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Original article

THE USAGE OF THERA-BAND EXERCISES AS A WAY OF MOBILITY IMPROVEMENT IN SCAPULOHUMERAL PERIARTHRITIS

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Abstract

Aim: The scapulohumeral periarthritis is a clinical syndrome characterized by shoulder pain and movement mobility limitation, caused by periarticular structures affecting the following: tendons, capsule, ligaments, muscles, synovial bursa. The disorder is favored by the congenital factors (a too narrow space between the rotator muscles tendons and the subacromial bony arch, for exemple) or by the mechanical factors (the excessive professional or sportif use of the articulation).

This study had as its purpose to determine in which degree the use of active with resistance Thera-Band exercises increases strength and mobility on the shoulder, compared with the application of the classical strategies in therapy.

Methods: The research was conducted at the Balneal and Recovery Sanatorium of Techirghiol in 2020 autumn and included 26 patients (11 men, 25 women, age media 43), all being diagnosed with scapulohumeral periarthritis and equally divided into two groups, control and experimental.

Results: All the subjects involved in the research gained mobility and pain intensity decreased, but the experimental group presented a higher score of the final goniometry tests than the control group.

Conclusions: Resistance band exercises for periarthritic shoulder optimized the given physical therapy sessions. It represents an effective and simple technique, which provides semnificative improvements in joint range of motion.

Key words: scapulohumeral periarthritis, resistance exercises, Thera-Band.

Introduction

The upper limb is an important part of the locomotor apparatus which integrates the human body into the environment and solves the individual interventions into various necessary activities. It can be considered a brain extension, as it assures the objects gripping and their moving in relation with the body and, same time, it is a mean of communication and human expression. Thus, the affecting in any way and of any upper limb segment brings major prejudices to the entire individual activity and existence.

The shoulder is the most mobile body articulation, with the most imperfect co-optation of the articular surfaces. This morphological inadequacy is supplanted through a capsulo-tendinous structural system, with a great morpho-functional efficiency, of which illness, in most of the cases, is the main reason for the shoulder malfunction (Crețu, 1996). The balance is part of the coordination and coordination capacity shown to be necessary in performing motor skills development² in general, if all the body structures are in good health, that is why any disorder has to be annihilated (Crețu, Gherghel, 2010).

Being the most mobile body articulation, the shoulder has the role to positin the hand, thus any motion limitation affects the person in cause. This is why the shoulder mobility rehabilitation is one of the main

objectives in therapy. From all its illnesses, scapulohumeral periarthritis has the higher incidence (Crețu, Gherghel, 2011). This type of affecting has a great interest in the recovery activity, as the shoulder is the connection between the trunk and the upper limb, an important one regarding the daily movements.

The scapulo-humeral periarthritis is a clinical syndrome characterised by shoulder pain and movement mobility limitation, caused by the periarticular structures affecting: tendons, capsule, ligaments, muscles, synovial bursa. This is the reason why this disease is included in the class of the abarticular rheumatism (Gherghel, Buzescu, 2013).

The disorder is caused by an inflammation of the tendons which action the rotator muscles (the most frequent being affected the supraspinatus muscle), of the subacromiodeltoid serous bursa (the gliding space between the deltoid muscle and the acromion, in a way and the rotator muscles, on the other way) and/or of the articular capsule (between the scapulae and the humerus). The periarthritis is favored by the congenital factors (a too narrow space between the rotator muscles tendons and the subacromial bony arch, for exemple) or by the machanical factors (the excessive professional or sportive use of the articulation) (Gherghel, Cordun, Cosma, 2018).

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The scapula-humeral periarthritis recovery and rehabilitation is often a challenge for the specialists, due to the movement restriction persistence in time and the pain recurrence. The physical therapy methods and means are one of the fundamental medical solutions for this disorder. In the practice field there are various types of techniques for approaching a patient with this diagnose, each having its advantages and disadvantages. Thus, there is always a lot of space for the research, in an attempt to discover better ways for recovery.

Two types of exercise that are best for bone and muscle health are weight-bearing and resistance exercises (<https://www.ouh.nhs.uk/files>). The elaboration of special physical therapy programmes and their inclusion in the rehabilitation process have as result the articular and periarticular structures flexibility, the increasing of the tendons and the ligaments resistance, in parallel with the muscular elasticity and the biomechanical optimising of the affected articulations, with a better stability and general mobility.

Methods

This study had as its purpose to determine in which degree the use of active with resistance Thera-Band exercises increases strength and mobility on shoulder, in comparison with the applying of the classical strategies in therapy.

Thera-Band is approved by the American Physical Therapy Association and represents an easy and efficient tool in therapy. It is made of different thickness of latex, which gives it its resistance level. Advantages: the execution speed can be adjusted by the patient himself, the risk of the muscular injuries is excluded because the tape resistance can not be higher than the one developed by the acting muscle, creates a minimum articular pressure (Roşulescu, 2009).

The research was conducted at the Balneal and Recovery Sanatorium of Techirghiol in 2020 autumn

and included 26 patients, of which 11 men and 25 women (age media 43), all being diagnosed with scapula-humeral periarthritis on the basis of the clinical examination performed by the physician. They were equally divided into two groups, control and experimental, both following balneal treatment along with physical therapy. The studied subjects attended 10 physical therapy sessions, 45 minutes each, for 2 weeks, as long as their hospitalization in sanatorium lasted.

In order to perform the functional balance of the patients, the measurement of the joint mobility were used, as evaluation methods, by goniometry. An initial assessment was made at the admission of subjects, prior to physical therapy (shoulder flexion and abduction) and one after the last kinesiotherapy session, before discharge.

Taking into account the functional consequences of the shoulder joint impairment, the objectives of the physical therapy for both programs, control and experimental, were the increase in muscle strength of the upper limb and the improvement of shoulder mobility.

In parallel with the kinesiotherapy sessions, all the patients included in the research followed physiotherapy procedures (ultrasound, short waves, interferential current, magnetotherapy etc.), mud baths specific for Techirghiol resort, hydrokinesiotherapy (20 minutes daily, general mobilization) and massage.

The study groups characteristics:

- The control group (13 subjects, age 29-63), 7 women, 6 men, performed a classical physical therapy program, with active, small weights and Codman exercises included;
- The experimental group (13 subjects, age 30-64), 8 women, 5 men, performed 8 types of active with resistance exercises using Thera-Band, presented in the images bellow. Uchida, Nishida, Sampaio, Moritani, & Arai, 2016)



Image 1. Exercise 1

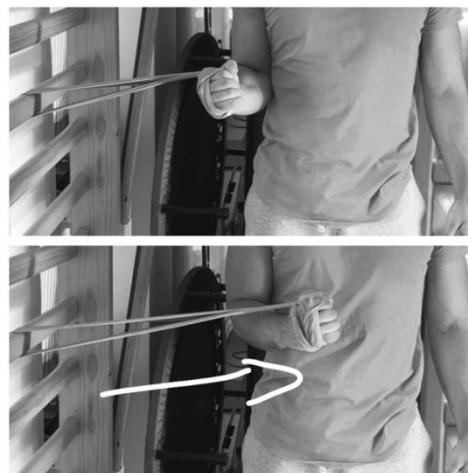


Image 2. Exercise 2



Image 3. Exercise 3

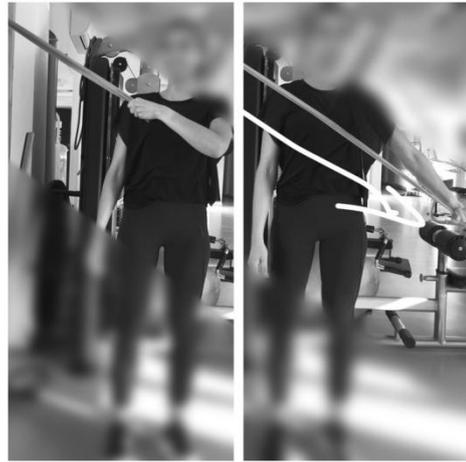


Image 4. Exercise 4

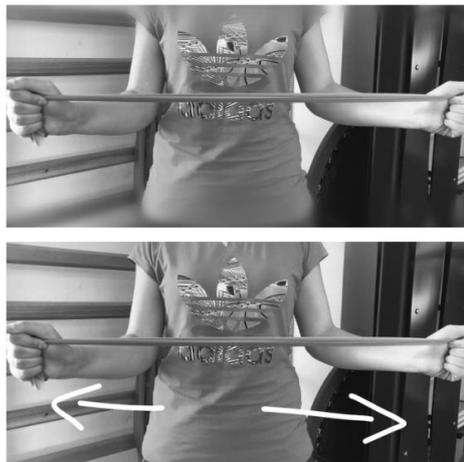


Image 5. Exercise 5



Image 6. Exercise 6



Image 7. Exercise 7



Image 8. Exercise 8

Results

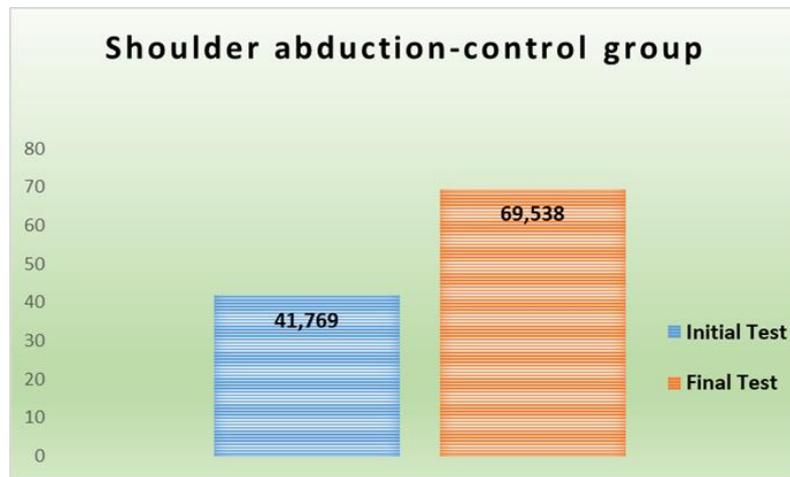
The control group. The flexion initial testing score was 43.231 ± 7.529 degree and the final $85.308 \pm$

15.467 degree. The result has a medium homogeneous value and statistic semnification ($T=16.196 / 13$ subjects; $p<0.0005$).



Graph 1. Shoulder flexion – control group

The abduction initial testing score was 41.769 ± 8.207 degree and the final 69.538 ± 8.599 degree. The result has also a medium homogeneous value and statistic semnification (T=16.027 / 13 subjects; $p < 0.0005$).



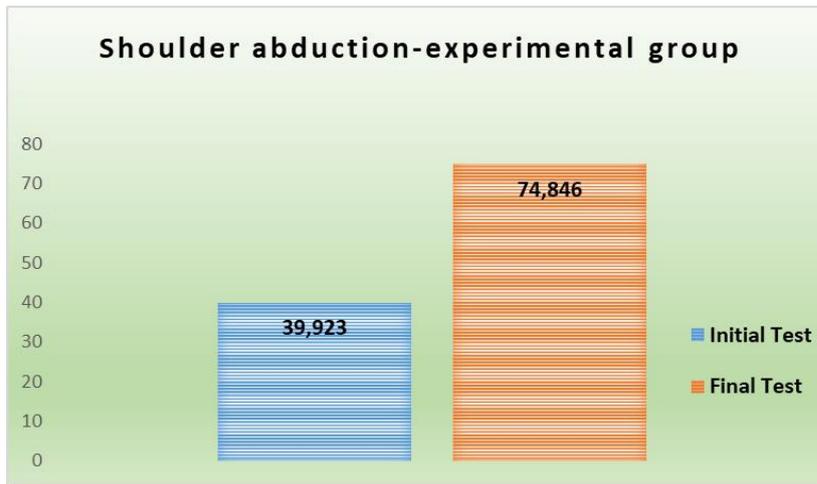
Graph 2. Shoulder abduction – control group

The experimental group. The flexion initial testing score was 44.231 ± 9.541 degree and the final 92.923 ± 15.152 degree. The result has a medium homogeneous value and statistic semnification (T=17.435 / 13 subjects; $p < 0.0005$).



Graph 3. Shoulder flexion – experimental group

The abduction initial testing score was 39.923 ± 7.529 and the final 85.308 ± 15.467 . The result has also a medium homogeneous value and statistic semnification (T=14.311 / 13 subjects; $p < 0.0005$).



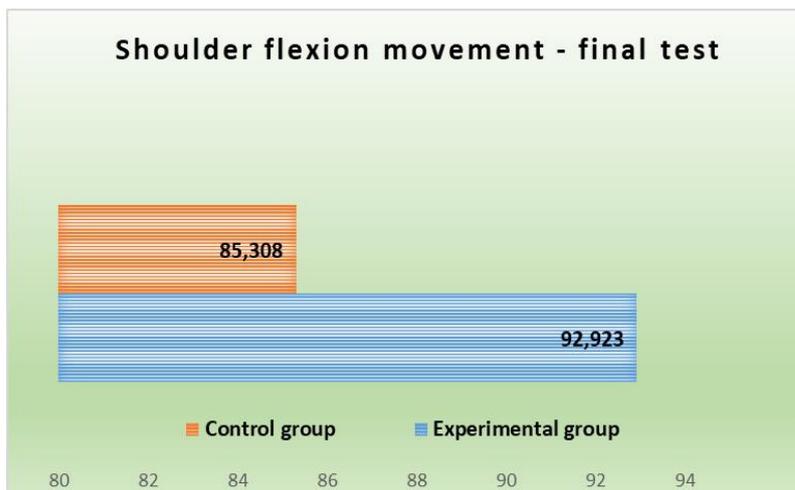
Graph 4. Shoulder abduction – experimental group

Discussions

Processing and comparing the data obtained from the initial and final shoulder goniometry measurements for the subjects involved in this study, it showed that flexion and abduction progress was gained for all.

Therefore, the joint mobility for flexion improved for both groups. The control, which followed a classical

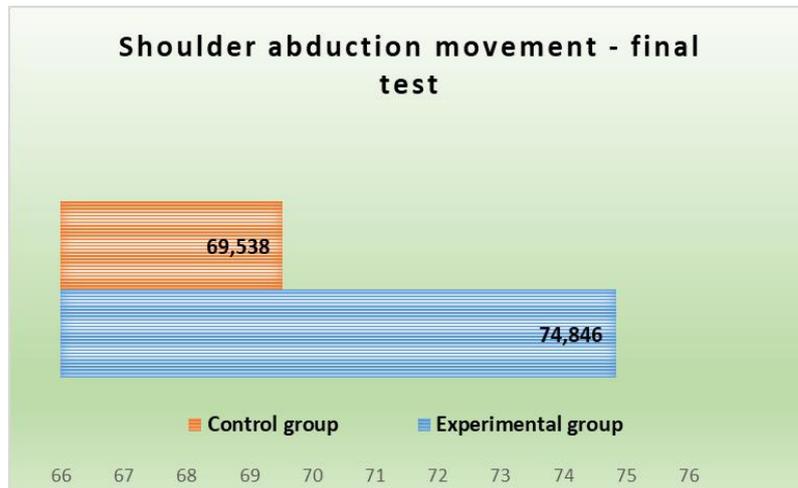
rehabilitation program had a general progress of 42.077 ± 9.367 and the experimental had 48.692 ± 10.077 , with a 6.615 grades difference between the two, in favor for the experimental group. The result has a non homogenous value and is staitistic semnificative ($T=1.734 / 13$ subjects; $p<0.05$).



Graph no 5. Comparison between experimental and control groups for shoulder flexion

The abduction degrees mobility raised also for all the subjects included in the research. The control group marked a 27.769 ± 6.247 progress and the eperimental 34.923 ± 8.798 , with 7.154 grades more efficient than

the classical approach. The result has a non homogenous value and is statistic semnificative ($T=2.39 / 13$ subjects; $p<0.025$).



Graph no 6. Comparison between experimental and control groups for shoulder abduction

Considering these results, it outlines that resistance band exercises for periarthritic shoulder optimised the given physical therapy sessions. It represents an effective and simple technique which provides semnificative improvements in joint range of motion.

Conclusions

Applying a physical exercises program, in any form, to a shoulder affected by periarthritis significantly improves the functionality of the joint. Its movement inside the medical perimeter accelerates the resorbtion of the inflammatory process, so decreases pain and restores muscle strength. This is the main and/or the first conclusion depicted by the study.

The modern researchs concerning the human balance reveal that the real balance could not exists in the biological system, in the meaning of a null deviation from a fix point (Crețu, Gherghel, 2010). Taking into account the initial values of the articular balance for the control and the experimental group, it can be observed progress for both, but the last registered 6,615 points more for flexion and 7,154 for abduction at the statistic data interpretation.

So the Thera-Band exercises program can be used in physical therapy field with very good results, as an alternative for the classic. The resistance provided by its usage has restorative influences upon shoulder, but inappropriate distribution of these forces can lead to abnormal movements that in turn cause excessive stress and lead to the destruction of connective tissue and muscles (Gherghel, Cordun, Cosma, 2018). This is why the stretch length, the thickness and the material of which Thera-Band is made, the working position of the patient, the pain feedback during the movement, the physical exercises dosage have to be in the front line

when adopting and implementing the rehabilitation strategy.

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