



## Orthopaedics

## THE FUNCTIONAL AND RADIOLOGICAL OUTCOME OF PROXIMAL FIBULAR OSTEOTOMY IN PRIMARY OSTEOARTHRITIS (GRADE II AND III) OF THE KNEE

**Dr. Hari Kishore\***

Senior Resident, Dept of Orthopaedics, Mahatma Gandhi Medical College & Research Institute, Puducherry, India \*Corresponding Author

**Dr. Manoharan Muthulingam**

Professor, Dept of Orthopaedics, Mahatma Gandhi Medical College & Research Institute, Puducherry, India.

**Dr. Vinayagamoorthy Anandapadmanaban**

Assistant Professor, Dept of Orthopaedics, Mahatma Gandhi Medical College & Research Institute, Puducherry, India.

### ABSTRACT

**Background And Aim** Knee osteoarthritis (KOA) is the most common chronic, progressive, degenerative illness in older people. There are several established surgical procedures for treating OA knee with their own merits and demerits. PFO (proximal fibular osteotomy) is a relatively recent surgery for treating knee OA involving the medial compartment. The study aimed to Evaluate the Functional and Radiological outcome of Proximal Fibular Osteotomy in Primary Osteoarthritis Knee (Grade II and III). **Materials And Methods** In this prospective interventional study, we enrolled 27 patients after satisfying inclusion and exclusion criteria based on consecutive sampling. VAS score for pain and AKSS (Functional) for functional outcome and MJS was assessed preoperatively and postoperatively on Day 1 and 2, 4thwk, 12thwk, 24thwk (6month). **Results** The VAS score for pain was reduced at all the time intervals, from preop to postop 6month follow-up, and was statistically significant (p-value < 0.001). The Functional AKSS increased in all the intervals from preop to postop with statistically significant (p-value < 0.001). The MJS increased at postop compared to preop with statistically significant (p-value < 0.001). **Conclusion** Proximal Fibular Osteotomy is a Simple, Safe, and Cost-effective procedure for Osteoarthritis Knee (Grade II, III), that gives immediate, satisfactory pain relief and functional outcome in our population. It acts as a bridge between patients suffering from Osteoarthritis (Grade II, III) with failed conservative management and unable to undergo HTO/TKR due to multiple factors. Patient selection is a key factor for a good prognosis.

**KEYWORDS :** Osteoarthritis Knee, KL scale, PFO, VAS, AKSS, MJS knee.

### INTRODUCTION:

Knee osteoarthritis (OA) is a common condition that affects the older population resulting in disability. Disability is due to pain, limitation of movement (stiffness), and varus deformity<sup>1</sup>. Individuals with knee OA often have a narrow medial joint space, which affects 74% of patients with idiopathic osteoarthritis<sup>17</sup>. Total knee arthroplasty (TKA) is a renowned surgery for older people with severe OA knee.

However, TKA in mild to moderate osteoarthritis is not a good alternative to knee preservation surgery and it is expensive and highly morbid in younger patients. High tibial osteotomy (HTO) is the best therapeutic choice for young people with osteoarthritis in the medial compartment of the knee.

HTO has the advantage of preserving the native joint and correcting the varus deformity, it has the potential disadvantage of a longer period of post-operative recovery and alteration of proximal tibial anatomy which makes future arthroplasty complicated. Unicompartmental knee arthroplasty (UKA) is also a very good alternative procedure for young age osteoarthritis of the knee, which is also expensive and highly morbid compared with the osteotomy procedure. Proximal Fibular Osteotomy (PFO) is a novel technique in which a segment of the proximal fibula is excised. It is a simple, effective, safe, and affordable procedure that could be used to delay or replace TKA/HTO in patients with osteoarthritis<sup>2</sup>.

The goal of this study is to evaluate the functional and radiological outcomes of proximal fibular osteotomy in patients with primary osteoarthritis of the knee (Grade II and III).

### METHODOLOGY:

This was a prospective interventional study, conducted in a tertiary hospital from November 2019 to June 2021. All 27 patients were included after satisfying inclusion and exclusion criteria as selected based on consecutive sampling. Patients with osteoarthritis involving the medial compartment of the knee as per the Kellgren Lawrance scale, Patients satisfying American College of Rheumatology criteria (ACR) for osteoarthritis knee, Varus deformity < 20 degrees were included in the study.

Patients with Valgus deformity and lateral compartment osteoarthritis of the knee, Inflammatory joint disease, body mass index > 35, associated ligament injury, and post-traumatic arthritis of the knee were excluded from the study. The patients were assembled into a

single group. Preoperative Visual Analogue Score (VAS) and American Knee Society Score (AKSS-Functional) was recorded. Standing x-ray of both knee anteroposterior and lateral view was taken and the medial joint space (MJS) was recorded. An informed and written consent from the patient and ethics committee approval was obtained. After getting the anaesthetic fitness, the patient underwent Proximal Fibular Osteotomy.

The patient was allowed to walk full weight-bearing as tolerated on the same day (post-op day 0). Functional and Radiological outcome assessment was done on postop day 1 and 2, 4<sup>th</sup> wk, 12<sup>th</sup> wk, and 24<sup>th</sup> wk (6month).

### Surgical Procedure:

Under Spinal anaesthesia in supine position with the affected limb in a tourniquet. The level for osteotomy was marked 7-9 cm below the fibular head. A 5-7 cm lateral skin incision centering the marked location was made and fibula was exposed between the Peroneus and Soleus muscle. Retractors were carefully placed and gently retracted to avoid injury to a nearby neurovascular bundle.

Multiple drill holes were done in the proximal and distal margin of the segment to be resected. Osteotome was used to mobilize the segment and a 1-2 cm bone was removed. After resecting, the open ends of the fibula were sealed off with the application of Bone Wax. Gentle thorough lavage was done and the incision was closed in layers. The patient was allowed full weight-bearing as tolerated on the same day. Suture removal was done on POD12.

### RESULTS:

The data were analyzed with Statistical Package for Social Sciences (SPSS) for windows 25.0 (SPSS, Inc. Chicago, Illinois). Descriptive statistics in the form of numbers, percentages, mean and standard deviation were given for demographic details, and using Friedman Test: VAS, Functional AKSS, and MJS were obtained. The mean age was 54 (Range 40-72) years. 59% was right knee involvement and 41% was left knee. 63% had Grade II and 37% had Grade III OA. VAS score was assessed for all patients Preoperatively and Postoperatively in different intervals (Table 1). It showed a statistically significant p-value (< 0.001) at each follow-up.

**Table 1: Visual Analogue Scale for Pain**

	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Mean Rank	Friedman Test	p-value
VAS Preop	9.22	0.97	10	8	10	6		

VAS D1	3.56	1.34	4	3	5	4.76	115721	<0.001
VAS D2	2.11	0.85	2	2	3	3.72		
VAS 4wk	0.89	0.97	1	0	2	2.48		
VAS 12wk	0.78	1.55	0	0	1	2.07		
VAS 24WK	0.52	1.31	0	0	0	1.96		

Functional outcome was assessed using AKSS (functional) for all patients Preoperatively and Postoperatively at different intervals (Table 2), which was statistically significant, p-value (<0.001) at each follow-up.

**Table 2: AKSS (functional)**

	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Mean Rank	Friedman Test	p-value
KSS Preop	7.3	2.81	8	6	9	1.02	130.823	<0.001
KSS D1	14.26	2.03	15	14	15	2.02		
KSS D2	17.78	2.21	17	16	19	2.96		
KSS 4WK	28	3.05	29	25	31	4.13		
KSS 12wk	31.41	4.41	31	31	35	5.17		
KSS 24wk	33.74	3.93	35	35	35	5.7		

MJS was assessed on all patients Preoperatively and Postoperatively in different intervals (Table 3) and shows a statistically significant p-value (<0.001) in the post-op period.

**Table 3: Medial Joint Space**

	Mean	Standard Deviation	Median	Percentile 25	Percentile 75	Mean Rank	Friedman Test	p-value
MJS Preop	2.87	1.69	2.8	2.3	3.9	1.19	108.437	<0.001
MJS D1	3.94	1.39	3.8	3.2	4.85	4.07		
MJS D2	3.9	1.43	3.8	3.2	4.85	3.94		
MJS 4wk	5.38	7.85	3.8	3.2	4.9	4.04		
MJS 12wk	3.9	1.43	3.8	3.2	4.85	3.94		
MJS 24wk	3.87	1.41	3.8	3.2	4.5	3.81		

**DISCUSSION:**

The main aim of the study was to evaluate the functional and radiological outcomes of proximal fibular osteotomy in patients with primary osteoarthritis of the knee (Grade II and III). In our study, the Left knee was more affected than the right side. There was a higher incidence of OA knee among the females compared to that of males (19:8) which supported the previous study done by Huda, N.et al.(2020), Akinpelu Ao et al. (2009) and Devis MA et al. (1998). The mean age of patients in this study was 54 years which was similar to the previous study done by Santhosh Kumar et al. (2021), Vishesh Varma et al. (2020)

In this study, The VAS decreased at the end of 6 months which was statistical significance correlating to an earlier study done by Najmul Huda et al. (2020), Kumar, S.et al.(2021), Verma, V.et al.(2020). Similarly, Functional AKSS improved at 6 months follow-up and was statistically significant which correlates with the study by Kumar, S.et al.(2021), Verma, V.et al.(2020), Rai, A. K.et al. (2019). The MJS increased in the immediate post-op period with a statistically significant (p-value < 0.001) which was similar to the previous study by Kumar, S.et al.(2021), Verma, V.et al.(2020), Wang, X.et al.(2017). In our study, one patient develops EHL weakness and 1 patient developed numbness over the dorsum of the foot. Weakness and numbness improved at 3month and 6month follow up both patients were asymptomatic which supported the earlier study by Kumar, S.et al.(2021), Yang, Z. Y.et al.(2015). Though the study sample size and duration of follow up is less which is the limitation of this study, it provides a path for more research in future.

**CONCLUSION:**

Proximal Fibular Osteotomy is a Simple, Cost-effective procedure for osteoarthritis knee (Grade II, III), that gives immediate, satisfactory pain relief and functional outcome in our population for a short period. It acts as a bridge between patients suffering from Osteoarthritis (Grade II, III) with failed conservative management and unable to undergo HTO/TKR due to multiple factors. Patient selection is a key factor for a good prognosis.

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