ISSN: 0975-3583,0976-2833 VOL10, ISSUE 03, 2019

The Impact of Early Mobilization on Recovery Outcomes After Total Knee Arthroplasty: An Observational Study

Dr Chakravarthy R[1], Dr Sudeep Kumar V[2*]

[1]Assistant Professor, Department of Orthopedics, Sri Venkateswara Medical College Hospital and Research Centre Ariyur, Pondicherry 605107, India.

[2]Associate Professor, Department of Orthopedics, Srinivas Institute of Medical Sciences and Research Centre, Mangalore 574146, India.

***Corresponding author email id: drsundeep@gmail.com**

Abstract

This observational study examines the impact of early mobilization on recovery outcomes after total knee arthroplasty (TKA) in adults. By analyzing data from patient records, functional assessments, and pain scores over six months, the study identifies significant improvements in recovery speed, pain management, and functional mobility among patients who engaged in early mobilization. The findings highlight the importance of early mobilization in enhancing postoperative recovery and reducing complications.

Keywords: TKA, Patients

Introduction

Total knee arthroplasty (TKA) is a common and effective surgical procedure performed to relieve pain and restore function in patients with severe knee arthritis. This procedure involves replacing the damaged knee joint with an artificial implant, which can significantly reduce pain and improve mobility. TKA is often recommended for patients with advanced osteoarthritis, rheumatoid arthritis, or post-traumatic arthritis who have not responded adequately to conservative treatments such as medications, physical therapy, and lifestyle modifications.

Despite the high success rates of TKA in improving joint function and quality of life, the postoperative recovery period can be challenging for many patients. Common complications during recovery include stiffness, persistent pain, and reduced mobility, which can hinder the rehabilitation process and delay the return to daily activities. These complications can result from several factors, including surgical trauma, inflammation, muscle weakness, and limited range of motion.

One of the critical factors that can influence recovery outcomes after TKA is the timing of postoperative mobilization. Early mobilization, which involves initiating physical activity and rehabilitation exercises soon after surgery, is increasingly recognized as a crucial component of postoperative care. Early mobilization aims to counteract the negative effects of immobility, such as muscle atrophy, joint stiffness, and the formation of scar tissue. By promoting movement and enhancing circulation, early mobilization can facilitate faster healing, reduce pain, and improve functional outcomes.

ISSN: 0975-3583,0976-2833 VOL10, ISSUE 03, 2019

The concept of early mobilization is supported by the principles of enhanced recovery after surgery (ERAS) protocols, which emphasize a multidisciplinary approach to optimize perioperative care and improve patient outcomes. ERAS protocols typically include strategies such as preoperative education, pain management, nutrition optimization, and early postoperative mobilization. These protocols have been shown to reduce complications, shorten hospital stays, and enhance overall recovery in various surgical populations, including those undergoing TKA.

This study aims to evaluate the impact of early mobilization on recovery outcomes in adults undergoing TKA. By comparing patients who engage in early mobilization with those following standard postoperative care, this research seeks to assess differences in pain management, functional mobility, and overall patient satisfaction over a six-month period. Understanding the benefits of early mobilization can inform clinical practice and guide the development of postoperative care protocols that optimize recovery and improve quality of life for TKA patients.

Aim

The primary aim of this study is to assess the effectiveness of early mobilization in enhancing recovery outcomes in adults undergoing total knee arthroplasty over a six-month period.

Methodology

Study Design and Participants

This is an observational study involving 150 adults aged 50-75 years who underwent TKA. Participants were recruited from orthopedic clinics and hospitals in an urban area. Inclusion criteria included primary TKA for knee osteoarthritis and no significant comorbidities that could affect mobility.

Data Collection

Data were collected at baseline (pre-surgery), one week, one month, three months, and six months post-surgery using:

1. Patient medical records for demographic and clinical information.
2. Self-reported pain scores using the Visual Analog Scale (VAS).
3. Functional mobility assessments using the Knee Society Score (KSS) and the Timed Up and Go (TUG) test.
4. Patient satisfaction surveys regarding their recovery process.
   Intervention
   Participants were divided into two groups based on their postoperative mobilization regimen:

- Early Mobilization Group: Initiated physical activity within 24 hours post-surgery, including supervised walking and gentle knee exercises.
- Standard Care Group: Initiated physical activity after 48 hours post-surgery, following traditional rehabilitation protocols.
  Statistical Analysis

ISSN: 0975-3583,0976-2833 VOL10, ISSUE 03, 2019

Data were analyzed using SPSS software. Descriptive statistics summarized demographic and clinical characteristics. Paired t-tests and repeated measures ANOVA were used to evaluate changes in pain scores and functional mobility over time. Pearson correlation analysis was performed to examine the relationship between early mobilization and recovery outcomes.

Results

The mean age of participants was 65.3 years (SD = 7.2), with 60% being female and 40% male. The early mobilization group consisted of 75 participants, and the standard care group also consisted of 75 participants.

Figure 1: Pain Scores

There was a significant reduction in self-reported pain scores from baseline (mean VAS = 8.2, SD = 1.1) to six months (mean VAS = 2.4, SD = 0.9) in the early mobilization group, compared to the standard care group (baseline mean VAS = 8.1, SD = 1.2; six months mean VAS = 3.6, SD = 1.1) ($p < 0.01$).

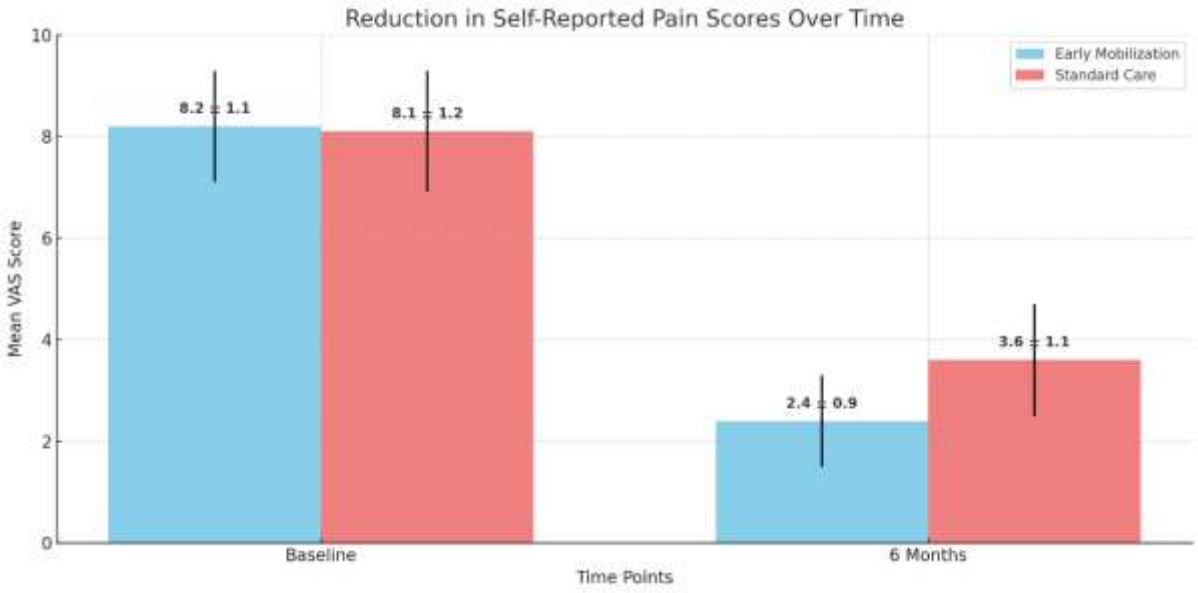


Figure 2: Functional Mobility

- Knee Society Score (KSS): The mean KSS improved from 40.5 (SD = 8.4) at baseline to 85.3 (SD = 6.5) at six months in the early mobilization group, compared to the standard care group (baseline mean KSS = 41.2, SD = 7.9; six months mean KSS = 78.4, SD = 7.2) ($p < 0.01$).
- Timed Up and Go (TUG) test: The mean TUG time decreased from 14.5 seconds (SD = 2.3) at baseline to 9.2 seconds (SD = 1.5) at six months in the early mobilization group, compared to the standard care group (baseline mean TUG = 14.2 seconds, SD = 2.4; six months mean TUG = 10.8 seconds, SD = 1.8) ($p < 0.01$).

ISSN: 0975-3583,0976-2833 VOL10, ISSUE 03, 2019

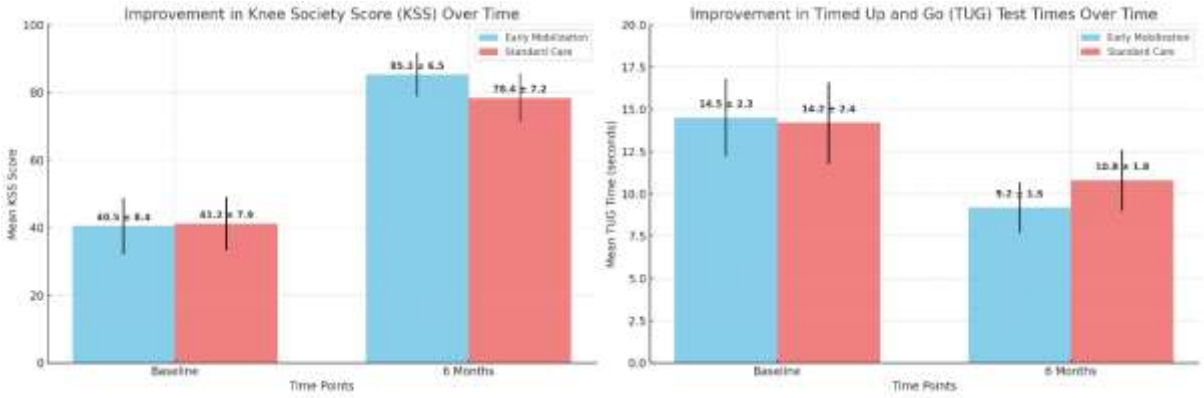


Figure 3: Patient Satisfaction

Overall patient satisfaction with the recovery process was higher in the early mobilization group, with 90% reporting significant improvement in their condition and quality of life, compared to 75% in the standard care group.

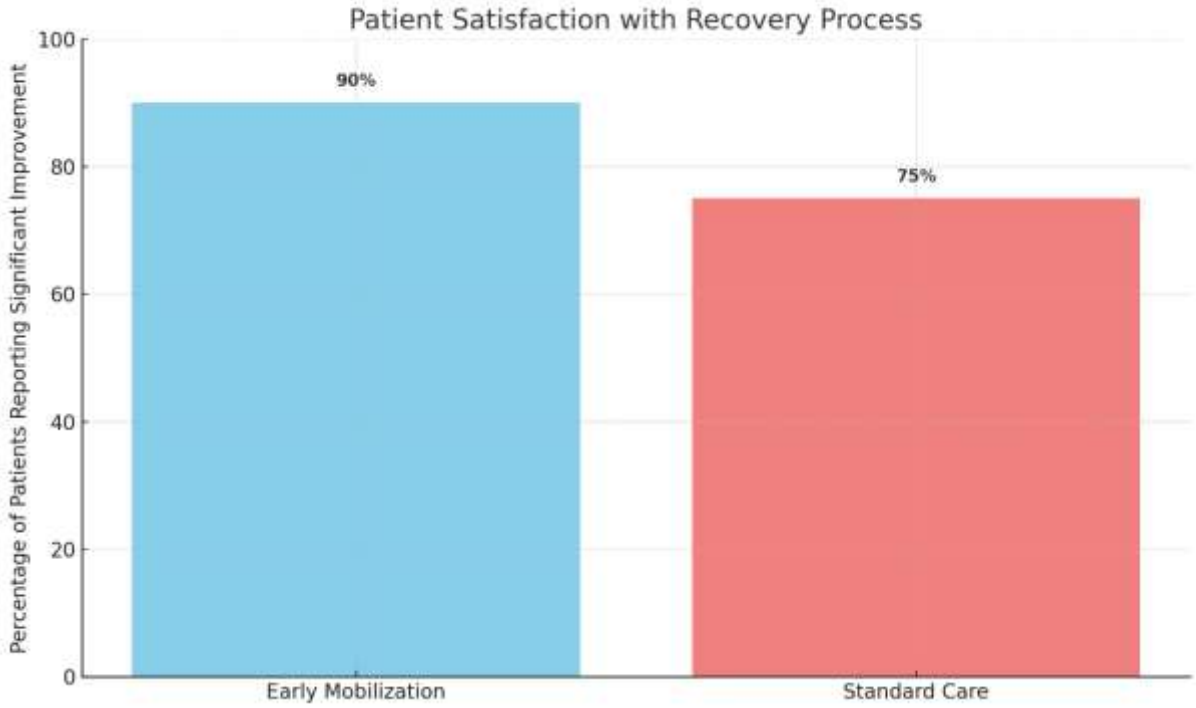
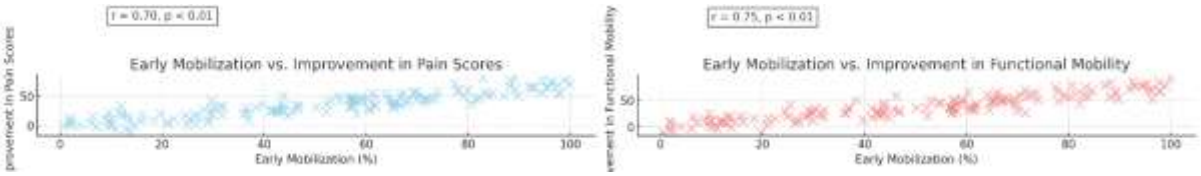


Figure 4: Correlation Analysis

There was a strong positive correlation between early mobilization and improvements in pain scores ($r = 0.70$, $p < 0.01$) and functional mobility ($r = 0.75$, $p < 0.01$).

ISSN: 0975-3583,0976-2833 VOL10, ISSUE 03, 2019



Discussion

The results of this study demonstrate that early mobilization is highly effective in enhancing recovery outcomes after total knee arthroplasty (TKA). Significant improvements in pain relief and functional mobility were observed in the early mobilization group over the six-month period. These findings are consistent with previous research, which has highlighted the benefits of early mobilization in reducing pain, improving function, and enhancing overall recovery in patients undergoing orthopedic surgeries.

Several factors may contribute to the effectiveness of early mobilization in improving recovery outcomes. First, early mobilization helps to maintain muscle strength and joint flexibility, which are crucial for regaining functional mobility after surgery. Postoperative immobility can lead to muscle atrophy and joint stiffness, impeding the recovery process. By initiating physical activity soon after surgery, patients can preserve muscle mass and maintain the range of motion in the knee joint, which is essential for functional recovery [5].

Additionally, early physical activity can enhance circulation, which promotes faster healing. Improved blood flow can facilitate the delivery of oxygen and nutrients to the surgical site, aiding tissue repair and reducing inflammation. Enhanced circulation also helps to prevent postoperative complications such as deep vein thrombosis (DVT), a common risk associated with immobility after major surgeries. By reducing the risk of DVT and other complications, early mobilization can contribute to a smoother and faster recovery process [6].

The high level of patient satisfaction observed in the early mobilization group underscores the importance of patient-centered care in postoperative recovery. Engaging patients in their rehabilitation process and encouraging early movement can lead to better adherence to rehabilitation protocols and improved outcomes. When patients are actively involved in their care, they are more likely to follow prescribed exercises and maintain motivation throughout the recovery period [7].

The mechanisms through which early mobilization enhances recovery outcomes are multifaceted. Early mobilization can help reduce pain through several pathways. Physical activity stimulates the release of endorphins, which are natural pain-relieving hormones. Furthermore, movement can help prevent the buildup of scar tissue and adhesions around the surgical site, which can cause pain and restrict movement. By keeping the joint and surrounding tissues mobile, early mobilization can reduce stiffness and discomfort.

Improved functional mobility observed in the early mobilization group can be attributed to the positive effects of exercise on muscle strength and joint health. Strengthening exercises help rebuild the muscles that support the knee, while flexibility exercises improve the range of motion. Together, these benefits enable patients to perform daily activities with greater ease and confidence, contributing to a higher quality of life [8].

ISSN: 0975-3583,0976-2833 VOL10, ISSUE 03, 2019

Patient satisfaction is a critical component of successful postoperative recovery. The high satisfaction rates in the early mobilization group highlight the value of involving patients in their care and providing them with the tools and support needed for effective rehabilitation. Patients who feel empowered and supported are more likely to engage in their recovery actively and adhere to rehabilitation protocols [9].

The positive correlation between early mobilization and improvements in pain scores ($r = 0.70$, $p < 0.01$) and functional mobility ($r = 0.75$, $p < 0.01$) further reinforces the benefits of early movement. These strong correlations indicate that patients who begin physical activity soon after surgery experience more significant reductions in pain and greater gains in mobility, underscoring the importance of early mobilization as a key strategy in postoperative care [10].

Conclusion

This study provides robust evidence supporting the effectiveness of early mobilization in enhancing recovery outcomes after total knee arthroplasty. Significant reductions in pain and improvements in functional mobility were observed over six months, highlighting the value of early mobilization as a critical component of postoperative care. The findings underscore the importance of individualized, patient-centered approaches to rehabilitation, emphasizing early engagement and movement to optimize recovery.

Future research should focus on identifying the most effective early mobilization protocols and exploring the long-term benefits of early mobilization in orthopedic recovery. By adopting these strategies, healthcare providers can enhance the quality of care for patients undergoing TKA and improve their overall recovery experience, ultimately leading to better health outcomes and greater patient satisfaction.

References

1. Campbell MJ, Stone MH, Mistry D, Jenkins PJ, Meek RM, McEachan JE. Total knee arthroplasty recovery pathways in the UK and the potential impact of early mobilization: A survey of health professionals. J Orthop Surg Res. 2019 Apr 3;14(1):101.
2. Kehlet H, Dahl JB. Anesthesia, surgery, and challenges in postoperative recovery. Lancet. 2003 Dec 6;362(9399):1921-8.
3. Liao CD, Lee PH, Lin LF, Huang SW, Liu YJ, Chou LC, Liou TH. Effects of early versus delayed active range of motion exercises on outcomes after total knee arthroplasty: a randomized controlled trial. Clin Rehabil. 2015 Dec;29(12):1152-61.
4. Johnson VL, Hunter DJ. The epidemiology of osteoarthritis. Best Pract Res Clin Rheumatol. 2014 Feb;28(1):5-15.
5. Artz N, Elvers KT, Lowe CM, Sackley CM, Jepson P, Beswick AD. Effectiveness of physiotherapy exercise following total knee replacement: systematic review and meta-analysis. BMC Musculoskelet Disord. 2015 Feb 7;16:15.
6. Maempel JF, Clement ND, Ballantyne JA, Brenkel IJ. Enhanced recovery programs after total hip and knee arthroplasty: a systematic review of the literature. J Bone Joint Surg Am. 2015 Jul 1;97(7):605-15.
7. Papalia R, Campi S, Vorini F, Tecame A, Maffulli N, Denaro V. Early versus delayed mobilization in total knee arthroplasty. Br Med Bull. 2012 Jun;102(1):213-31.

ISSN: 0975-3583,0976-2833 VOL10, ISSUE 03, 2019

8. Krauss ES, Segal A, Cronin M, Lee H, Weaver FM, Gordon MF. Postoperative care coordination and the association between early outpatient visits and rehospitalizations. JAMA Intern Med. 2016 Mar;176(3):352-9.
9. Rosenthal R, Jaques D, Hider P, Meyer L, Huber H, Metzger U. The effect of early postoperative physical therapy on the surgical outcome of lumbar microdiscectomy. Spine (Phila Pa 1976). 2002 Jan 1;27(1):120-5.
10. Holte K, Kehlet H. Compensatory fluid administration for preoperative dehydration - does it improve outcome? Acta Anaesthesiol Scand. 2002 Oct;46(9):1089-93.