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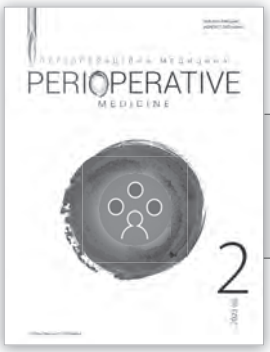

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Pain and possibilities of physiotherapy for impingement syndrome in the shoulder joint

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Abstract

Introduction: *Shoulder problems are the second most common disease of the musculoskeletal system.*

Background: *The most common cause of these problems is impingement syndrome. The aim of our work was to point out the possibilities of conservative treatment for impingement syndrome. In this work, we tried to draw attention to the deterioration in the quality of life caused by shoulder problems and we wanted to improve the range of motion in the shoulder to flexion, abduction, and reduce pain due to the chosen physiotherapy procedures. Our work has a theoretical part, in which we approach the impingement syndrome, its examination and treatment.*

Material and methods: *In the practical part, we used a clinical study with a questionnaire method to achieve the goal of our work. The group consisted of 20 patients with impingement syndrome, in whom we used manual therapy, kinesiotherapy, electrotherapy, and Kinesio taping. Using a questionnaire, we were able to assess how much impingement affects the quality of life.*

Results: *Due to the methods we chose, we managed to improve the range of motion of the arm, where the average value at the initial measurement was 119.25° to flexion and 113° to abduction. In the output measurement, the average value up to flexion was 163.25° and up to abduction 165.75°.*

Conclusion: *We also reduced the overall pain, which averaged 6.90 at baseline and 2.90 at the end. Based on our results we recommend a combination of methods to be used in impingement and not individual methods separately. It would be appropriate to perform further studies with a larger number of patients.*

Keywords: *pain, impingement syndrome, shoulder plait, rotator cuff, physiotherapy*

The main goal was to point out the significant impact of physiotherapy options in the treatment of patients with impingement syndrome in the shoulder joint.

Hypotheses

Hypothesis 1: We assume that due to impingement syndrome there will be a deterioration in the performance of normal daily activities, which we will try to confirm using the "Oxford shoulder score" questionnaire.

Hypothesis 2: We assume that due to the influence of physiotherapy methods, we can increase the range of movement to flexion in the shoulder joint.

Hypothesis 3: We assume that due to the influence of physiotherapy methods, we can increase the range of motion to abduction in the shoulder joint.

Hypothesis 4: We assume that due to the influence of physiotherapy methods, we can reduce the pain of the shoulder.

File characteristics

The research group consisted of 10 men and 10 women with an average age of 47 years. In the group of women, the age ranged from 28 to 70 years with an average of 52.60 years and in the group of men from 16 to 67 years with an average of 41.40 years.

Work methodology

To find out our goals, we decided on a prospective study and evaluated the results using descriptive statistics. Entrance and exit measurements to the study and subsequent physiotherapy were carried out in a private rehabilitation facility in Piešťany and in private premises in Krásno nad Kysucou. All measurements lasted from 11.11.2019 until 22.08.2020. The examination was carried out by a doctor for diagnosis and a physiotherapist, where we did special tests for impingement syndrome (Hawkins, Neer, painful arc, etc.). During the examination, we also had MR at our disposal.

Range of motion

In patients, we measured the range of motion in flexion and extension according to Janíková [1]. We used a metal goniometer for the measurement. The patient sat on a chair during the examination [2–7].

The COVID-19 pandemic

On March 6, 2020, Slovakia had its first confirmed case of the disease COVID-19. More are gradually added, in the middle of March 2020 in dozens a day [8–12]. Therefore, during this period, all patients were tested for SARS-CoV-2 and we counted on the risk of possible complications [13–18].

Physiotherapy plan

We created a physiotherapy plan for each patient. Physiotherapy of the patients was twice a week for 5 weeks — a total of 10 visits for each patient. Each exercise unit lasted about 50 minutes. During the first therapy, the patients were educated about exercise and load in the home environment. In all patients, we used soft techniques to relax the muscles and fascia around the cervical spine and shoulder. We modified the humeroscapular rhythm using the PNF method, we tried to increase the subacromial space by centering the humeral head. We gradually worked on increasing the range of motion first passively and then by active exercises using propriomed. With propriomed, we performed movements into flexion, extension, abduction, external rotation and internal rotation. In therapy, we also used the raband exercises to improve shoulder stability and strengthen the shoulder. In case of significant movement restrictions, we used shoulder joint mobilization.

We reduced patients pain using electrotherapy. We used the MLS laser (900 Hz, time 10 minutes, intensity 100 %). We also used ultrasound (Gymna device), which we applied during each therapy, a total of 10 times to the patient. The ultrasound intensity was 1 to 2 W/cm^2 with a frequency of 1.4 MHz and a duration of application of 5 minutes. Patients were indicated for cryotherapy at home, if needed. At the end of the therapy, we put the patients kinesio tape (*m. deltoideus, m. supraspinatus, m. coracobrachialis*) [4]. Patients have limited weight-bearing activity during treatment.

After the end of the physiotherapy, we performed an exit examination for overall pain and range of motion in flexion and abduction. We then evaluated the results of our clinical study using descriptive statistics.

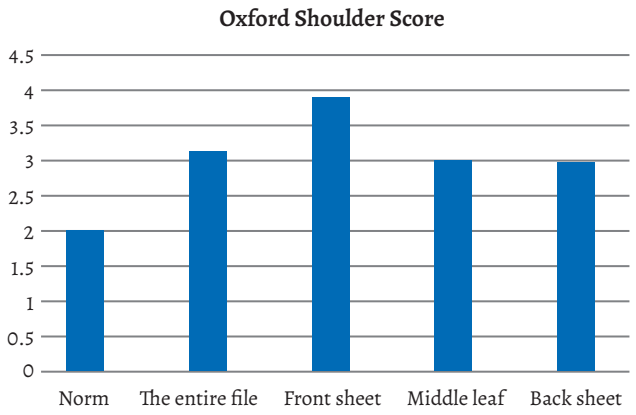
Results of the study

They had impingement syndrome in the shoulder joint in the front leaf 3 (15 %) participants, in the middle sheet 10 (50 %) and in the back 7 (35 %).

Results of hypothesis verification

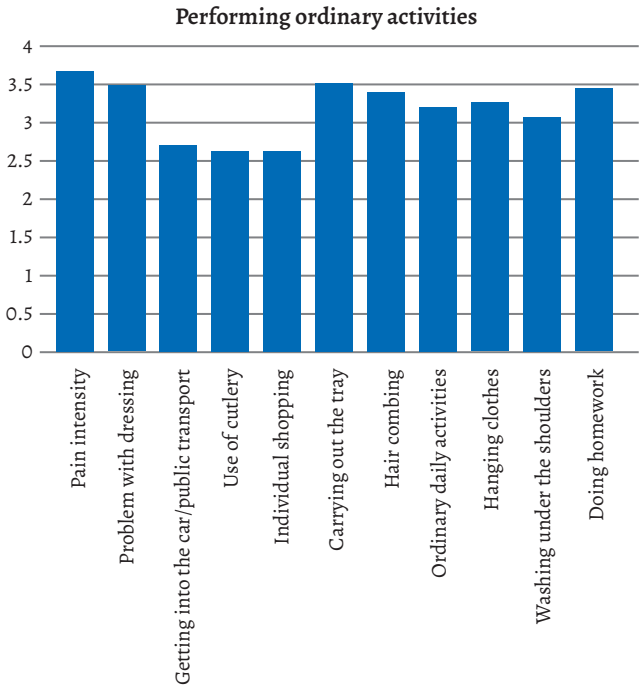
Hypothesis 1: We assume that due to impingement syndrome, the performance of normal daily activities will deteriorate, which we will try to confirm using the "Oxford shoulder score" questionnaire.

The statistical analysis showed that the studied set achieved a statistically significantly higher score than the norm.

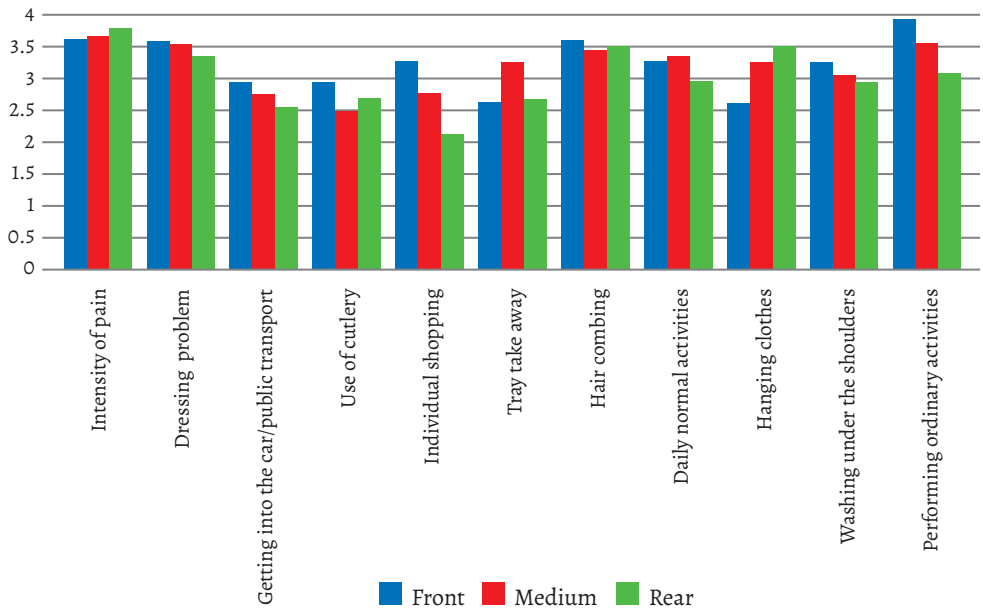


Research question 1: In which commonly performed activities do patients report the greatest deterioration?

We also analyzed the individual items of the "Oxford shoulder score" questionnaire. The respondents achieved the highest average score in the evaluation of the intensity of shoulder pain during normal daily activities, followed by items capturing problems and carrying a tray containing a plate of food across the room with dressing and doing housework. We recorded the lowest values in the activities problems when getting in and out of the car or when using public transport because of the shoulder, using a knife and fork at the same time and doing household shopping independently.



For individual arm leaves, we see differences in average scores only in some items, for example independent shopping, where the highest early was shown in the front and the lowest in the back leaf. Also, in the activity of doing housework, we found a higher average score for the front part of the arm than for the back part. On the contrary, in the activity of hanging clothes in the wardrobe, we found the highest average score for the back leaf of the shoulder and the lowest for the front leaf.



Discussion

In the study, we focused on the issue of the shoulder joint, namely impingement syndrome. According to the some studies shoulder problems are one of the most common musculoskeletal problems seen by healthcare professionals, with an incidence of 9.5 per 1000 patients. These pathologies can lead to a significant deterioration of the health status, can be repetitive and may not resolve over time, therefore shoulder problems represent a serious health problem for doctors, employers and health insurance companies. Although there is no standardized diagnostic classification of shoulder problems, most patients show clinical signs of subacromial impingement syndrome with their shoulder problem. According to a study by Kalter et al. the most common shoulder problem is subacromial impingement syndrome, which accounts for 44–65 % of all shoulder problems [19]. Another representative study showed that 30 % of the Finnish population over the age of 30 suffer from occasional or persistent shoulder pain lasting at least one month. The greatest incidence was during the sixth decade of life. The most common clinical diagnoses were rotator cuff injuries 85 % and impingement syndrome 74 %. The prevalence of rotator cuff injury that can lead to subsequent IS increases with age. Up to 30 % of people over the age of 70 have a shoulder problem, but 75 % of such cases are asymptomatic. These and other studies confirm that shoulder injuries, specifically IS, make up a large percentage of the total number of pathologies of the musculoskeletal system. For this reason, we tried to deal specifically with IS in our work, even though there are many more pathologies in the shoulder. Most of the patients included in our study were in the age category from 45 to 70 years, which confirms the fact from the Finnish study that a large part of IS in the shoulder occurs at an older age. A smaller percentage was made up of younger people, mainly athletes or people with a significant overload of the shoulder girdle. In our work, we focused on the effect of conservative treatment in order to improve shoulder problems caused by impingement. According to a study by Garvinga et al. patients with IS suffer from painful soft tissue entrapment every time they raise their arm. As a result of this, in our work we focused on influencing the pain and range of motion into flexion and abduction using conservative treatment. According to the aforementioned study by Garving et al. the diagnosis of impingement itself is also a big problem, because several pathologies in the shoulder can mimic the symptoms of impingement during the examination, so a proper clinical examination, taking an anamnesis and confirming the diagnosis using X-ray or MRI are very important [20]. In our study, the patients had a confirmed diagnosis of impingement by medical examination, with the help of MRI, and then we supplemented it with our physical therapy examination. However, with therapies, there was not always only "pure" impingement, but some patients also had associated secondary pathologies.

According to White et al. in one study, several pathologies in the shoulder had a similar history, location of pain and clinical examination findings similar to impingement. In this study, 14 of 80 patients (17.5%) clinically diagnosed with impingement had to be excluded based on MRI due to the determination of other pathology in the shoulder [21]. According to Garving et al. the initial treatment of impingement is conservative, e.g. non-steroidal anti-inflammatory drugs, infiltrations and exercise of the patient [20].

According to Kalter et al. is a suitable conservative treatment in terms of influencing pain and function in IS and kinesiotaping in combination with manual therapy, but the probability of effectiveness is still a subject of study [19]. Three studies also investigated the clinical effects of taping. In a pilot study of 22 patients with IS lasting more than six weeks, they compared taping as an adjunct to usual manual therapy with usual physical therapy. The authors found a significant improvement in function and a reduction in pain due to taping after two weeks of application. All three studies reported pain relief and improved shoulder function. The results of taping look very promising, but the studies were small or had no control group. According to Kromer and Bastiaenen, most technical treatments such as ultrasound or laser cannot be recommended [22]. However, the evidence is limited by poor methodological quality, short follow-ups, and small patient sample sizes. In our study, we tried to combine all the above-mentioned interventions. We used manual therapy along with exercise to improve function and reduce pain. Subsequently, we used a combination of electrotherapy (laser, ultrasound) and at the end we supplemented the therapy with the application of kinesiotaping, which prolonged the effect of the therapy even at home. With the help of the methods chosen by us, according to the result, it was possible to influence the impingement syndrome in the shoulder very well. We reduced the pain in the shoulder, and subsequently, with a suitable intervention, we also managed to improve the range of

motion in flexion and abduction. However, our study included 20 patients, which is a relatively small representative sample, but it pointed out that it makes sense to work in the future on further studies focused on the conservative treatment of impingement syndrome. According to Garving et al. conservative treatment provides satisfactory results within 2 years in 60 % of cases [20]. The formal level of evidence regarding the best treatment strategy is low and it has not yet been established whether surgical or conservative treatment is more appropriate. Almost all current systematic reviews emphasize the need for better trial interventions, especially combinations of treatment techniques.

Kromer and Bastiaenen point out in their study that impingement can also be influenced by psychological factors, such as kinesiophobia or catastrophizing attitudes, which can negatively affect recovery and thus lead to chronic pain and deterioration of health [22]. We managed to confirm this statement using the Oxford Shoulder Score questionnaire, in which we tried to find out how impingement syndrome worsens the quality of life. The result of the questionnaire was that almost all patients had a limitation of life during normal daily activities. This is the reason why a high-quality physiotherapy intervention is very important, namely to improve the given difficulties and not allow the patients to get into the chronic phase of the disease, which can lead to a deterioration of the psychological state.

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Біль і можливості фізіотерапії при імпінджмент-синдромі в плечовому суглобі

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Резюме

Вступ: *Проблеми з плечем є другим за поширеністю захворюванням опорно-рухового апарату. Найпоширенішою причиною цих проблем є імпінджмент-синдром.*

Цілі: *Метою нашої роботи було вказати на можливості консервативного лікування імпінджмент-синдрому. У цій роботі ми намагалися привернути увагу до погіршення якості життя, спричиненого болем та проблемами з плечем, і хотіли покращити діапазон рухів у плечі до згинання, відведення та зменшити біль за рахунок обраних фізіотерапевтичних процедур. У нашій роботі звертаємо увагу на синдром імпінджменту, його дослідження та лікування.*

Матеріал і методи: *Групу склали 20 пацієнтів з імпінджмент-синдромом, у яких застосовували мануальну терапію, кінезіотерапію, електротерапію та кінезіотейпування. За допомогою опитувальника ми змогли оцінити, наскільки імпінжмент впливає на якість життя.*

Результати: *Завдяки обраним нами методам нам вдалося покращити діапазон рухів руки, де середнє значення при початковому вимірюванні становило 119,25° для згинання та 113° — відведення. У вихідному вимірюванні середнє значення згинання становило 163,25°, а відведення — 165,75°. Також нам вдалося зменшили біль, який у середньому оцінювався у 6,90 балів на початку реабілітації та 2,90 у кінці.*

Висновок: *На підставі наших результатів ми рекомендуємо використовувати комбінацію різних методів, а не окремі методи. Доцільно було б провести подальші дослідження з більшою кількістю пацієнтів.*

Ключові слова: *біль, імпінджмент-синдром, плечовий суглоб, манжета ротатора, фізіотерапія*