

KINESITHERAPY TO INJURIES OF THE ROTATOR MUFF

(Preliminary communication)

Daniela Popova¹ and Stamenka Mitova²

¹*South-West University "Neofit Rilski" Blagoevgrad, Faculty of Public Health and Sports,
Department of „Sports and kinesitherapy”, Blagoevgrad, Bulgaria*

²*South-West University "Neofit Rilski" Blagoevgrad, Faculty of Public Health and Sports,
Department of „Sports and kinesitherapy”, PhD student, Blagoevgrad, Bulgaria*

Abstract

The main role of the rotator muff is related to securing stability in extremely not congruent Glenn-humeral joint. A highly intensive load to which it is subjected is a prerequisite for the development of various injuries. There are several basic biomechanical concepts that lie in the selection of kinesitherapeutic tools used for this type of damage. One of them is that of power couples. Well-chosen means applied correctly and in the right sequence at different stages of functional-repair process are of key importance to the overall recovery of upper limb function. Possible earlier in the day to day motor activities should include exercises for distal limb affected by progress and gradual loading. Restored by the end of the first month arthrokinematic and lack of pain in movements allow to continue treatment at home. The study included four patients, the duration of kinesitherapy was four weeks followed between 15 January and 15 March 2013. This period was conducted in 20 treatment procedures. Patients were aged between 31 and 45, and in four affected the dominant right upper limb. Implemented by kinesitherapeutic methodology allows 4-week recovery of joint mobility and overcome the pain of the mechanical movement.

Keywords: *physiotherapy, shoulder joint, arthrokinematic, tension injury (hyperextension), micro traumatic damage, shoulder joint in SFTR-methodology, functional testing of the shoulder, pending exercises*

INTRODUCTION

As a major dynamic stabilizer of the shoulder joint, the rotator muff is involved in high-intensity loads, which is a prerequisite for the development of various injuries. Of particular relevance in this regard are associated with frequent lifting the arm above the head. Etiological factors causing damage to the rotator muff vary from overvoltage to significant acute micro trauma. We discern four main conditions leading to the involvement of the rotator muff:

- compression disease (primary impingement);
- compression secondary disease (secondary impingement);
- tension injury (hyperextension);
- micro traumatic damage.

Clinical examination should determine the type, extent of damage, but also the reasons behind the suffering. There are several basic biomechanical concepts that underlie the selection of kinesitherapeutic tools used for this type of damage. One of them is that of power couples. Typical power couple on the shoulder section is that of m.deltoid and rotator muff. Isolated contraction of m.deltoid is cranial directed and would cause cranial displacement of the head of the humerus.

M.supraspinatus, m. teres minor and m. infraspinatus did pull the head of the humerus Caudal, neutralizing cranial drawing m.deltoid. Other power couples in the are those of m.serratus anterior and m.trapezius and internal and external rotators of the rotator muff. The couple m.serratus anterior - m.trapezius is also important in damage to the rotator muff as it carries upward rotation of the scapula displacing cranial acromion, which takes the lift up his arm in flexion, abduction, and scaption. Pair of external and internal rotators is also a frequent subject of development of muscle imbalance. During the training process dominated by strengthening internal rotators engaged throwing while external rotators which have to control slowing down and stopping the movement of the humerus by eccentric contraction, behind.

The aim of the report is to trace the functional effect of applying their own methods of physiotherapy after arthroscopic restore damaged rotator muff.

METHODS

The study included four patients, the duration of kinesitherapy was four weeks followed between 15 January and 15 March 2013. This period was conducted in 20 treatment procedures. Patients were aged between 31 and

45, and in four affected the dominant right upper limb

To follow the effect of the applied by us kinesi-therapeutic program selected the following methods of functional analysis:

1. Taking account of the time of appearance of pain - during the movement, at the end of the movement and stretching.
2. Measure the pain to 10 - speed visual analog scale.
3. Measurement of physiological mobility of the shoulder joint in SFTR-methodology.
4. Taking into account the strength of shoulder muscles by manual muscle-testing (MMT).
5. Evaluation of the scapula-humeral rhythm by light.
6. Complex test for functional testing of the shoulder.

Methodology applied physiotherapy

During the first week of kinesitherapy we applied tools appropriate for acute period of aseptic inflammatory reaction. Objectives and the means to achieve during this period are:

1. Reduce pain and muscle guard in the operated limb. With passive flexion, extension, abduction and scaption in painless range of motion. Relaxing massage of the shoulder muscles. Passive internal and external rotation from the neutral position within the comfort. Carefully dorsal slide the head of the humerus.
2. Maintaining mobility blade and relax the muscles of the shoulder girdle: Active-assisted and active movements of the scapula - protraction, retraction, elevation, depression, rotation of the leg side.
3. Improvement of the body stand in the upper part of the body and neck Training for retractors of the scapula and neck to avoid vicious protraction on shoulders and increased kyphosis of the thoracic spine bone.
4. Maintaining the mobility of the immobilization in the intact segments of the upper limb: free active movements of elbow, wrist and hand joints of the full range of motion. The total duration of the procedure was 30 minutes. We recommend performing the pending exercises at home like 2-3 minutes in every hour.

Physiotherapy in the second and third week

During this period continues the applying of the devices till know. A gradual transition to active-assisted and active exercises, as well as resistive. Resistance appears manually, working in painful volume. The main therapeutic agents aimed at gradually strengthening the muscles of the glenohumeral joint and restore joint mobility. It is important at this time to achieve the ability to self to the level of head. We also work to prevent persistent symptoms of pain. However, if it occurs, reduce load, or discontinue proceedings for a day or two. Of joint mobilization techniques we include dorsal and caudal sliding humeral head from occipital leg without stretching the joint capsule and ligaments. The duration of the procedure was 30 minutes gave instructions to

perform exercises at home - light isometric contractions against the resistance of a wall or door frame to the flexors, extensors, abductor, adductor and external rotators.

Physiotherapy during the fourth week

At the beginning of this period, joint mobility has substantially recovered. We work for a full refund of the ability to perform daily physical activity related to the lifting of the humerus above the head. We apply mainly active and resistive exercises. Than we focusing on toning the muscles of the rotator cuff, especially the external rotators - mm. infraspinatus, supraspinatus, teres minor. If it is necessary, we apply a stretching and joint mobilization. Also we can include exercises in closed kinetic chain, toning muscles and stabilizers glenohumeral blade, push-ups against a wall and military presses. Implement exercises with a resistance of free weights from 2 to 2.5 kg. spored ability of the patient

RESULTS

Functional results of the physical therapy have reported primary and final measurements we use methods of functional analysis described above. With patients had 4 weeks of physical therapy between initial and final tests. Taking account of the time of onset of pain.

At the beginning of the study, all patients had pain during movement in the operated shoulder joint. After performing 20 kinesitherapeutical procedures pain to all patients was only after further pressure on abduction and external rotation in the operated joint. These results show good effects of surgery and applied physiotherapy.

Quantifying the severity of the pain

Analysis of the results shows that the initial studies patients had severe pain in movement, and the additional pressure easily intensifies the pain and makes it unbearable.

In the final study found that pain is much reduced and occurs only at a significant additional pressure, but only slightly. This study confirms the positive effect of the applied physical therapy in terms of pain reduction.

Measurement of physiological mobility of the shoulder joint through protractor

In Table 1 we present the results of the initial and final determination of the volume of the main physiological movements of the operated shoulder joint.

In initial studies we found that all movements in the main planes are very limited. This limited mobility makes limbs almost completely unfit to perform daily motor activities. In the sagittal plane, with early studies found possible flexion between 30 and 50 ° (average 40 °) and possible extension between 10 and 25 ° (average 17.5 °). In the final research movements in the sagittal plane showed close to normal. Flexion is between 165 and 180 ° (average 175 °). Extension reaches values between 40 and 50 ° (average of 45 °). The average increase in flexion is 135 °, while the average increase in

Table 1. Initial and final determination of the volume of the main physiological movements of the operated shoulder joint.

Examination Study	Initial			Final		
	Min	Max	X	Min	Max	X
Traction	10	25	17.5°	40	50	45°
Flexion	30	50	40°	165	180	175°
Abduction	20	35	27.5°	150	170	161.25°
External rotation	10	30	20°	70	90	80°
Internal rotation	25	45	35°	90	90	90°

flexion is 135 °, while the average increase for the extension is 27.5 °.

In the initial abduction research shows values between 20 and 35 ° (average 27.5 °). In the final research also reached close to normal - between 150 and 170 ° (average 161.25 °). This shows an average increase in joint mobility around 133.75 °, which is a very good result for the 4-week postoperative physiotherapy.

These results confirm the almost complete recovery of mobility in the shoulder joint of the operated limb within three weeks of physical therapy.

Initial studies showed angle meter and severely restricting rotations. With limited external rotation, is between 10 and 30 ° (average 20 °). Internal rotation showed values between 25 and 45 ° (average 35 °).

In the final survey indicated almost complete recovery of rotational movements.

External rotation reaches values between 70 and 90 ° (average 80 °). This shows the average traffic increase by about 60 °. In extreme internal rotation tests showed values of 90 ° in all patients, an average increase of about 55 °. Summary of research angle meter showed almost complete recovery of joint mobility in the shoulder. That, and the pain is a prerequisite for fully complete functional recovery.

Strength of the shoulder muscles with MMT

With manual muscle testing, muscle weakness studied only at the final examinations because of pain and

Table 2. Muscle weakness studied only at the final examinations

Movement	Valuation			
	3+	4	4+	5
Flexion	1	3	-	-
Traction	1	2	1	-
External rotation	3	1	-	-
Internal rotation	1	3	-	-
Abduction	2	2	-	-

muscle guard, who did not allow conducting initial surveys immediately prior to kinesitherapy (Table 2).

Research shows insufficient restored muscle strength after application of 4 weeks of physical therapy. Most remain weak external rotators at prevailing 3 + score. Also still weak abductor, in which there are two guest 3 + and 4 two estimates. The strongest were extensors. In one patient, we have a 3 + score in two score of 4 and a score of 4+.

These results indicate that kinesitherapy a full complex functional recovery should continue at home until full recovery of muscle strength. When restored painless physiological mobility patients can safely exercise alone. Recovery of muscle strength, especially the rotator cuff (internal and external rotation) is important not only to achieve the maximum therapeutic effect, but also for the prevention of future complications and injuries.

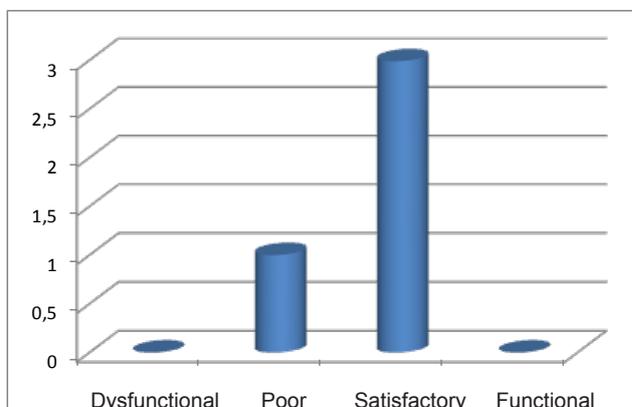


Diagram 1. Final examinations of complex test for functional testing of the shoulder

View of the scapula-humeral rhythm

In the initial studies we found violations of the scapula-humeral rhythm even at the beginning of the abduction. As a result of the applied physical therapy at final study found normal scapula-humeral rhythm in all patients.

Comprehensive test for functional testing of shoulder Palmer & Epler

The results of the final examinations of complex test for functional testing of the shoulder are presented in diagram 1. Initial complex functional tests are not applied, because then there was pain, mobility was limited and muscular effort was contraindicated. Therefore recognize the initial results of this test as dysfunctional.

The final research complex test functional testing of the shoulder showed a satisfactory result in three patients.

One patient outcome remains weak. Lack of functional results demonstrate the need for continued targeted physiotherapy after the fourth week of operation with a focus on restoring muscle strength and function of the complex.

CONCLUSIONS

1. Literature data and the results of the survey show that kinesitherapy is an integral part of the comprehensive treatment of the injured rotator cuff.

2. Implemented by kinesitherapeutic methodology allows 4-week recovery of joint mobility and overcome the pain of the mechanical movement.

3. Four week period of operative treatment of injuries of the rotator cuff does not allow full recovery of muscle strength and function of the shoulder complex area.

4. Restored by the end of the first month arthro kinematics and lack of pain on movement allow continued kinesitherapy at home

5. As a result of the treatment of end studies have found normal scapula-humeral rhythm in all patients

In conclusion we can say that the pathologies of rotator cuff are developing in two interrelated mechanisms: repeated overload and subacromial pressure. Applied by us methodology after his arthroscopic recovery is effective and helps overcome pain syndrome, normalization of the scapula-humeral rhythm and significantly improve the complex functionality of the operated limb.

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Correspondence:

Daniela Popova
South-West University "Neofit Rilski"
Faculty of Public Health and Sports,
Department of „Sports and kinesitherapy
Mihaylov” St. 66, 2700, Blagoevgrad, Bulgaria
E-mail: dany.popova@abv.bg