other with oral AINS In studies [2]. The efficacy of radial extracorporeal shockwave therapy in shoulder adhesive capsulitis: a prospective, randomised, double-blind, placebo-controlled, clinical study one group was treated with ESWT, and the other with placebo treatment.

In study [4], the effects of extracorporeal shock wave therapy on frozen shoulder patients' pain and functions. All patients received NSAIDs once a day. The subjects of this study were divided into the conservative physical therapy group one group was treated with ESWT, All subjects were treated 2 times a week for 6 weeks. In within-group comparisons of VAS and PSFS, both ESWT and CPT groups showed significant decreases in VAS and PSFS. In comparisons between VAS and PSFS groups, ESWTG showed much lower results compared to CPTG.

In studies [6], Efficacy of Extracorporeal Shockwave Therapy in Frozen Shoulder and [7] Shock Wave Therapy and Ultrasound Therapy plus Exercises for Frozen Shoulder Joint Clients, one group was treated with ESWT, the other with conservative physical therapy

Results: For the studies considered it was observed that: patients treated with ESWT have an earlier and more noticeable improvement in pain and functionality, articular ROM compared to the effect from other treatments such as: (placebo, AINS, conservative treatment, ultrasound) applied to patients.

Conclusions: Based on the above studies, it is concluded that ESWT is more effective in treating pain and functionality, articular ROM, compared to other treatments applied to the groups of patients diagnosed with adhesive capsulitis.

Keywords: Frozen shoulder, Physiotherapy, Placebo, ESWT

Introduction

The selection of therapy for the treatment of a disease is always a dilemma not only for physiotherapists, but for the entire multidisciplinary team. As one of the pathologies that is often encountered in the adult and elderly population, the treatment of adhesive capsulitis (also known as frozen shoulder) is a dilemma in itself for us as physiotherapists.

Frozen shoulder consists on hardening of the capsule that surrounds the scapulo-humeral joint, which is expressed by a gradual loss of active and passive movements of the shoulder and an increase in pain during the attempt to move. Fibrotisation, thickening and inflammation of the articular capsule causes movement blockage in all planes, especially in extrarotation and abduction. In most cases, AC has an unknown etiology, but the continuous fracture

of the bones that form the articulation, frequent suction, diabetes, neurological and cardiovascular diseases, thyroid disorders, etc. can serve as a risk factor. Frozen shoulder appears in 2-5% of the population, affects more women aged 40-60 and is bilateral in 20-30% of cases. Currently, there is no treatment that can be called "the best" for the treatment of the disease. Many surgical methods or conservative treatments are mentioned as methods for the treatment of this pathology, but their efficiency varies as a result of the installation stage of the disease. We have selected some studies, conducted by different professors from universities around the world.

Extracorporeal Shockwave Therapy Improves Short-term functional Outcomes of Shoulder Adhesive Capsulitis [1]

This study was conducted by the University of Taipei, Taiwan, where 40 patients with primary adhesive capsule were taken to demonstrate the efficacy of shock-wave therapy. After fulfilling the inclusion criteria in the study, the patients were randomly divided into two groups, where the first group received treatment with oral AIJS, specifically 30 mg of Prednisolone, every morning for 2 weeks (6 tablets of 5 mg) and the two weeks of others 15 mg every day, taken in the morning (3 tablets of 5 mg). The second group of patients was treated with shock-wave, with 3 sessions over four weeks, where during one session a patient received shockwave in 3 directions; anterior-posterior, around the acromion, posterior-anterior, with an average of 450-500 strokes in each area. So, in total, a patient who was treated with shockwave received about 1350-1500 blows in the total glenohumeral art. The energy transmitted was 0.6 mJ/mm² and the frequency 1.25 Hz. The results of both groups were obtained using CSS (Constant Shoulder Scale) and ROM specifically in Flexion and Abduction. At the end of this study, it was seen that the patients of both groups showed signs of improvement, but earlier and longer-term improvement occurred in the group treated with shock-wave.

The Efficacy of Radial Extracorporeal Shockwave Therapy in Shoulder Adhesive Capsulitis: A Prospective, Randomised, Double-Blind, Placebo-Controlled, Clinical Study [2]

This study includes 106 patients randomly selected from 4 clinics in New York. The patients were divided into two groups (n=53) where one of them received shock-wave treatment and the other placebo treatment. Each patient received treatment with ESWT, in a number of treatments of 4 and with a number of impulses of 2000 in each session. The air pressure in the device was set to 3.5 bar, the energy flow was 0.16mJ/mm² and a 15mm applicator with a frequency of 8Hz was used. Patients receive treatment from the apparatus in two directions, antero-posterior and postero-anterior. In total, each patient received approximately 2000 total strokes from the antero-posterior and postero-anterior direction. The placebo treatment was applied identically, but with a hood inside the head of the applicator to block the transmission of impulses from the applicator to the skin at the treatment site. It was also ensured that the sound, appearance and manner of use of the shock-wave device was the same for all patients of both groups and the duration and areas of application were the same. At the end of the treatment, the results of the patients were obtained from the DASH questionnaire (Disability of Arm Shoulder and Hand), the VAS and ROM scale. From these results, it was seen that the patients

of the experimental group (the group that was treated with shock-wave), had a significant decrease in pain and mobility disability in the fourth week, specifically a decrease in the DASH questionnaire and in the VAS scale compared to the control group, which had a smaller decrease in the DASH questionnaire and the VAS scale.

Extracorporeal Shockwave Therapy Improves Functional Outcomes of Adhesive Capsulitis of the Shoulder in Patients with Diabetes [3]

In this study, 50 patients with diabetes (type 1 and type 2) who had the diagnosis of frozen shoulder took part, received shock-wave treatment, as the best, most effective way and for the benefit of the patient's general condition. , as patients could very well receive injections with AIJS which were less painful, less expensive than shockwave treatment, but would this improve the global condition of the patient? The use of AIJS in patients with primary AC and diabetes is contraindicated, as it promotes the increase of glucose in the blood and would worsen the situation. The essence of the Italian researchers was to show that shockwave therapy is effective, the patient recovers faster and does not help in the accompanying diseases of the patients (such as diabetes in this case), and looking at the points in the quick DASH, CSS and VAS questionnaires, therapy with companions has given good results.

The Effects of Extracorporeal Shock Wave Therapy on Frozen Shoulder Patients' Pain and Functions [4]

In this study (2015) which took place in the orthopedic hospital in Korea, 30 patients were included who were diagnosed with frozen shoulder, by means of relevant medical equipment such as radiography and clinical signs. All patients received NSAIDs once a day. The subjects of this study were divided into the conservative physical therapy group (CPTG, n=15), with an average age of 52.8±5.6 years, average height 163.9±7.6 cm, average weight 61.2±11.7 kg, and the group with extracorporeal shock wave (ESWTG, n=15) with an average age of 54.2±5.7 years, average height 162.6±7.7 cm, and average weight 64.3±10.1 kg. For ESWTG, VITERA (Comed, Korea) was used for shock wave therapy. The patients received 1000 shock waves at 2.5 Hz, with the energy adjusted to 0.01-0.16 mJ/mm², depending on the degree to which the patients tolerated the pain. For CPTG with hot compresses (20 minutes) and ultrasound (5 minutes), which are thermotherapy, and with interference current therapy for (15 minutes, 100 bps). ESWTG and CPTG do not receive any other physical therapy. All subjects were treated 2 times a week for 6 weeks. Visual analog scales (VASs) were used to evaluate pain and patient-specific functional scales (PSFSs) were used to evaluate functions. In within-group comparisons of VAS and PSFS, both ESWT and CPT groups showed significant decreases in VAS and PSFS. In comparisons between VAS and PSFS groups, ESWTG showed much lower results compared to CPTG.

The Effects of Extracorporeal Shock Wave Therapy on Pain And Range of Motion In Patients With Adhesive Capsulitis [5]

The aim of this study is to investigate the effects of ESWT on pain and ROM in patients with adhesive capsulitis. The subjects of the study were 30 patients divided into two groups, aged 50 to 70 years, who had been diagnosed by their doctors with adhesive capsulitis based on clinical examinations. Subjects were selected from

outpatients at S Orthopedic Clinic in Daegu Metropolitan City. Patients who had neurological disease, dislocation, subluxation, rheumatism or had surgery were excluded. The control group was treated with a series of conservative physical therapies, including hot packs (20 minutes), ultrasound (5 minutes), and current intervention therapy (100 bps, 15 minutes). The experimental group received conservative physical therapy, then was additionally treated with an ESWT magnetic unit (REGENWAVE, HNT Med, Korea). Visual analogue scale (VAS) was used to assess the degree of pain; Shoulder ROM was measured using a goniometer while patients were in the supine position. Intergroup comparison after treatment showed that the experimental group recorded statistically significant lower VAS scores and higher FROM and ERROM scores than the control group.

Efficacy of Extracorporeal Shockwave Therapy in Frozen Shoulder [6]

This clinical study was conducted in Kashani Hospital, Isfahan, Iran in 2011 and 2012. Enrolled patients were divided into two groups using randomization software. The intervention groups received ESWT and the control group received sham ESWT. The mean age of the intervention and control groups was 56.1 ± 10.6 and 60.3 ± 4.8 years, respectively. All patients received analgesic (meloxicam 15 mg daily) and activity modification to reduce pain, and were advised to perform pendulum exercises (arm swing back and forth, side to side and around in circles for 5-10 times) and back extension of the involved shoulder for 30 s twice a day. The patients were not aware of the way the study was conducted. Patients in the intervention group received shock wave therapy once a week for 4 weeks. Focus probe arrays were used, and in each session, patients received ESWT from the anterior and posterior directions (average 1200 shocks between 0.1 and 0.3 mJ/mm²) to the maximum shoulder pain tolerance threshold. The control group received sham shock wave therapy once a week for 4 weeks, while the device was turned off and placed on the patient's shoulder for the same period of time. The device used in this study was a standard electromagnetic shock wave (Doulith SD1). According to the findings of this study and compared to similar studies, ESWT has positive effects in accelerating the healing process of frozen shoulder. Considering the significant side effects of other therapies such as surgery, frozen shoulder patients may benefit from ESWT due to its non-invasive, safe nature, low costs, no need for hospitalization, fewer visits of the patient in the hospital and the absence of significant negative events during the treatment.

Shock Wave Therapy and Ultrasound Therapy plus Exercises for Frozen Shoulder Joint Clients [7]

This study was determined by the following 20 patients of both sexes aged between 40 and 60 years with frozen shoulder. The current study was designed to evaluate the therapeutic effect of ultrasound and shock wave therapy in reducing pain severity and improving range of motion in patients with frozen shoulder. All patients were randomly selected by the orthopedic surgeon. They were divided into two groups; Group (A): ten patients received shock wave therapy plus exercise therapy for 12 sessions over a four-week period, three sessions each week. Group (B): ten patients received ultrasound therapy combined with the same exercises for 12 sessions over a four-week period, three sessions

each week. The shock wave therapy was administered using a 15 mm head applicator. Each patient in experimental group A received 4 sessions, one session per week for four consecutive weeks with 2000 pulses per session, a bending energy density of 0.22 mJ/mm², pulse frequency 10/sec and frequency 1-15 Hz. The treatment area was prepared with a coupling gel to minimize the loss of shock wave energy at the interface between the applicator tip and the skin. Ultrasound therapy: In addition to the exercise program given to group (A), the subjects representing the sample of this study received ultrasound for 12 sessions, 3 sessions per week as follows. Each exercise was performed in 3 sets of 10 repetitions with a 60-second rest period between each set as well as mobilization exercises. The results showed that ESWT was more effective in reducing pain and increasing ROM of the shoulder.

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