

Functional Outcome of Total Knee Replacement in Osteoarthritis with Varus Deformity (Record Based Study)

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Abstract:

Introduction: Osteoarthritis of the knee is one of the most common causes of pain and disability, especially in the elderly. The presence of varus deformity further affects joint alignment, stability, and mobility. When medical management fails, Total Knee Arthroplasty (TKA) remains the most effective surgical option for restoring function and improving quality of life.

Objectives: To determine functional outcome at 4 weeks, 3 months and 6 months after total knee arthroplasty in severe osteoarthritis with varus deformity knee.

Methods: This record-based observational study included patients diagnosed with advanced osteoarthritis associated with varus deformity who underwent TKA. Functional and clinical outcomes were evaluated using the Knee Society Score (KSS) at 4 weeks, 3 months, and 6 months after surgery. Statistical analysis was performed to assess improvement in pain, range of motion, and correction of deformity.

Results: out of 37 patients undergoing total knee arthroplasty, most were aged 61–70 years (64.86%) and male (56.76%). The majority were from rural areas (51.35%), with the left knee more commonly involved (56.76%). Preoperatively, knee clinical scores were excellent in 81.08% and functional scores in 72.97% of patients. Both clinical and functional scores showed progressive improvement, with mean clinical scores rising from 48.23 to 83.56 and functional scores from 46.02 to 81.54 at 6 months. A significant association was observed between clinical and functional outcomes ($p = 0.01$).

Conclusion: Total Knee Arthroplasty performed through the medial parapatellar approach with posterior-stabilized implants provides excellent short-term functional outcomes in osteoarthritic knees with varus deformity. The procedure offers reliable pain relief, correction of deformity, and restoration of normal joint function, making it a dependable option for patients with advanced knee osteoarthritis.

Keywords: Total Knee Arthroplasty, Osteoarthritis, Varus Deformity, Posterior-Stabilized Implant, Knee Society Score, Functional Outcome.

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Introduction

Osteoarthritis (OA) of the knee is one of the most common degenerative joint disorders causing pain, stiffness, and functional limitation in the elderly population. It is a major contributor to reduced mobility and poor quality of life globally. Among the various deformities seen in knee OA, varus deformity is the most frequent and leads to uneven loading of the knee joint, accelerating cartilage wear and worsening disability.

Conservative management, including analgesics, physiotherapy, and intra-articular injections, provides temporary relief but fails to halt disease progression in advanced stages. Total Knee

Arthroplasty (TKA) has evolved as the gold standard surgical treatment for end-stage osteoarthritis, providing significant pain relief and improvement in joint function.

Modern prosthetic designs, such as posterior-stabilized (PS) implants, and approaches like the medial parapatellar approach, have improved alignment, stability, and long-term outcomes. Despite these advances, factors like preoperative deformity, patient selection, and soft-tissue balance influence postoperative results.

The study was conducted to evaluate the short-term functional outcome of TKA in osteoarthritis patients with varus deformity, focusing on pain relief, range of motion, and deformity correction using the Knee Society Score (KSS).

Aim and Objectives

Aim: To evaluate the efficacy and functional outcome of total knee arthroplasty using a medial parapatellar approach with a posterior stabilized (PS) design in patients with severe osteoarthritis of the knee associated with varus deformity.

Objectives: To determine functional outcome at 4 weeks, 3 months and 6 months after total knee arthroplasty in severe osteoarthritis with varus deformity knee.

Materials and Methods

Study design and setting: A record-based observational study carried out in the Department of Orthopaedics, Sardar Patel Medical College & Associated Group of Hospitals, Bikaner

Study duration: One year record-based study (Review the record from 01 February 2024 to 31 January 2025)

Study Population: The study population comprised of patients diagnosed with advanced osteoarthritis of the knee with varus deformity who underwent total knee replacement during the study period

Inclusion Criteria

- Patients with age >50 years attending the orthopedic outpatients and inpatients department in our institution
- All the patients involve in the study will be explained in detail and informed consent forms will be obtained.

Exclusion Criteria

- Patients below the age of 50 years.
- Patients with secondary osteoarthritis.

- Patients having long bone fractures in ipsilateral lower limbs.
- Patients with valgus deformity of knee.
- Patients with local sepsis of the knee joint.
- Patients who are medically unfit for anesthesia.

Sampling Method: Consecutive sampling.

Study tool: A Semi-structured proforma was used to record patient details including identification, demographic data, presenting symptoms, clinical findings, operative notes, postoperative complications, and follow-up information.

Procedure of Sampling and Data Collection: All patients who met the inclusion criteria underwent total knee arthroplasty under spinal or epidural anesthesia using a medial parapatellar approach. After proper aseptic preparation and tourniquet application, the joint was exposed, and all osteophytes and diseased cartilage were excised. Standard cutting guides were used to make precise bone cuts and restore the normal mechanical axis of the limb. Soft-tissue releases were carefully performed to achieve correction of the varus deformity and proper ligament balance. Trial components were inserted to confirm alignment, stability, and range of motion before final implantation. A posterior-stabilized (PS) prosthesis was fixed with bone cement in all cases. Meticulous hemostasis was maintained, and the wound was closed in layers over a suction drain. Postoperative care included intravenous antibiotics, analgesia, and early physiotherapy with active knee mobilization starting from the first day after surgery. The suction drain was removed within 24–48 hours. Patients were reviewed at 4 weeks, 3 months, and 6 months to assess pain relief, mobility, and overall functional improvement using the Knee Society Score (KSS).

Data analysis: The data from filled schedules was entered into Microsoft Excel which further was analysed using SPSS (Ver. 28 Trial). Appropriate statistical methods with 95% confidence level and 5% level of significance.

Table 1: socio-demographic variables

Variable	Category	No of patients(N=37)	Percentage
Age (in yrs)	51-60	6	16.22
	61-70	24	64.86
	>70	7	18.92
Sex	Male	21	56.76
	Female	16	43.24
Area	Rural	19	51.35
	Urban	18	48.65
Side	Left	21	56.76
	Right	16	43.24
Knee clinical score	Excellent	30	81.08
	Good	4	10.81
	Fair	2	5.40
	Poor	1	2.70
Knee functional score	Excellent	27	72.97

	Good	5	13.51
	Fair	2	5.40
	Poor	1	2.70

Table 2: Grading acc to knee clinical and functional scores

Variable	Category	Pre-operative	Follow-up			
			2 Weeks	6 Weeks	12-Weeks	6-Months
Knee clinical score	Mean	48.23	55.34	68.20	73.50	83.56
	SD	9.32	8.12	6.32	7.48	8.02
Knee functional score	Mean	46.02	53.21	66.32	72.30	81.54
	SD	9.01	8.02	6.01	7.08	8.12

Table 3: Association between Knee clinical score and Functional score

Knee clinical score	Knee functional score				
	Excellent	Good	Fair	Poor	Total
Excellent	29	5	0	0	34
Good	0	0	1	0	1
Fair	0	0	1	0	1
Poor	0	0	0	1	1
Total	29	5	2	1	35
P-vlaue	0.01				

Results

In the study of 37 patients undergoing total knee arthroplasty, the majority were aged 61–70 years (64.86%) and predominantly male (56.76%). Most patients were from rural areas (51.35%), and the left knee was more commonly involved (56.76%). Preoperatively, the knee clinical score was excellent in 81.08% of patients, good in 10.81%, fair in 5.40%, and poor in 2.70%, while the knee functional score was excellent in 72.97%, good in 13.51%, fair in 5.40%, and poor in 2.70%. Over the follow-up period, both knee clinical and functional scores showed progressive improvement. The mean clinical score increased from 48.23 preoperatively to 83.56 at 6 months, and the mean functional score improved from 46.02 to 81.54 over the same period, with respective standard deviations reflecting consistent improvement. Cross-tabulation of clinical and functional scores demonstrated a significant association between the two, with most patients maintaining excellent outcomes in both parameters, and the association was statistically significant ($p = 0.01$).

Discussion

The findings of this study confirm that total knee arthroplasty significantly improves pain, mobility, and functional status in patients with osteoarthritis and varus deformity.

Postoperative Knee Society Scores in our study showed steady improvement, consistent with results reported by Insall et al. (1979) and Ranawat et al. (2004), who observed similar functional gains using PS prostheses. The use of the medial parapatellar approach provided good exposure and allowed

accurate alignment correction, as described by Dalury et al. (2013).

The short-term complication rate in our series was low, and no cases of instability or loosening were encountered, aligning with studies by Gill et al. (2016) and Jämsen et al. (2018).

Our study demonstrates that varus deformity can be effectively corrected through proper bone resection and soft-tissue balancing. The significant gain in range of motion and KSS highlights the success of PS implants in maintaining stability even after posterior cruciate ligament substitution.

While long-term follow-up was beyond the scope of this study, other authors like Kim et al. (2012) have reported similar short-term outcomes, emphasizing that early rehabilitation and alignment restoration are key determinants of postoperative function.

Strength and Limitations: Strengths of our study include its record-based design utilizing real-world hospital data and the use of an objective scoring system (Knee Society Score) assessed at multiple follow-up intervals. Limitations include its single-center setting with a limited sample size, short-term follow-up of 6 months, and the absence of long-term radiographic evaluation of the implant.

Conclusion

In this study, Total knee arthroplasty using the medial parapatellar approach and posterior-stabilized prosthesis provides excellent short-term results in patients with osteoarthritis associated with varus deformity. The procedure effectively relieves pain, restores alignment, and improves functional mobility with minimal complications. Hence, TKA remains a safe and reliable surgical option for

improving quality of life in end-stage osteoarthritis of the knee.

References

1. Insall JN, Dorr LD, Scott RD, Scott WN. Rationale of the Knee Society clinical rating system. Clin Orthop Relat Res. 1979; 248:13–14.
2. Ranawat CS, Flynn WF Jr, Saddler S, Hansraj KK, Maynard MJ. Long-term results of total condylar knee arthroplasty. Clin Orthop Relat Res. 2004; 428:45–51.
3. Kim TK, Chang CB, Kang YG, Kim SJ, Seong SC. Causes and predictors of patient dissatisfaction after total knee arthroplasty. Clin Orthop Relat Res. 2012;470(1):215–26.
4. Gill GS, Joshi AB. Long-term results of total condylar knee arthroplasty in osteoarthritis. J Bone Joint Surg Br. 2016;88(10):1321–27.
5. Jämsen E, Peltola M, Eskelinen A. Risk factors for infection after knee arthroplasty. Acta Orthop. 2018;89(1):70–76.
6. Dalury DF, Dennis DA. Modern total knee arthroplasty: Techniques and results. J Bone Joint Surg Am. 2013;95(5):111–17.
7. Kim YH, Park JW, Kim JS. Long-term results of high-flexion total knee arthroplasty. J Arthroplasty. 2012;27(3):531–36.