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PHYSICAL REHABILITATION OF PATIENTS AFTER TOTAL HIP REPLACEMENT: NEW APPROACHES AND PERSPECTIVES

Annotation. *The article is devoted to the issues of physical rehabilitation after hip arthroplasty. The purpose of this study was to analyze the effectiveness of restorative measures after total hip replacement in the late postoperative rehabilitation period. The study involved 35 patients after hip arthroplasty in the late postoperative period, which were divided into two groups. In the course of the study, the practical importance of the physical rehabilitation method proposed by us in the late postoperative period was revealed.*

Key words: *endoprosthesis, hip joint, knee joint, patient satisfaction, rehabilitation.*

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ФИЗИЧЕСКАЯ РЕАБИЛИТАЦИЯ ПАЦИЕНТОВ ПОСЛЕ ТОТАЛЬНОГО ЭНДОПРОТЕЗИРОВАНИЯ ТАЗОБЕДРЕННОГО СУСТАВА: НОВЫЕ ПОДХОДЫ И ПЕРСПЕКТИВЫ

Аннотация. *Статья посвящена вопросам физической реабилитации после эндопротезирования тазобедренного сустава. Целью данного исследования был анализ эффективности восстановительных мероприятий после тотального эндопротезирования тазобедренного сустава в позднем послеоперационном периоде. В исследовании приняли участие 35 пациентов после эндопротезирования тазобедренного сустава в позднем послеоперационном периоде, которые были разделены на две группы. В ходе исследования была выявлена практическая значимость предложенного нами метода физической реабилитации в позднем послеоперационном периоде.*

Ключевые слова: *эндопротез, бедренный сустав, коленный сустав, удовлетворенность пациента, реабилитация.*

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CHANOQ-SON BO'G'IMINI ENDOPROTEZLASHDAN KEYINGI BOSQICHLARDA BEMORLARNI JISMONIY REABILITATSIYA QILISH: YANGI YONDASHUVLAR VA ISTIQBOLLAR

Annotatsiya. *Maqola chanoq-son bo'gimini endoprotezlashdan keyin jismoniy reabilitatsiya masalalariga bag'ishlangan. Ushbu tadqiqotning maqsadi operatsiyadan keyingi davrda chanoq-son bo'gimini endoprotezlashdan so'ng tiklanish choralarining samaradorligini tahlil qilish qaratilgan. Tadqiqotda operatsiyadan keyingi kech davrda jismoniy reabilitatsiya choralari 35 bemor qo'llanildi, ular ikki guruhga bo'lingan. Tadqiqot davomida operatsiyadan keyingi davrda biz taklif qilgan jismoniy reabilitatsiya usulining amaliy ahamiyati aniqlandi.*

Tayanch iboralar: *endoprotez, son bo'g'imi, tizza bo'g'imi, bemorning qoniqishi, reabilitatsiya.*

Introduction.

In recent years, there has been a rapid increase in the number of surgical interventions for total hip replacement, which has consequently led to a growing number of patients requiring effective and high-quality rehabilitation care [1, 4]. However, a well-performed surgery is only one component of the comprehensive treatment of hip joint pathology [2, 3]. Postoperative rehabilitation plays a crucial role in determining the patient's quality of life. Therefore, the development and implementation of modern rehabilitation approaches for patients recovering from total hip arthroplasty is a highly relevant issue.

Objective: To analyze the effectiveness of rehabilitation interventions following total hip arthroplasty during the late postoperative recovery period.

Materials and Methods.

The study was conducted at the Research Institute of Rehabilitation and Sports Medicine of Samarkand State Medical University. It involved 35 patients in the late postoperative period following total

hip arthroplasty (THA), who were divided into two groups. Group I included 18 patients who underwent rehabilitation according to a program developed by our team, while Group II consisted of 17 patients who received rehabilitation based on a standard protocol. The participants were aged 55 to 64 years, with a mean age of 57 ± 2.5 years.

The effectiveness of rehabilitation interventions was assessed using clinical and instrumental methods, as well as standardized scales and questionnaires evaluating functional limitations and changes in quality of life. Clinical assessments included the evaluation of pain dynamics using the Visual Analogue Scale (VAS) and measurement of lower limb muscle strength using a 6-point grading system.

Data analysis was performed using Statistica Version 6.0. Paired Student's *t*-test was used for within-group comparisons. Differences were considered statistically significant at $p < 0.01$ and $p < 0.05$.

Rehabilitation Program.

The rehabilitation program included the following components:

1. **Individual Therapeutic Exercise Sessions**

These sessions consisted of both dynamic and static muscle-loading exercises, as well as isometric contractions targeting specific muscle groups of the lower limbs. Exercise duration and the number of repetitions were tailored individually based on the patient's general condition, age, and physical fitness level. Each session lasted 15–20 minutes and included three sets of 10–12 repetitions, with rest intervals of 15–20 seconds between sets and up to 1 minute between exercises. The starting positions included supine, prone, and kneeling-elbow positions. This exercise complex was designed to restore impaired motor functions and counteract muscle hypotrophy in the lower limbs. It served as the preparatory phase, followed by the main part of the session involving kinesitherapy on a weight-resistance block machine.

2. **Kinesitherapy Using a Weight-Resistance Block Trainer**

This component targeted both deactivated muscles responsible for joint movement and functionally interconnected muscle systems contributing to motor performance. By minimizing gravitational load on one or both lower limbs, the training provided local activation without overexertion. Zero-gravity conditions and weight compensation significantly reduced fatigue, thereby enhancing the therapeutic effect. The suspension system of the device enabled various modes of activity: active, passive, isometric, and isokinetic.

Particular attention was given to the lumbar-sacral (pelvic) region and the lower extremities, as deficits in functional activity and stabilization in these areas were identified as primary issues. The kinesitherapy course consisted of 12 sessions, each lasting 30–40 minutes. Exercises were performed in three sets of 10–12 repetitions, with 30–35 seconds of rest between sets and up to 1 minute between exercises. The starting positions mirrored those used during therapeutic exercise (supine, prone, kneeling-elbow), thereby eliminating vertical stress on the joints. The resistance load was individually selected and ranged from 15 to 35 kg.



Fig. 1. **Suspension system for isolated training of the operated limb muscles to restore strength, circulation, and mobility**

The use of active-passive movement modes with optimal loading in the operated limb is a key feature of the proposed program. The exercises are specifically designed to progressively increase the range of motion in the affected joint and to enhance muscular strength.

Results and Discussion.

A comparative analysis of pain syndrome assessment (see table) revealed that after undergoing the rehabilitation course developed by our team, patients in the first group reported less frequent nighttime pain or discomfort (53 ± 2.1% and 30 ± 1.5%*) compared to those in the second group (52 ± 1.1% and 47 ± 1.85%*). We suggest that optimal motor activity improves tissue trophism in the hip joint region, thereby reducing the severity of pain.

Assessment of Pain Syndrome After Total Hip Replacement in Patients of Group I and II Before and After the Rehabilitation Course

Indicators	Group I Before rehabilitation	Group I After rehabilitation	Group II Before rehabilitation	Group IIAfter rehabilitation
Pain or discomfort during night rest, %	53 ± 2.1	30 ± 1.5*	52 ± 1.1	47 ± 1.85*
Duration of morning stiffness or pain after getting up, %	90 ± 2.3	38 ± 2.31*	88 ± 2.5	79 ± 1.1*
Prolonged standing (30 minutes) increases pain, %	45 ± 3.1	26 ± 0.38*	45 ± 3.1	41 ± 3.1*
Pain while walking, %	43 ± 2.2	30 ± 1.9*	46 ± 1.7	39 ± 1.06*
Pain or discomfort while sitting for two hours, %	45 ± 1.05	27 ± 0.9*	47 ± 1.8	40 ± 2.7*

Note: Statistically significant differences are marked with an asterisk (*) based on intergroup comparisons before and after the rehabilitation course; significance level $p \leq 0.05$.

When evaluating the duration of morning stiffness and pain-free standing within 30 minutes after waking, changes were observed in both groups. However, a larger number of patients in the second group reported pain upon verticalization (88 ± 2.5 and 79 ± 1.1*), (43 ± 0.1 and 41 ± 3.1*) compared to the first group (90 ± 2.3 and 38 ± 2.31*), (45 ± 3.1 and 26 ± 0.38*) (see table). These differences, in our opinion, can be attributed to the broader involvement of muscle groups in physical activity, which facilitated increased venous return, activated lymphatic drainage, and reduced pain symptoms.

The dynamics of the indicators between the groups (see table) also demonstrated that fewer patients in the first group reported pain during walking and prolonged sitting (43 ± 2.2 and 30 ± 1.9*), (45 ± 1.05 and 27 ± 0.9*) compared to the second group (46 ± 1.17 and 39 ± 1.06*), (47 ± 1.8 and 40 ± 2.7*). These improvements suggest an increase in pain tolerance threshold, which was achieved through reduced joint mobility restrictions, the sufficiency of compensatory mechanisms for residual impairments, restoration of muscle components, and improved motor function of the operated limb [4, 6].

Assessment of muscle strength in the operated limb using a 6-point scale showed that by the end of the rehabilitation course, 10 patients in the first group (55.5%, $p \leq 0.01$) reached a strength level of 4 points, 5 patients (27.7%, $p \leq 0.01$) reached 3 points, and 3 patients (16.6%, $p \leq 0.01$) reached 5 points. In contrast, in the second group, only 4 patients (22.2%, $p \leq 0.01$) reached 4 points and 13 patients (72.2%, $p \leq 0.01$) reached 3 points. Optimization of motor activity and proper selection of physical exercises facilitates faster activation of patients after hip joint arthroplasty and contributes to more complete recovery of adaptive function [5, 6, 7].

Thus, the rehabilitation treatment based on our developed methodology enables early patient mobilization after surgery, facilitates return to their usual environment, and restores their baseline levels of physical, social, and professional activity. It also significantly improves their psycho-emotional well-being.

ConclusionThe use of individualized therapeutic exercise sessions combined with a course of kinesiotherapy on a pulley-type resistance trainer (Crossover) in patients following total hip arthroplasty promotes improved tissue trophism in the operated limb and reduces pain syndrome. The implementation of the developed physical rehabilitation methodology in the late postoperative period after total hip replacement allowed us to:– perform joint mobilization in various starting positions and directions with greater involvement of muscle groups in physical activity, which contributed to enhanced venous circulation, activation of lymphatic flow, and pain reduction;– achieve full restoration of muscle

strength in the operated limb, as well as recovery of lost motor functions.

The proposed rehabilitation program facilitates a more complete recovery of adaptive activity and enables early mobilization of the patient during the late postoperative rehabilitation period after total hip arthroplasty.

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