



## KINESITHERAPY FOR CALCIFYING TENDINITIS OF THE SHOULDER

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### SUMMARY

The accumulation of calcium deposits in the tendons of the muscles of the rotator cuff is the cause of calcifying tendonitis of the shoulder. It is most common in people of working age between 30 and 50 years, expressed in pain in the affected shoulder, both at rest and when moving the arm. This condition makes it difficult to carry out daily activities and worsens the quality of life of patients.

**The purpose** of this report is to present the improved functionality of the affected limb from our kinesitherapy program in combination with extracorporeal shock wave therapy.

**Material and methods:** we examined 20 patients with calcifying shoulder tendinitis, which we divided into two groups - experimental and control, 10 for each. The study was conducted at the Clinic of Orthopedics and Traumatology, University Hospital “St. Marina”, Varna. To illustrate the results, we used a visual analog scale (VAS), ROM (range of motion) and manual muscle testing (MMT).

**Results:** the kinesitherapy program applied by us in combination with extracorporeal shock wave therapy in the respondents from the experimental group showed better results compared to the control group.

**Keywords:** kinesitherapy, calcifying tendinitis, extracorporeal shock wave therapy,

### INTRODUCTION

The accumulation of calcium deposits in the tendons of the muscles of the rotator cuff is diagnosed as calcifying tendonitis of the shoulder. The disease occurs in the highest percentage of people in working age between 30 and 50 years, and is characterized by pain in the affected shoulder, both at rest and when moving the arm. This condition makes it difficult to carry out daily activities and worsens the quality of life of patients. The tendon of the m. supraspinatus is most often affected (80%), with less frequent calcifications in m. infraspinatus (15%), m. subscapularis and m. teres minor (5%) [1]. In more severe conditions, more than one tendon may be affected. Statistics show, that the female sex is more affected than the male, and is more common in the dominant limb. As a result of numerous

studies by various authors, the disease is not the result of trauma to the shoulder complex or systemic disease, but the causes are still unclear.

The most common causes are subacromial impingement, diabetes and overload [2].

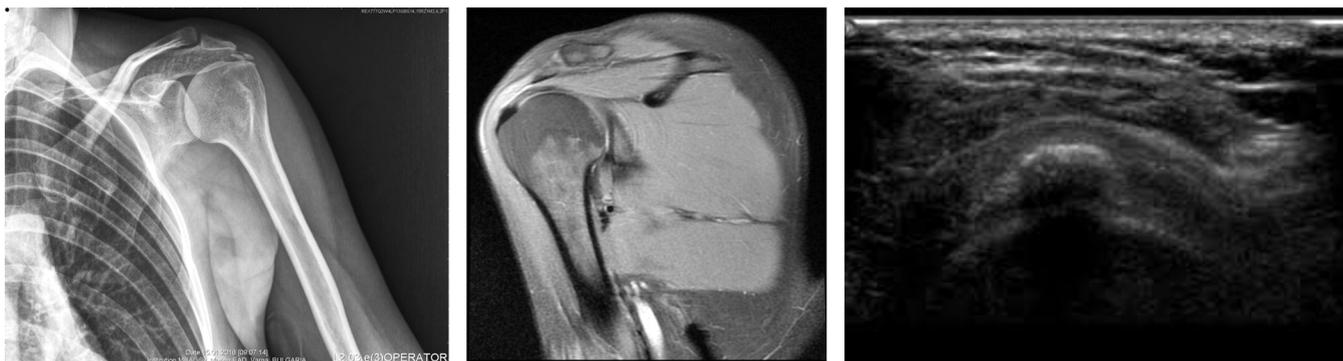
The initial hypothesis for this disease was made by Codman and is based on the initial degeneration of tendon fibers followed by calcification [3]. Moseley later identified a “critical area” in the tendon-bone insertion prone to calcium deposits [4]. The latter hypothesis presents Uthoff, pointing to the cause as reactive calcification in a healthy tendon [1]. Probably each of these hypotheses has its weight in diagnosing this condition.

This disease goes through several main phases. The initial or “forming” phase is characterized by initial metaplasia of fibroblast cells and deposition of calcium ions. This phase is asymptomatic. The classification phase is the next, in which a “separating” wall is formed around the deposit. This period is often called the “resting” period. The resorptive phase is characterized by vascularization on the periphery of the deposit and macrophage resorption. This period is symptomatic and often very painful due to the inflammatory reaction [5].

The main reason why patients visit an orthopedist is severe pain in the shoulder, both at rest and when performing movements, in some cases the pain may radiate to the neck or distal to the arm. As a result, they fail to cope with their daily activities, and with greater calcium deposits, mechanical damage to the movements in the shoulder can occur. There are four main forms of the disease based on the symptoms. The acute form lasts between one and six weeks, is very painful and dependent on the limb’s movement. The chronic recurrent form is between 6 weeks and 6 months. It is characterized by relatively painless periods and moments of severe pain. The persistent chronic form covers the period over 6 months and usually the pain is constant, but with low intensity and intensifies with movement. The asymptomatic phase is usually diagnosed by random examination of the shoulder on another occasion [6].

The diagnosis is made not only by examination by an orthopedist but also by imaging - radiography, computed tomography, magnetic resonance imaging, ultrasound [5] (Fig. 1)

**Fig. 1.** Different imaging methods for diagnosis: Radiography, MRI and ultrasound image of calcium deposits.



The classification of the type of deposit is important for both the therapeutic approach and the patient's expectations. In our practice we use the classification of the French Arthroscopy Society [7] :

- type A homogeneous, demarcated
- type B heterogeneous, fragmented, demarcated
- type C heterogeneous, difficult to distinguish, punctate
- type D dystrophic

Treatment is conservative or surgical, with conservative treatment including nonsteroidal anti-inflammatory drugs, analgesics, kinesitherapy and physical therapy, and surgical treatment consists of removing calcifications with varying degrees of success in different cases [8, 9].

#### MATERIAL AND METHODS

For the period 01. 2021 to 02. 2022 with calcifying tendonitis of the shoulder in the Department of Orthopedics and Traumatology, University Hospital "St. Marina", Varna, we had 20 patients, which we divided into two groups - experimental and control. In 10 of them, we applied kinesitherapy with physical therapy - magnetic therapy, interference current and phonophoresis, which we included in the control group, and in those of the experimental group 10 patients kinesitherapy in combination with extracorporeal shock wave therapy - 6 procedures. To illustrate the results, we used VAS, ROM and MMT. We did the testing of the patients at the beginning before the start of the kinesitherapy program, after the end of the procedures and 30 days after the last procedure. The course of treatment lasted two weeks and in the patients of the experimental group, we completed the shock wave therapy of 1 procedure after the end of kinesitherapy, as the therapies are performed every few days. The patients were between the ages of 30 and 55, and in all of them, suffering appeared for the first time.

#### RESULTS AND DISCUSSION:

With the development of medical technology in recent years, in the treatment of calcifying tendinitis extracorporeal shock wave therapy has become more popular. Shock wave therapy is an effective non-invasive solution to eliminate pain. The technology is based on pneumatically generated acoustic waves with low frequency (5-20 Hz ) and pressure (5 bar), which are applied around the existing pathology. They penetrate deep into the tissues and create conditions for the natural resumption of healing processes

[10,11]. Stopping chronic inflammatory processes enhances the activity of fat cells, which in turn causes the release of more anti-inflammatory compounds. This supports the overall healing process of damaged tissues. Shock wave therapy causes the biochemical degradation of calcifications, which is characteristic of tendon damage [12,13]. Broken deposits are removed from the body thanks to the lymphatic system. This makes it possible to release the joint surface from mechanical irritants and the application of a kinesitherapy program is more effective [8]. The end effects of the therapy are long-term pain relief and restoration of mobility.

Reducing pain, increasing joint mobility and improving muscle strength after the use of shock wave therapy allowed us to include a variety of methods and means of kinesitherapy in the complexes to restore limb function (Fig. 2). Regarding the kinesitherapy that we applied in our program in both groups are: massage, breathing exercises, general development exercises, passive kinesitherapy, active kinesitherapy, joint mobilization techniques.

**Fig. 2.** Before shock wave therapy (a). After shock wave therapy (b)





In the patients of the experimental group, we reported better results in terms of the volume of movement in the affected shoulder joint compared to the respondents in the control group, which is explained by their use in combination with kinesitherapy and extracorporeal shock wave therapy. Patients in the control group also improved their condition compared to the beginning and this improvement continued after the end of the course, which we expected after the application of physical therapy in combination with kinesitherapy, but in terms of external rotation, we found significant differences with the experimental group. In the other two main movements - flexion and abduction, we also reported differences that 30 days after the procedures are slightly smaller, but still not as accepted as the biomechanics of the joint. We have presented the results as average values with respect to the volume of motion in the three planes in the table 1.

**Table 1.** Results of the average values of ROM in experimental and control groups

	Experimental group x	Control group x
Flex in the beginning	64 °	65 °
Flex at the end	180 °	165 °
Flex after 30 days	180 °	170 °
Ext in the beginning	26 °	30 °
Ext at the end	50 °	50 °
Ext after 30 days	50 °	50 °
Abb in the beginning	59.5 °	57 °
Abb at the end	170 °	160 °
Abb after 30 days	175 °	170 °

Add at the beginning	63.5 °	60.5 °
Add at the end	75 °	70 °
Add after 30 days	75 °	70 °
External rotation in the beginning	30.5 °	31 °
External rotation at the end	60 °	45 °
External rotation after 30 days	61.5 °	50 °
Internal rotation at the beginning	66 °	65 °
Internal rotation at the end	70 °	70 °
Internal rotation after 30 days	70 °	70 °

**Table 2.** Results of the mean values of MMT in experimental and control groups

	Experimental group x	Control group x
Flex in the beginning	2.06	2
Flex at the end	4	3.8
Flex after 30 days	4.3	4
Ext in the beginning	2.2	2.5
Ext at the end	4	4
Ext after 30 days	4.5	4
Abb in the beginning	2	2
Abb at the end	4	3.4
Abb after 30 days	4.1	3.7
External rotation in the beginning	2	2
External rotation at the end	4	3.5
External rotation after 30 days	4	3.8
Internal rotation at the beginning	3	2.2
Internal rotation at the end	5	4.1
Internal rotation after 30 days	5	4.5

On the table 2 from the values thus reported it can be seen that in terms of muscle strength the patients from the experimental group after the completion of the two-week course of kinesitherapy have regained their muscles. After the follow-up examination on the 30th day after the end of the procedures, the patients from the control group reported the presence of weakness in the limb and faster fatigue.

**Table 3.** Results from the mean values for pain in the experimental and control groups measured with VAS

	Experimental group x	Control group x
In the beginning	7.5	8.1
In the end	2	4
After 30 days	2	3.5

The data from the table 3 shows a significant reduction in pain in patients who have received shock wave therapy. The participants in the experimental group reported that they could not even determine whether there was pain or discomfort that may occur when the arm is overloaded. In the beginning, the pain was almost constant both at rest and when moving. The positive results in the patients of the experimental group also showed long-term, as after the last follow-up examination on the 30th day after the end of the procedures they did not report the presence of pain and limitations in the function of the limb.

## CONCLUSION:

Shock wave therapy leads to a decrease in the concentration of Substance P, and dispersion of non-receptive metabolites, thus stopping inflammatory processes, and this is a prerequisite for reducing pain. Improved microcirculation and better metabolism at the cellular level, help to provide more substances to hypertensive muscles and ligaments and reduce tension in them. Reducing pain symptoms, increasing the range of motion in the joint, and improving muscle strength after using shock wave therapy allows for the expansion of the kinesitherapy complex to restore limb function and enhance the quality of life.

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