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Comparison of effectiveness of selected physical modalities in patients with rotator cuff injury

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Introduction

Damage of the rotator cuff is one of the most common injuries of the shoulder in people over 50 years old and athletes. In the conservative treatment of this dysfunction the significant role has appropriately selected physical treatments.

Aim of work

The aim of the study was to compare the effectiveness of selected treatments of electrotherapy and cryotherapy and kinesitherapy in people with the rotator cuff damage.

Materials and research method

Abstract The study comprised group of 32 patients with age from 55 to 75 years, the average age - 64 years. The patients were divided randomly into two groups, A and B. Each patient performed a series of 15 treatments suggested by a specialist in accordance with current treatment methodology. In group A it were selected treatments of electrotherapy field, while in group B it were treatments of local cryotherapy and kinesitherapy. Performance evaluation was based on the visual analogue scale VAS and measuring the range of motion method SFTR. The obtained research results were statistically analyzed.

Results

In both treated groups reported pain reduction of 25% in group A and 51% in group B. Also observed improve and increase the mobility of the shoulder joint after performing a series of treatments.

Conclusions

Applied physical procedures are useful in improving people with damage to the rotator cuff. Better therapeutic effects gives the use of treatments combining cryotherapy with local kinesitherapy than using only electrotherapeutic treatments.

Key words: rotator cuff, damage, physiotherapy

Introduction

The shoulder joint is one of the most complex joints in the human body. It has a large number of structures in a relatively small space, which makes the joint susceptible to injury and damage. One of the frequent dysfunctions is the damage to the rotator cuff. This pathology concerns mainly the tendon of supraspinatus muscle in area to its attachment to the greater tuberosity of the humerus. Damage is usually caused by an indirect mechanism, e. g. a fall on an abducted upper limb, a lifting of a heavy object, a violent abduction of the limb combined with a jerk. Very often they are caused by the addition of micro-injuries and overloading during work.

Rotator cuff damage may cause pain, mobility restriction and shoulder joint instability in people affected by this pathology. There may also be a deficit of muscle strength along with muscle atrophy.

In conservative treatment, apart from pharmacotherapy, appropriately selected physical modalities are important. Lack of improvement after several weeks of treatment may be an indication for surgical treatment in individually selected cases.

The methods of surgical treatment used include: decompression of the space inside the shoulder by resection of the coracoclavicular ligament, partial resection of the acromion, resection of the subacrominal bursa. Surgery can be performed using arthroscopic or open technique. It is advisable to start the procedure with the arthroscopic technique and in case of

lack of possibility to perform the arthroscopic reconstruction, move to the open technique. [1,2,3]

The aim of the study

The aim of the study was to compare the effectiveness of selected electrotherapy, cryotherapy and kinesiotherapy procedures in patients with rotator cuff damage.

In particular, it is an attempt to determine the usefulness of physical procedures applied to achieve the analgesic effect in the examined persons and their influence on mobility in the shoulder joint affected by this pathology.

Material and methods

The study was conducted in a group of 32 male patients (100%), in age from 55 to 75 years (mean age 64 years). All patients were directed for physiotherapeutic treatment by a specialist doctor because of pain and decreased range of motion in the shoulder joint as a result of damage to the rotator cuff. The research was conducted in one of the rehabilitation centres in Jelenia Góra. The respondents were randomly divided into two equal groups A and B, each of 16 people. Group A consisted of patients who underwent physiotherapy modalities, such as laser therapy, iontophoresis with NSAIDs, H-Tens currents and magnetotherapy. The group B patients underwent local cryotherapy of the dysfunctional joint and kinesiotherapy of the shoulder. The program of kinesiotherapy included active exercises, antigravity exercises, isometric exercises and self-help exercises. The procedures were performed daily from Monday to Friday for 3 weeks in accordance with the current treatment methodology and medical recommendations[4,5].

In each of the examined patients twice, before and after a series of procedures, the level of pain was assessed using the VAS (Visual Analogue Scale) scale and the active range of SFTR motion in the shoulder joint undergoing pathology was measured. The results obtained from the research were subjected to a descriptive statistical analysis.

Results

In all patients after the procedures the range of motion in the shoulder joint was improved and the degree of pain intensity assessed on the VAS scale was reduced.

Before the procedures in both groups, the mean level of pain was similar in group A (7.71 ± 1.58 points) and in group B (7.5 ± 2.1 points). After the procedures in both groups, the intensity of pain decreased, with an average decrease of 1.93 points in group A (25% improvement) and a much greater improvement in group B, namely 3.89 points in group B (51.8% improvement). After a series of treatments, an average score of the VAS scale was 5.78 ± 1.42 points in group A and 3.61 ± 1.74 points in group B. A graphical presentation of the above results is presented in Figures 1 - 2.

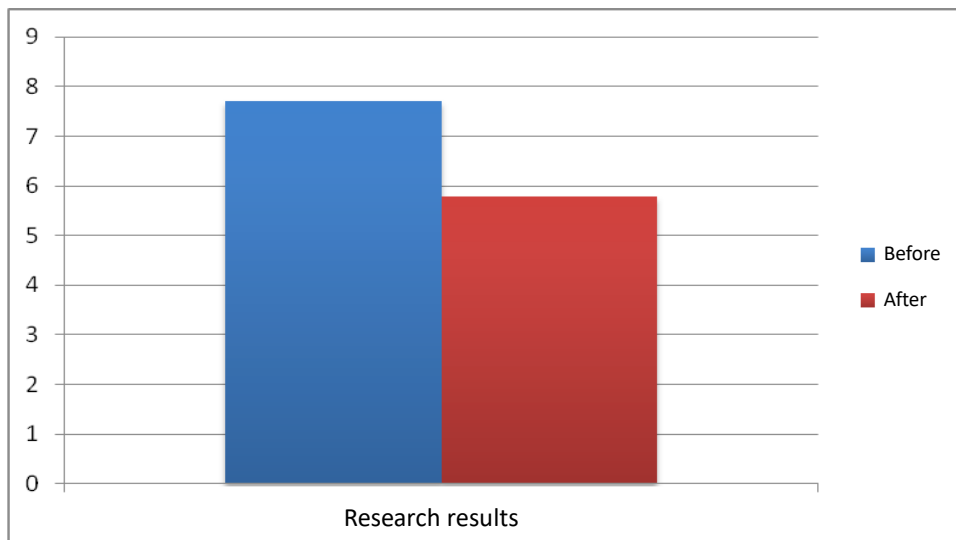


Fig.1 Average score of the VAS scale before and after physiotherapy in group A

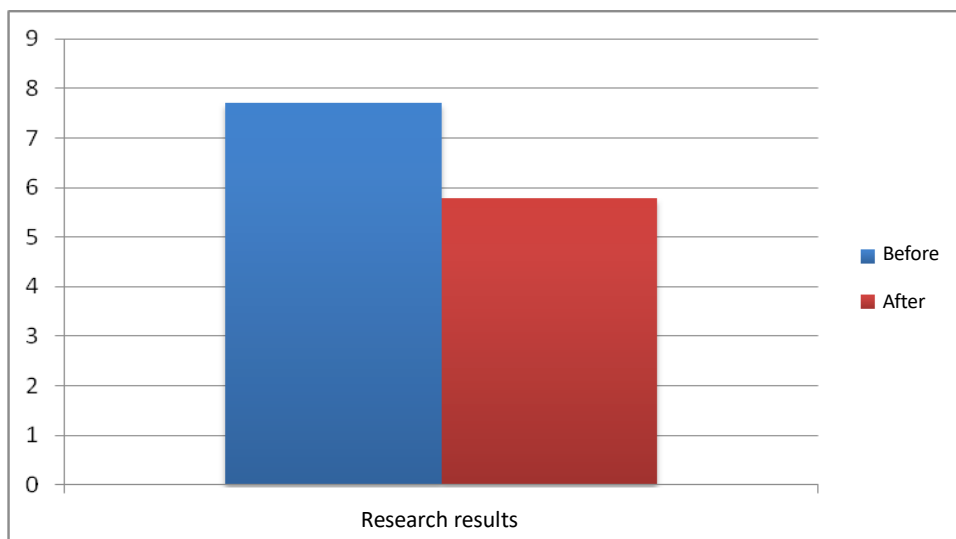


Fig. 2 Average score of the VAS scale before and after physiotherapy in group B

The range of SFTR motion in the shoulder joint (motion - flexion) in all patients in group A increased on average by 0. 22% and in group B by 0. 87%. Before the procedures in group A it was $159.35^{\circ} \pm 3.31$, and in group B $156.85^{\circ} \pm 4.48$. After the procedures the patients from group A achieved an average of $159.71^{\circ} \pm 3.24$, and from group B $158.23^{\circ} \pm 3.64$ (Fig. 3).

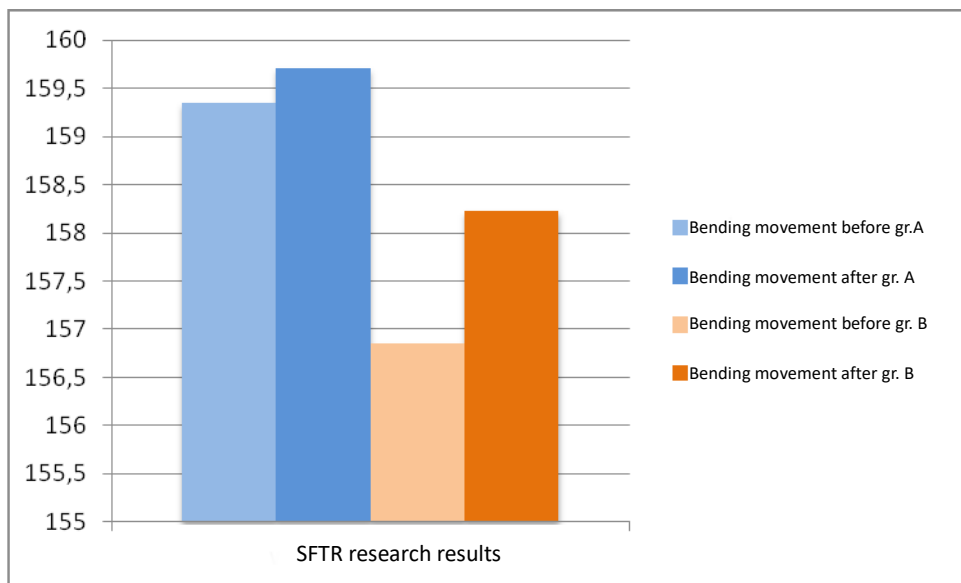


Fig. 3 Average value of range of the flexion in shoulder joint before and after physiotherapy in group A and B

The range of SFTR motion in the shoulder joint (movement - extension) in all patients in group A increased on average by 2. 04% and in group B by 3. 2%. Before the procedures in group A it was $34. 71^{\circ} \pm 3. 09$ and in group B $35. 92^{\circ} \pm 2. 05$. After the procedures the patients from group A reached $35. 42^{\circ} \pm 2. 53$ on average and from group B $37. 07^{\circ} \pm 2. 01$ (Fig. 4).

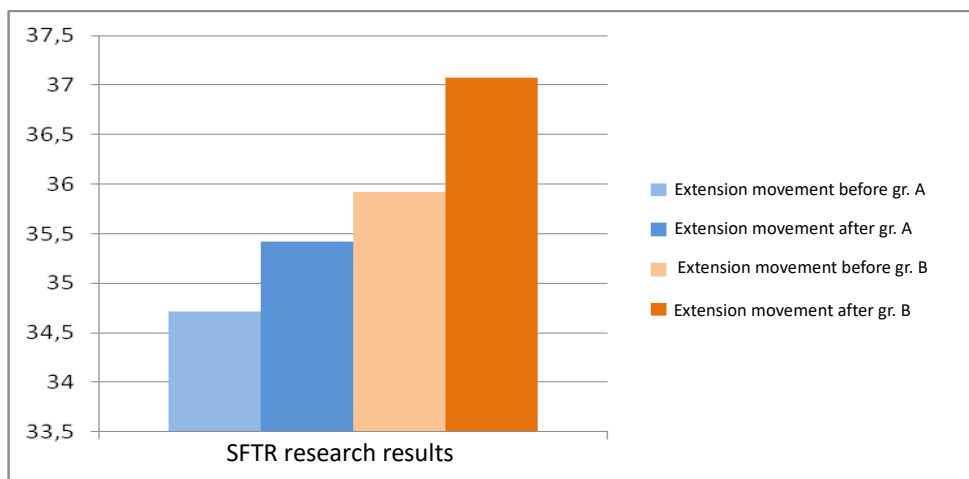


Fig. 4 Average value of range of the extension in shoulder joint before and after physiotherapy in group A and B

The range of SFTR motion in the shoulder joint (movement - abduction) in all patients in group A increased on average by 9. 44% and in group B by 20. 13%. Before the procedures in group A it was $68. 07^{\circ} \pm 6. 42$, and in group B $68. 85^{\circ} \pm 6. 46$. After the procedures the patients from group A achieved an average of $74. 5^{\circ} \pm 4. 84$, and from group B $82. 71^{\circ} \pm 4. 68$ (Fig. 5).

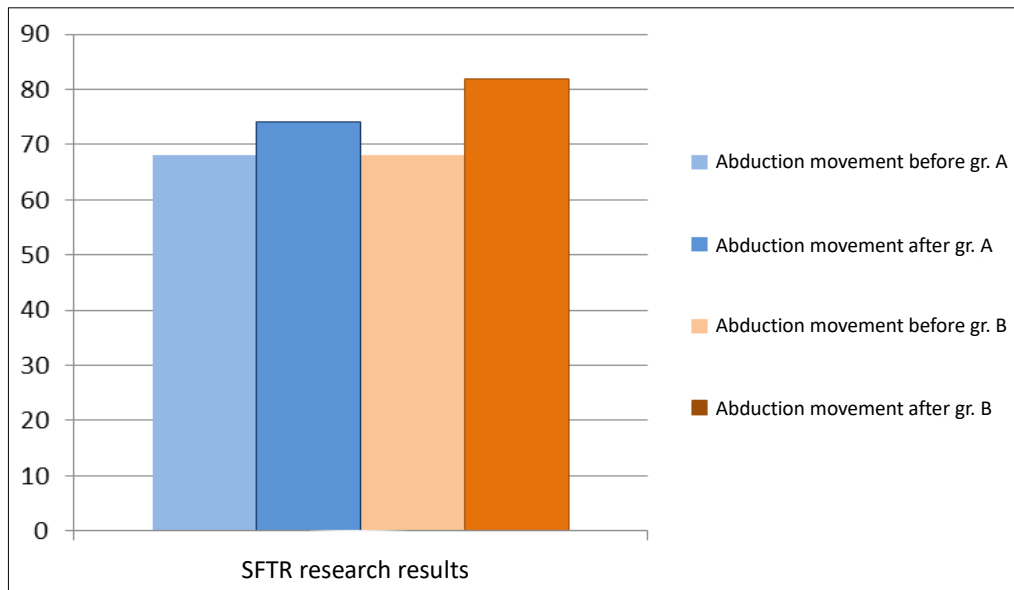


Fig. 5 Average value of range of the abduction in shoulder joint before and after physiotherapy in group A and B

The range of SFTR motion in the shoulder joint (motion - internal rotation) in all patients in group A increased by 12. 37% on average, and in group B by 34. 67% on average. Before the procedures in group A it was $28.92^{\circ} \pm 5.62$, and in group B $28.64^{\circ} \pm 5.44$. After the procedures the patients from group A were $32.5^{\circ} \pm 5$, and from group B $38.57^{\circ} \pm 5.04$ (Fig. 6).



Fig. 6 Average value of range of the internal rotation in shoulder joint before and after physiotherapy in group A and B

The range of SFTR motion in the shoulder joint (motion - external rotation) in all patients in group A increased on average by 11. 91% and in group B by 32. 15%. Before the procedures in group A it was $40.78^{\circ} \pm 3.53$ and in group B $39.78^{\circ} \pm 2.72$. After the procedures, subjects from group A achieved an average of $45.64^{\circ} \pm 4.46$ and from group B $52.57^{\circ} \pm 4.30$ (Fig. 7).

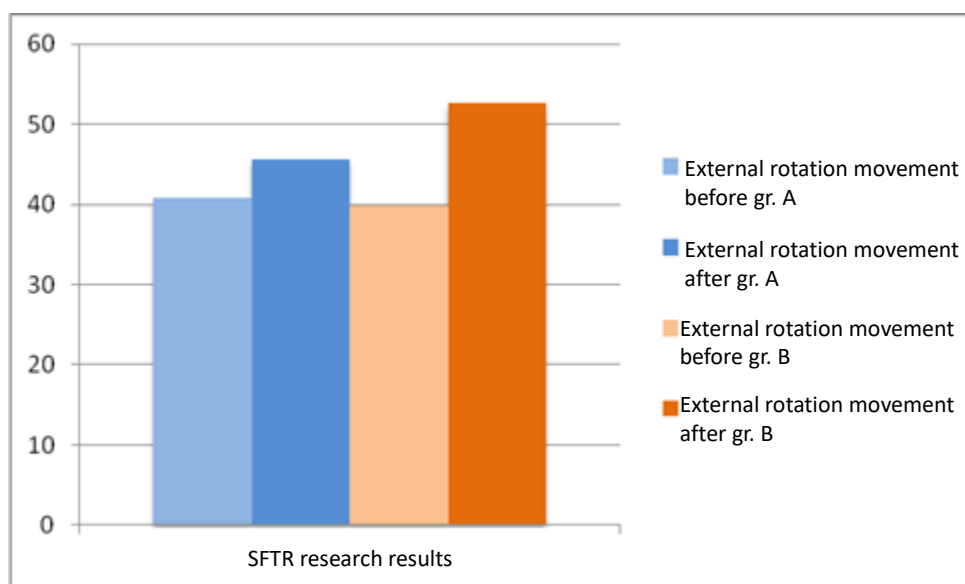


Fig. 7 Average value of range of the external rotation in shoulder joint before and after physiotherapy in group A and B

Discussion

The authors of this research want to deal with the problem of the rotator cuff damage. As a disease, it mainly affects athletes, but this type of pathology is increasingly prevalent in non-sportsment-related men. Rotator cuff damage and shoulder impingement syndrome are among the most common causes of pain, weakness, shoulder instability, and the frequency of dysfunctions, as emphasized by many studies, increases with age. This situation is probably related to the summation of overloads and micro-injuries during the life. The use of physiotherapy and kinesitherapy plays an important role in the conservative treatment of this pathology. [6,7,8]

The results of our own research presented in this paper indicate the usefulness of application of selected physical methods in patients with rotator cuff pathology. Application of appropriate physiotherapeutic management resulted in the reduction of pain in the examined patients and contributed to the improvement of the range of motion in the affected joint. The results of our own research are consistent with the results of research of other authors in the field of physiotherapy, who confirm the effectiveness of physiotherapy in the treatment of symptoms of this pathology. Michalik et al. [9] evaluated the level of pain intensity in patients after cryorehabilitation in the shoulder area. The effect of physiotherapy was to reduce the severity of pain in the examined patients by more than half in relation to the initial state.

Boerner et al. [10] emphasize in their work the importance and influence of local cryotherapy in complex physiotherapeutic management on the effectiveness of treatment of symptoms occurring in the frozen shoulder. Their improvement concerned the reduction of pain and improvement of mobility of the shoulder joint. Grymel-Kulesza et al. [11] evaluated the use of complex physiotherapy in the treatment of rotator cuff damage. In their opinion comprehensive physiotherapeutic management including cryotherapy, massage and kinesitherapy is most reasonable to achieve the expected therapeutic effects.

Conclusions

1. Application of selected physical procedures reduced pain and improved range of motion of the affected shoulder in patients with rotator cuff damage.
2. Cryorehabilitation procedures have been shown to be more effective in achieving the expected results than using only physiotherapeutic procedures.

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