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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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ANALYSIS THE RESULTS OF SURGICAL TREATMENT AND EARLY REHABILITATION OF PATIENTS WITH MASSIVE TEARS THE ROTATOR CUFF THE SHOULDER

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Abstract.

Aim: The aim of the study was to evaluate the treatment outcomes in patients who underwent arthroscopic repair of large and massive rotator cuff tears and underwent rehabilitation at different stages of the recovery process.

Materials and methods: The clinical study group consisted of 88 patients, with an age range of 47 to 68 years (mean age 52,7±9,5 years). All patients underwent a double-row repair of the rotator cuff tendons and tenodesis or tenotomy of the long head of the biceps tendon under arthroscopic guidance. The results were assessed using the Constant Shoulder Score and the Oxford Shoulder Score scales at 6 and 12 months after the surgery.

Study design: A total of 88 patients were selected, with 50 patients in the main group (MG) who had a 6-week immobilization period. The control group (CG) consisted of 38 patients who had a shortened immobilization period of 3-4 weeks due to patient preference or recommendations from other rehabilitation centers where patients underwent rehabilitation. Shoulder immobilization was performed using a standard sling with a triangular pillow and a 15° abduction angle in the shoulder joint. Following the surgeon's recommendation, all patients were offered a rehabilitation program consisting of three periods: immobilization (0-6 weeks), functional (6-12 weeks), and training (>12 weeks) periods.

Results: Comparative analysis of the treatment results using the Oxford Shoulder Score scale showed that significantly better results were obtained in the MG patients (41,5±2,1 points) compared to the CG patients (34,2±3,6 points) at 6,2±1,2 months ($p<0.05$). Comparative analysis of the treatment results using the Oxford Shoulder Score scale at 12,2±1,3 months showed that there were no statistically significant differences between the MG and CG results (MG – 44,5±2,2 and CG – 42,4±3, $p>0,05$). Similarly, according to the Constant Shoulder Score scale, better results were observed in the MG both at 6 months and 12 months after the surgery (excellent in 82% of MG vs 36.8% in CG, good in 18% of MG vs 57.9% in CG, respectively).

Conclusion: Thus, in the short term, early activation of the operated joint leads to delayed healing of the operated tissues and worsening of joint function, as confirmed by the comparative analysis of the examined groups. Significant advantages of prolonged immobilization (at least 6 weeks) were found in short-term observation (up to 6 months), and no differences in functional outcomes were observed in the long term during the follow-up at 12 months.

Key words. Rehabilitation, tears of the rotator cuff of the shoulder, surgical treatment.

Introduction.

Injuries to the rotator cuff of the shoulder are characterized by the development of a symptom complex involving a range of movements and positions that cause pain in the shoulder joint area. This pain is associated with the loss of the rotators' guiding function during abduction and rotation, as well as the fibrosis of the capsuloligamentous apparatus of the shoulder joint [1,2]. This not only impairs the function of the shoulder joint but also leads to persistent pain syndrome and can result in the development of degenerative shoulder arthritis [3,4].

Injuries to the rotator cuff of the shoulder are characterized by the loss of anatomical integrity of the skeletal muscles: supraspinatus, infraspinatus, teres minor, and subscapularis muscles [1,4-6]. The main clinical manifestations of rotator cuff injuries are the absence or impairment of active elevation of the upper limb accompanied by persistent pain syndrome in the shoulder joint region. The lack of movement leads to the development of contracture and limited range of motion in the shoulder joint. Insufficient function of the rotator cuff results in impingement of the greater tuberosity of the humerus against the acromion during elevation, which is associated with pain [4,6]. Another factor contributing to the pain syndrome is the retraction of the multi-innervated capsule of the shoulder joint and its impingement in the subacromial space during shoulder elevation [1,4,5].

The main functional problem of the shoulder joint in this pathology is the impairment of the shoulder-scapular rhythm. An anatomical defect of the rotator cuff has been shown to cause functional deficiency in the elevation of the upper limb [7]. Surgical treatment of the rotator cuff is aimed at overcoming this functional impairment of the shoulder joint, along with reducing persistent pain syndrome. The surgical management of patients with this pathology includes repairing the injured structures of the rotator cuff with transosseous fixation to the greater tuberosity of the humerus, myolysis, and tenolysis [4,5,8,9], suturing of the rotator tendons [3,6,9-11], shoulder joint arthrolysis, closure of defects in the rotator cuff through transposition of other shoulder and scapular muscles to the greater tuberosity [2,6,10], decompressive procedures of the subacromial space, including anterior acromioplasty [4,9,10], and others. Unsatisfactory results of conservative treatment [3,9,11,12] underscore the importance of analyzing the surgical treatment of the rotator cuff and determining indications and developing an algorithm for physiotherapeutic interventions for such patients in the postoperative stage.

Aim. The aim of the study is to evaluate the treatment outcomes of patients who underwent arthroscopic repair of large and massive tears of the rotator cuff of the shoulder and underwent rehabilitation at various stages of the recovery process.

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Materials and methods.

The clinical study group consisted of 88 patients, ranging in age from 47 to 68 years (mean age 52.7±9.5 years). All patients underwent double-row repair of the rotator cuff tendons and tenodesis or tenotomy of the long head of the biceps tendon under arthroscopic control. The results were assessed using the Constant Shoulder Score and the Oxford Shoulder Score scales at 6 and 12 months after the rotator cuff repair. The evaluation according to the Oxford Shoulder Score scale was based on the following criteria: maximum score of 48, minimum score of 0. Scores ranging from 0 to 19 were considered unsatisfactory, 20-29 points were considered satisfactory, 30-39 points were considered good, and 40-48 points were considered excellent. The Constant Shoulder Score was used to assess both shoulder joints. The maximum score was 100, and the minimum score was 8. The scores of the affected and healthy upper limbs were compared. A difference of more than 30 points was considered unsatisfactory, 21-30 points were considered satisfactory, 11-20 points were considered good, and less than 11 points were considered excellent.

Statistical analysis of the research materials was performed using the MedStat software, employing descriptive statistical methods to calculate quantitative indicators in the study groups, such as mean values (M) and standard error of the mean (m). Qualitative indicators were presented as frequencies and their percentage ratios. The statistical significance of differences was determined using parametric and non-parametric methods. For independent groups of quantitative variables, the t-test was used. Differences were considered statistically significant at $p<0.05$ for all types of analysis.

Study design.

Shoulder immobilization was performed using a standard sling with a wedge-shaped pillow and a shoulder abduction angle of 15°. The clinical study group consisted of 88 patients, with 50 patients in the main group who underwent a 6-week immobilization period. The control group comprised 38 patients who underwent a 3-4-week immobilization period. The reduction in the immobilization period in the control group was due to the following factors:

- Patient's own desire to shorten the immobilization period.
- Recommendations from other rehabilitation centers where postoperative patients underwent rehabilitation.
- Since the physiotherapy program was individually prescribed to each patient, and some patients independently decided to start earlier than the recommended 6 weeks, reducing the duration of wearing the immobilization sling.

Results.

Based on the recommendation of the operating surgeon, patients were offered a rehabilitation program in the postoperative period, consisting of three stages: immobilization period (0-6 weeks), functional period (6-12 weeks), and training period (> 12 weeks).

The immobilization period (0-6 weeks). After the repair of the rotator cuff tendons under arthroscopic control, patients were placed in a standard soft immobilizing sling with an abduction angle of 15° or 45°, depending on the extent of tendon retraction observed during the surgery. Patients were allowed finger movements and movements at the wrist joint. Passive elbow joint movements (flexion and extension) were performed once a day to prevent elbow joint contracture in patients after rotator cuff repair under arthroscopic control. All patients were prohibited from any movements in the shoulder joint and sudden movements in the operated limb. Anti-inflammatory therapy involved the administration of moderate therapeutic doses of non-steroidal anti-inflammatory drugs orally or intramuscularly. Analgesics were prescribed as needed.

Cold therapy included the use of gel cold packs or a local hypothermia device. Postoperative wound management followed standard procedures, and drains (if used) were removed 24-48 hours after the surgery. The goals during this period were to ensure that there were no painful sensations during or after the exercises. The recommended exercises included:

Passive external rotation of the shoulder while lying on the back (Figure 1).

Passive shoulder flexion while lying on the back (Figure 2).

Shoulder shrugs.

Elbow flexion/extension (Figure 3).

The functional period began 6 weeks after the surgery with the removal of the immobilization dressing and continued until full restoration of shoulder joint range of motion (typically up to 12 weeks after the surgery). Passive, active-assisted, and active range of motion exercises were performed for the shoulder joint. Block trainers, rehabilitation equipment, and strength training devices were utilized.

For patients who underwent arthroscopic repair of the rotator cuff under arthroscopic control, during the first two weeks of the functional period, the dressing was removed only during exercises, and the patients remained in the dressing the rest of the time. Patients who underwent immobilization with the shoulder abducted at 45 degrees continued immobilization with the shoulder abducted at 15 degrees.

Figure 1. *Passive external rotation of the shoulder while lying on the back.*

Figure 2. *Passive shoulder flexion while lying down.*

Figure 3. *Elbow flexion/extension.*

Figure 4. *Strength exercises with additional weight of 0.5-3 kg.*

The goals of this period were:

Protect the repaired tissues.

Improve range of motion in the shoulder joint.

Initiate muscle activation. Certain restrictions were recommended, including: DO NOT:

- Lift heavy objects.
- Hold onto handrails with the operated arm.
- Perform abrupt movements.
- Abduct the shoulder more than allowed in the dressing.

The following exercises were prescribed:

Pendulum exercise

Passive external rotation of the shoulder while lying on the back

Passive external rotation of the shoulder while standing

Passive flexion of the shoulder while lying on the back

Flexion of the shoulder while sitting or standing

Passive internal rotation of the shoulder

Wall stretches

Strength exercises with an additional weight of 0.5-3 kg (to be performed once a day) (Figure 4).

Pronation/supination of the forearm with resistance

Flexion/extension of the wrist with resistance

Isometric internal and external rotation in neutral position.

The training period (starting from the 12th week after surgery)

Goals:

1. Restore full range of motion.
2. Regain muscle strength.

Timelines required for return to professional sports: The main criterion is achieving full range of motion, strength, absence of pain, and swelling. Swimming, tennis - 6-8 months.

Exercises:

3. Stretching (perform 1 time per day, 3 times per week)
4. Exercises for passive internal rotation of the shoulder
5. Wall stretches
6. Strength exercises with additional weight of 0.5-3 kg (perform 1 time per day, 3 times per week)
7. Shoulder extension while lying down
8. Shoulder and scapular abduction while lying down (Y-type), (Figure 5)
9. External and internal rotation with the use of resistance bands
10. External rotation with a resistance band (W-type)
11. Diagonal resistance band pull from top to bottom.

Comparative analysis of treatment results using the Oxford Shoulder Score showed that at 6,2±1,2 months, significantly better results were obtained in the main group (41,5±2,1 points) compared to the control group (34,2±3,6 points) ($p<0.05$). Comparative analysis of treatment results using the Oxford Shoulder Score at 12,2±1,3 months showed no significant difference between the main group (44,5±2,2 points) and the control group (42,4±3,9 points) ($p>0.05$). Thus, in the short-term perspective, it was observed that early activation of the operated joint leads to delayed healing of the operated tissues and deterioration of joint functioning, which is confirmed by the comparative analysis of the examined groups. In the long-term analysis of treatment results, it was observed that at 12 months, the results of both groups did not show significant differences, indicating that the functional capabilities of the patients were at the same level (Figure 6).

The comparative analysis of treatment results using the Constant Shoulder Score scale at 6 and 12 months after the surgical intervention showed that patients in the main group, where immobilization lasted for 6 weeks, had slightly better outcomes compared to patients in the control group, where immobilization lasted for 4 weeks ($p<0.05$). After 6 months, an excellent result was achieved by 80% of patients in the main group, while only 26,4% of patients in the control group achieved the same. A good result was obtained by 18% of patients in the main group and 57,9% in the control group, while a satisfactory result was observed in 2% of the main group and 15,7% in the control group. These differences may be attributed to the disruption of tendon-bone healing processes in elderly patients who initiated early activation of the operated limb (Figure 7 & Figure 8). A similar trend was maintained during the follow-up at 12 months, with 82% of patients in the main group achieving an excellent result compared to 36,8% in the control group. A good result was obtained by 18% in the main group and 57,9% in the control group, while the satisfactory result was absent in

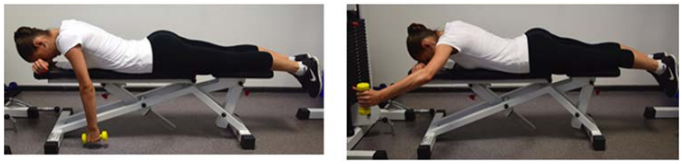

Figure 5. *Shoulder and scapular abduction while lying down (Y-type).*

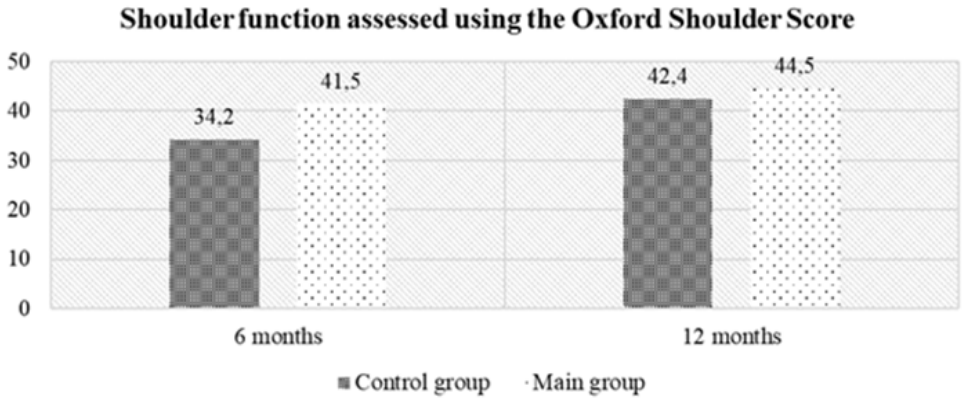

Figure 6. *Comparative analysis of treatment results according to the Oxford Shoulder Score scale, (points).*

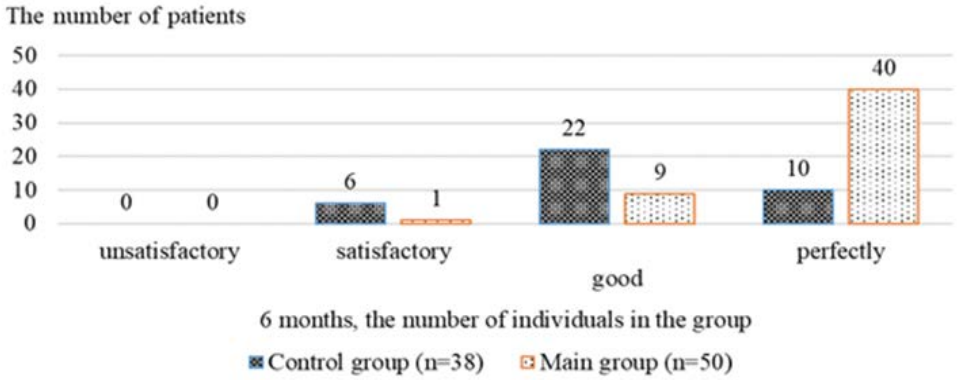

Figure 7. *Comparative analysis of treatment results according to the Constant Shoulder Score scale after 6 months, (number of patients).*

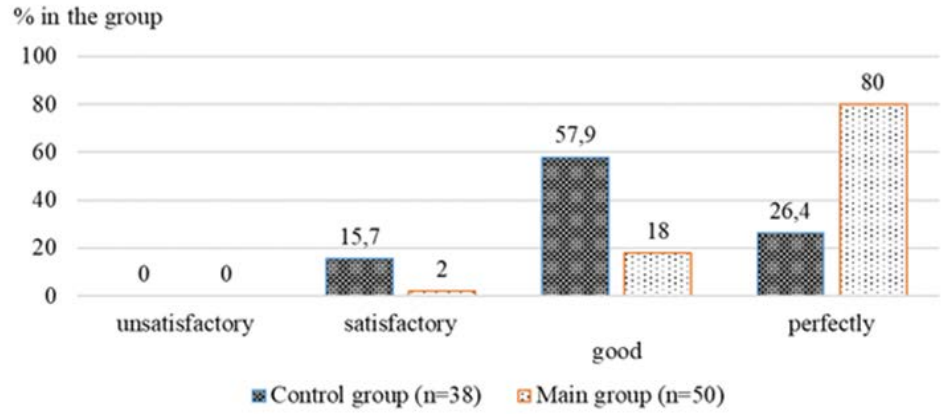

Figure 8. *Comparative analysis of treatment results according to the Constant Shoulder Score scale after 6 months, (% of patients).*

the main group and present in 5,3% of patients in the control group.

Thus, based on our observations, prolonging the immobilization period of the shoulder joint contributes to better fusion between the tendon and bone, thereby improving treatment outcomes. Early loading on the shoulder joint after repair of large and massive rotator cuff tendon tears is not always appropriate and rational, especially in older patients.

Discussion.

In the study by Keener J.D., Galatz L.M. [13], which compared the clinical outcomes and healing rates of tendons after arthroscopic rotator cuff reconstruction using two different rehabilitation protocols (n=124, patients were randomized to either a traditional early motion rehabilitation program or an immobilization group with a delayed range of motion for six weeks), it was found that active elevation and external rotation were better in the traditional rehabilitation group at 3 months. There were no significant differences in functional measures, active motion, and shoulder strength between the rehabilitation groups at 12 and 24 months.

The study by Sheps D.M., Silveira A. (Level of Evidence 1) [14] compared the effects of early mobilization (EM) with

standard rehabilitation (SR) during the first 24 months after arthroscopic rotator cuff repair (n=206). The early mobilization group (n=103) discontinued sling use and performed painless active motion activity for the first 6 weeks, while the standard rehabilitation group (n=103) wore a sling without active motion for 6 weeks.

At 6 weeks post-surgery, the EM participants had significantly better flexion and abduction ($p < 0,03$) compared to the SR participants; no other group differences were noted. No group differences in range of motion at 6 weeks and beyond ($p > 0,08$), pain ($p > 0,06$), strength ($p = 0,35$), or HRQOL ($p > 0,20$) were observed at 24 months. Among 52 patients (30% EM; 33% SR) who underwent ultrasound examination at 12 months post-surgery, full-thickness tears were found ($p > 0,8$).

Thus, our study results complement the findings of Keener JD, Galatz LM (2014) regarding faster restoration of functional capabilities of the operated limb with longer immobilization of the shoulder joint in short-term follow-up (3-6 months). However, in the long-term perspective, both our results and the results of Sheps DM, Silveira A. (2019) and Keener JD (2014) showed no differences in the restoration of active range of motion and quality of life in patients ($p > 0.05$).

Conclusion.

Arthroscopic full-thickness repair of small and medium-sized rotator cuff tears leads to a reliable improvement in clinical results and a high degree of tendon integrity using the double-row plastic technique in elderly patients. Significant advantages in long-term immobilization (at least 6 weeks) were found during short-term observation (up to 6 months), and later during re-examination after 12 months. no differences in functional results are observed.

Conflict of interest.

There is no conflict of interest.

REFERENCES

1. Bernard F. Morrey, Richard J. Hawkins. Surgery of the shoulder. Mosby. 1990:386.
2. Joseph P. Iannotti. Rotator cuff disorders. American academy of orthopedic surgeons monograph series. 1993:88.
3. Bakhsh W, Nicandri G. Anatomy, and physical examination of the shoulder. Sports Med Arthrosc Rev. 2018;26:10-22.
4. Di Benedetto P, Mancuso F, Tosolini L, et al. Treatment options for massive rotator cuff tears: a narrative review. Acta Biomed. 2021;92:e2021026.
5. Bliven KC, Parr GP. Outcomes of the Latarjet procedure compared with Bankart repair for recurrent traumatic anterior shoulder instability. J Athl Train. 2018;53:181-183.
6. Bullock GS, Garrigues GE, Ledbetter L, et al. A Systematic Review of Proposed Rehabilitation Guidelines Following Anatomic and Reverse Shoulder Arthroplasty. J Orthop Sports Phys Ther. 2019;49:337-346.
7. Kjær BH, Magnusson SP, Warming S, et al. Progressive early passive and active exercise therapy after surgical rotator cuff repair - study protocol for a randomized controlled trial (the CUT-N-MOVE trial). Trials. 2018;19:470.
8. Le HV, Lee SJ, Nazarian A, et al. Adhesive capsulitis of the shoulder: review of pathophysiology and current clinical treatments. Shoulder Elbow. 2017;9:75-84.
9. McFarland EG, Huri G, Yoon Suk Hyun, et al. Reverse total shoulder arthroplasty without bone-grafting for severe glenoid bone loss in patients with osteoarthritis and intact rotator cuff. J Bone Joint Surg Am. 2016;98:1801-1807.
10. Saccomanni B. Inflammation and shoulder pain- a perspective on rotator cuff disease, adhesive capsulitis, and osteoarthritis: conservative treatment. Clin Rheumatol. 2009;28:495-500.
11. Somerson JS, Bois AJ, Wirth MA. Anatomic Shoulder Arthroplasty. Interposition Shoulder Arthroplasty. In: Armstrong A, Murthi A. (eds) Anatomic Shoulder Arthroplasty. Springer, Cham. 2016:121-127.
12. Schoch B, Schleck C, Cofield RH, et al. Shoulder arthroplasty in patients younger than 50 years: minimum 20-year follow-up. J Shoulder Elbow Surg. 2015;24:705-710.
13. Keener JD, Galatz LM, Stobbs-Cucchi G, et al. Rehabilitation following arthroscopic rotator cuff repair: a prospective randomized trial of immobilization compared with early motion. J Bone Joint Surg Am. 2014;96:11-19.
14. Sheps DM, Silveira A, Beaupre L, et al. Shoulder and Upper Extremity Research Group of Edmonton (SURGE). Early Active Motion Versus Sling Immobilization After Arthroscopic Rotator Cuff Repair: A Randomized Controlled Trial. Arthroscopy. 2019;35:749-760.e2.

Аннотация. Анализ результатов оперативного лечения и ранней реабилитации пациентов с массивными разрывами сухожилий ротаторной манжеты плеча

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Цель исследования – оценить результаты лечения больных, которым выполнен артроскопический шов больших и массивных разрывов сухожилий ротаторной манжеты плеча и проведена реабилитация на разных этапах восстановительного лечения.

Материал и методы исследования. Клиническая группа обследования составила 88 больных, возраст пациентов - от 47 до 68 лет (средний возраст 52,7±9,5 лет). Всем больным был выполнен двухрядный шов сухожилий ротаторной манжеты плеча и тенодез или тенотомия сухожилия длинной головки бицепса плеча под артроскопическим контролем. Результаты оценивались по шкале Constant Shoulder Score и по шкале Oxford Shoulder Score через 6 и 12 мес после операции.

Дизайн исследования. Было отобрано 88 больных, из них 50 больных составили основную группу (ОГ), у которых иммобилизационный период длился 6 недель. 38 больных составили контрольную группу (КГ), у которых иммобилизационный период был сокращен до 3-4 недель в результате желания самого пациента или рекомендаций других реабилитационных центров, где пациенты проходили реабилитационное восстановление. Иммобилизация плечевого сустава проводилась в стандартной повязке с клиновидной подушкой и углом отведения в плечевом

суставе 15°. По рекомендации оперирующего хирурга в послеоперационном периоде всем пациентам была предложена программа реабилитационных вмешательств, состоявшая из 3 периодов: иммобилизационного (0–6 недель), функционального (6–12 недель), тренировочного (>12 недель).

Результаты исследования. Сравнительный анализ результатов лечения по шкале Oxford Shoulder Score показал, что через 6,2±1,2 месяцев достоверно лучшие результаты были получены у пациентов ОГ (41,5±2,1 балла) в отличие от пациентов КГ (34,2± 3,6 баллов), (при $p<0,05$). Сравнительный анализ результатов лечения по шкале Oxford Shoulder Score через 12,2±1,3 месяца показал, что результаты в ОГ и КГ уже не имели статистически значимых различий (ОГ - 44,5±2,2, и КГ 42,4±3 ($p>0,05$)). Аналогично, по шкале Constant Shoulder Score лучший результат отмечен в ОГ как через 6 мес, так и через 12 мес после операции (отличный у 82% ОГ против 36,8 % в КГ, хороший у 18% ОГ против 57,9% в КГ, соответственно).

Выводы. Таким образом, в краткосрочной перспективе отмечено, что ранняя активизация прооперированного сустава приводит к замедлению заживления прооперированных тканей и ухудшению функционирования сустава, что подтверждает сравнительный анализ обследованных групп. Достоверные преимущества в длительной иммобилизации (не менее 6 недель) выявлены при краткосрочном наблюдении (до 6 мес), в дальнейшем при повторном обследовании через 12 мес. отличий относительно функциональных результатов не наблюдается.

Ключевые слова: реабилитация, разрывы ротаторной манжеты плеча, оперативное лечение