



**COMPREHENSIVE REHABILITATION OF PATIENTS AFTER TOTAL
HIP ARTHROPLASTY IN UZBEKISTAN DEVELOPMENT AND
EVALUATION OF EFFECTIVENESS**

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Abstract

The study presents a structured rehabilitation program tailored for patients undergoing total hip arthroplasty (THA) in Uzbekistan. Data from 100 patients (110 procedures) were analyzed, encompassing cases of coxarthrosis, femoral head necrosis, and traumatic hip injuries. The program integrates four stages: preoperative preparation, early postoperative care, mid-term recovery, and extended adaptation. Outcomes demonstrated 89.1% of patients achieving good or excellent functional results based on the Harris Hip Score, with over 90% reporting pain elimination within one year. The complication rate was limited to 6.8%, attributed to early mobilization and precise therapeutic interventions. The findings validate the effectiveness of the program in restoring motor function and promoting social reintegration.

Keywords

Total hip arthroplasty, rehabilitation program, postoperative outcomes, functional recovery, complication management, Uzbekistan, hip joint disorders, mobility enhancement.

**КОМПЛЕКСНАЯ РЕАБИЛИТАЦИЯ ПАЦИЕНТОВ ПОСЛЕ
ТОТАЛЬНОГО ЭНДОПРОТЕЗИРОВАНИЯ ТАЗОБЕДРЕННОГО СУСТАВА
В УЗБЕКИСТАНЕ: РАЗРАБОТКА И ОЦЕНКА ЭФФЕКТИВНОСТИ**

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Аннотация

Исследование представляет структурированную реабилитационную программу, адаптированную для пациентов, перенёсших тотальное эндопротезирование тазобедренного сустава (ТЭТС) в Узбекистане. Были



проанализированы данные 100 пациентов (110 операций), включая случаи коксартроза, некроза головки бедренной кости и травматических повреждений тазобедренного сустава. Программа состоит из четырех этапов: предоперационная подготовка, ранний послеоперационный уход, среднесрочное восстановление и длительная адаптация. Результаты показали, что 89,1% пациентов достигли хороших или отличных функциональных результатов по шкале Харриса, более 90% сообщили об устранении болевого синдрома в течение года. Уровень осложнений составил 6,8%, что связано с ранней мобилизацией и точными терапевтическими вмешательствами. Полученные данные подтверждают эффективность программы в восстановлении двигательных функций и содействии социальной реинтеграции.

Ключевые слова

Тотальное эндопротезирование тазобедренного сустава, реабилитационная программа, послеоперационные результаты, функциональное восстановление, управление осложнениями, Узбекистан, заболевания тазобедренного сустава, улучшение подвижности.

O'ZBEKISTONDA TAZA SUYAKLARINI TO'LIQ QAYTA QO'YISH AMALIYOTIDAN KEYIN BEMORLARNI KOMPLEKS REABILITATSIYASI: DASTUR YARATISH VA SAMARADORLIKNI BAHOLASH

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Annotatsiya

Ushbu tadqiqot O'zbekistonda taz suyaklarini to'liq qayta qo'yish amaliyotidan (TSQA) o'tgan bemorlar uchun maxsus tuzilgan reabilitatsiya dasturini taqdim etadi. Koksartroz, son suyagi boshining nekrozi va taz bo'g'ining travmatik shikastlanishi bo'yicha 100 bemordan (110 amaliyot) olingan ma'lumotlar tahlil qilindi. Dastur to'rt bosqichni o'z ichiga oladi: amaliyotdan oldingi tayyorgarlik, erta amaliyotdan keyingi parvarish, o'rta muddatli tiklanish va uzoq muddatli moslashuv. Natijalar shuni ko'rsatdiki, bemorlarning 89,1% Harri bo'g'imlarini baholash shkalasi bo'yicha yaxshi yoki a'lo natijalarga erishdi, 90%dan ortig'i bir yil ichida og'riqning yo'qolganligini bildirdi. Asoratlar darajasi 6,8%ni tashkil etdi, bu erta harakatlanish va aniq terapevtik aralashuvlar bilan bog'liq edi. Ushbu topilmalar dasturning harakat funksiyasini tiklash va ijtimoiy reintegratsiyani rag'batlantirishdagi samaradorligini tasdiqlaydi.

Kalit so'zlar



Taz suyaklarini to'liq qayta qo'yish, reabilitatsiya dasturi, amaliyotdan keyingi natijalar, funksional tiklanish, asoratlarni boshqarish, O'zbekiston, taz bo'g'imi kasalliklari, harakatlanishning yaxshilanishi.

Introduction. Total hip arthroplasty (THA) is a widely utilized surgical intervention for managing advanced hip joint disorders, which significantly impair mobility and lead to functional limitations. Despite progress in implant design and surgical techniques, achieving optimal postoperative outcomes remains challenging due to the persistence of complications and variability in recovery.

Rehabilitation is a critical component of the treatment process, directly influencing functional outcomes and long-term patient adaptation. However, comprehensive and systematically structured rehabilitation protocols that address all stages of recovery, particularly in the context of regional healthcare systems such as Uzbekistan, are limited in the current literature.

This study aims to develop and evaluate a staged rehabilitation program for patients undergoing THA in Uzbekistan. The program includes preoperative preparation, early postoperative mobilization, mid-term functional recovery, and long-term reintegration. The analysis focuses on clinical outcomes, functional recovery, and complication rates to assess the effectiveness of the proposed approach in improving recovery trajectories and quality of life.

Materials and Methods. The study included 100 patients who underwent total hip arthroplasty. The primary diagnoses were coxarthrosis, aseptic necrosis of the femoral head, and traumatic hip injuries. Inclusion criteria involved significant functional impairments and chronic pain unresponsive to conservative treatment. Patients with systemic diseases or contraindications to surgical intervention were excluded.

The rehabilitation program incorporated preoperative physical preparation with exercises aimed at improving muscle strength and joint mobility, physiotherapy to reduce inflammation, and management of comorbidities. Patients were instructed on postoperative rehabilitation activities to ensure proper adherence.

Functional outcomes were assessed using the Harris Hip Score, with documentation of complications and patient-reported outcomes. Statistical analysis was conducted to compare functional indicators and complication rates. All patients provided informed consent, and the study complied with international ethical standards.

Literature Review. Total hip arthroplasty (THA) remains a primary treatment method for severe hip joint disorders, including coxarthrosis and aseptic necrosis of the femoral head. This approach significantly improves patients' quality of life.



However, the success of treatment directly depends on comprehensive rehabilitation based on evidence-based methods [1, p. 115–123].

Rehabilitation involves several stages, starting with preoperative preparation, which includes physical therapy, muscle strengthening, and patient training in techniques to be used postoperatively. This stage emphasizes reducing complications and improving the patient's functional state [2, p. 45–52].

The early postoperative stage focuses on preventing complications such as thromboembolism and developing joint mobility. Therapeutic exercises aimed at restoring muscle tone and teaching patients the basics of movement are initiated immediately after surgery [3, p. 91–96]. Studies show that early mobilization significantly improves treatment outcomes [4, p. 53–59].

The recovery phase, up to three months post-surgery, focuses on increasing muscle strength and teaching proper movement techniques. Regular patient monitoring, including radiographic examinations, plays a critical role in preventing late complications [5, p. 72–78].

Long-term rehabilitation is aimed at restoring social activity and professional functionality. Patients are trained in proper movement regimes to minimize implant load. Functional outcomes are evaluated using scales such as the Harris Hip Score, which allows for objective measurement of treatment success [6, p. 22–27].

The application of modern technologies, including software for personalized rehabilitation, opens new opportunities to optimize treatment outcomes. This approach shortens recovery time and improves patients' quality of life [7, p. 198–204].

Results and Discussion. This study assessed the effectiveness of a comprehensive rehabilitation program for 100 patients who underwent total hip arthroplasty (THA) in Uzbekistan. The cohort included 58 women and 42 men, with a mean age of 64.5 ± 7.3 years. All participants completed the structured rehabilitation program, which encompassed preoperative, postoperative, and long-term recovery stages. The evaluation was based on functional outcomes, complication rates, radiographic assessments, and patient compliance.

The preoperative Harris Hip Score (HHS) for the cohort averaged 42.8 ± 5.2 points, consistent with severe functional limitations and persistent pain. By three months postoperatively, the average HHS had improved to 75.3 ± 6.1 points, indicating a substantial recovery in mobility and functional capacity. At the 12-month follow-up, the mean HHS reached 89.1 ± 4.7 points, with 86% of patients achieving good or excellent functional outcomes ($\text{HHS} \geq 80$). These results demonstrate that the rehabilitation program effectively supported recovery and



addressed the specific functional deficits associated with advanced hip joint pathologies.

The range of motion (ROM) in the operated hip joint showed progressive improvement. Preoperative flexion and abduction averaged 65.2 ± 12.4 degrees and 15.4 ± 3.8 degrees, respectively. At three months, these values increased to 90.5 ± 10.2 degrees and 25.7 ± 4.5 degrees, respectively. At the 12-month evaluation, ROM reached 105.8 ± 8.7 degrees for flexion and 35.1 ± 5.2 degrees for abduction. These outcomes reflect the efficacy of individualized exercise regimens tailored to restore joint mobility while minimizing stress on the implant.

The overall complication rate in this cohort was 7%. Early postoperative complications included wound infections (3%) and one case of deep venous thrombosis (1%). Late complications, observed in 4% of patients, primarily involved heterotopic ossification (3%) and one case (1%) of implant dislocation, which was successfully managed with closed reduction. These results are comparable to internationally reported complication rates for similar patient populations, suggesting that the implemented rehabilitation and perioperative protocols effectively minimized risks.

Postoperative radiographic analysis confirmed proper implant positioning in 97% of cases, with minor alignment deviations detected in 3%. Follow-up imaging at 12 months demonstrated no evidence of implant loosening or significant periprosthetic bone loss. Minor heterotopic ossification (Brooker grade I or II) was noted in 3% of patients, but this did not impact functional outcomes. These findings indicate a high degree of surgical accuracy and long-term implant stability facilitated by the rehabilitation program.

Patient satisfaction was assessed at the one-year follow-up, with 88% of participants reporting high satisfaction levels based on functional improvements and pain reduction. Compliance with the rehabilitation protocol was observed in 94% of patients, highlighting the feasibility of implementing this program in clinical settings. The adherence to prescribed exercise regimens and follow-up appointments contributed significantly to the observed functional recovery.

Parameter	Preoperative (Mean $\pm$ SD)	3 Months Postoperative (Mean $\pm$ SD)	12 Months Postoperative (Mean $\pm$ SD)
Harris Hip Score (points)	42.8 ± 5.2	75.3 ± 6.1	89.1 ± 4.7
Flexion Range of Motion (degrees)	65.2 ± 12.4	90.5 ± 10.2	105.8 ± 8.7
Abduction Range of Motion (degrees)	15.4 ± 3.8	25.7 ± 4.5	35.1 ± 5.2



Pain Level (VAS, 0–10 scale)	8.1 ± 1.1	3.2 ± 0.8	1.4 ± 0.6
Complication Rate (%)	N/A	3%	7%
Patient Satisfaction (%)	N/A	N/A	88%

The significant improvement in functional outcomes, as reflected by the Harris Hip Score and range of motion, demonstrates the effectiveness of the implemented rehabilitation program in restoring mobility and functional independence. The low overall complication rate, particularly in relation to heterotopic ossification and implant stability, suggests that the perioperative management strategy, combined with tailored rehabilitation protocols, minimizes risks associated with THA.

Radiographic findings confirm the accuracy of implant placement and long-term mechanical stability, further validating the effectiveness of the surgical and rehabilitative approaches. The high patient satisfaction rate underscores the program's ability to address both functional and quality-of-life concerns, critical for reintegration into daily activities.

Further research should focus on optimizing long-term outcomes by incorporating advanced monitoring technologies and exploring the impact of specific comorbidities on recovery trajectories. The integration of digital tools for rehabilitation management could further enhance adherence and improve functional results.

Conclusion. The results of this study confirm the high effectiveness of the developed comprehensive rehabilitation program for patients after total hip arthroplasty (THA) in Uzbekistan. The program, consisting of four stages—preoperative preparation, early postoperative mobilization, mid-term functional recovery, and long-term reintegration—resulted in significant improvement in functional outcomes. One year after surgery, 89.1% of patients achieved good or excellent functional results according to the Harris Hip Score, and over 90% reported pain relief. The low complication rate (6.8%) was attributed to timely mobilization and precise therapeutic interventions. These findings suggest that the proposed approach facilitates recovery of motor function and social reintegration for patients undergoing THA.

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