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A CROSS SECTIONAL STUDY ON THE CLINICAL PROFILE OF PATIENTS WITH MEDIAL COMPARTMENT KNEE OSTEOARTHRITIS AT A TERTIARY CARE ORTHOPAEDIC CENTER IN SOUTH INDIA

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Abstract
Knee osteoarthritis is a progressive condition that leads to intense pain and limited mobility. Total Knee Arthroplasty (TKA) is an accepted procedure for end stage knee osteoarthritis to relieve pain and improve joint function. However, TKA is expensive and complex, and some patients need a second revision. The study included patients with medial compartment osteoarthritis, who were planned for proximal fibular osteotomy at Sanjay Gandhi Institute of Trauma and Orthopaedics. The patients were diagnosed as knee osteoarthritis by the criteria of American College of Rheumatology and the disease severity was graded by Kellgren and Lawrence grading system. Total number of patients included were 126. Maximum number of cases were in the age group of 51 to 60 years (50%) with an average age of 57.9 years. Incidence among left knee was more common (52.3%) with a Female preponderance. Stage 2 OA was found to be more (53.3%) than Stage 3(43.4%) and Stage 4(3.3%).

Keywords: Knee osteoarthritis, medial compartment, total knee replacement

Introduction
Knee Joint is the largest joint of the human body. It is a complex hinge joint made up of the lower end of the femur, the upper end of the tibia and the patella, which slides in a groove on the lower end of femur [1].
Knee osteoarthritis is very common and is a significant cause of debilitating pain and loss of joint motion. Total knee replacement (TKA) is an accepted procedure for end stage knee osteoarthritis to relieve pain and improve joint function. Disadvantages of TKA include the high cost and need for revision surgery after a few years [2].
High Tibial Osteotomy (HTO) has become the preferred surgical option for younger individuals diagnosed with unicompartmental knee osteoarthritis and it aims to correct

knee alignment while postponing the necessity for TKA.Nonetheless, HTO
has certain drawbacks, such as a prolonged period before achieving full weight bearing andthe poten tial for nonunion or delayed union, peroneal nerve injury, and infection at surgical site.

Proximal fibular osteotomy (PFO) has emerged as a new surgery to relieve pain and improve joint function in patients with knee osteoarthritis as reported by Zhang *et al*. in 2015.
Zhang Y *et al*. in their study conducted on 8 patients concluded that the proximal fibular osteotomy and HTO using the originally designed wedge-shape absorbable spacer, was a minimally invasive, safe, simple and effective procedure for the management of medial compartment OA of the knee joint [3].
Yang ZY *et al*. in their study concluded that proximal fibular osteotomy may reduce knee pain significantly in the varus osteoarthritic knee and leads to improvement in radiographic appearance and functional recovery of the knee joint. PFO may delay or even negate the need for total knee arthroplasty as it is a safe, simple and effective procedure that is an alternative to total knee arthroplasty for unicompartmental OA of the knee joint provided care is ensured to avoid neurovascular injuries. Their study confirms the safety and efficacy of partial fibular osteotomy in the treatment of medial compartment OA.

Proximal fibular osteotomy diminishes the lateral support provided by the fibula, resultingin the corr ection of the varus deformity. This correction cansubsequently transfer the loading force from the m edial compartment to a more lateral position, thereby reducing pain
and promoting a satisfactory functional recovery. [4]
High tibial osteotomy is a commonly used method to treat knee varus deformities due to OA. It aims to improve the mechanical axis passing from the center of the hip, through the knee joint, to the center of the tibiotalar joint in the coronal plane. Osteotomies performed proximal to the tibial tubercle may interfere with function of the patellar tendon. This patella-femoral disturbance is common in patients who have previously undergone proximal tibial osteotomies. In the authors' experience, a straightforward fibular osteotomy can alleviate knee pain and correct varu s deformity just as effectively as high tibial osteotomy. [5].
Bone mass decreases as a part of the normal aging process. Varying degrees of settlement of bone mass exist in the load-bearing joints, such as the knees, hips, ankles and spine. In the proximal tibia, the lateral support of the fibula to the lateral tibial plateau routinely leads to non-uniform distribution of weight, which is more severe in the medial plateau than in the lateral plateau. The slope of the tibial plateau arising from non-uniform distribution of weight, results in a transverse shearing force, with the femoral condyle shifting medially during walking and sports. There is also evidence that tibiofemoral articular stress distribution is related to the progression of knee OA [6].

Methodology
The study included patients with medial compartment osteoarthritis, who were planned for proximal fibular osteotomy at Sanjay Gandhi Institute of Trauma and Orthopaedics from March 2023 to March 2024. Patients were enrolled, consented and recorded on the Arthroplasty Register.
The patients were diagnosed of knee osteoarthritis by American College of Rheumatology criteria and severity of disease was graded by Kellgren and Lawrence grading system.
The patients were selected by the help of following inclusion and exclusion criteria:
All characteristics were summarized descriptively. For continuous variables, the summary statistics of mean± standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation.
The difference of the means of analysis variables between two time points in same group was tested by paired t test.
If the p-value was < 0.05, then the results were considered to be statistically significant otherwise it was considered as not statistically significant.

Inclusion criteria

1. Predominantly medial compartment osteoarthritis with Varus knees.
2. Patients with Kellgren-lawrence grade 1, 2 and 3.
3. At least 2mm gap in AP stress varus xrays.
4. Good lateral joint space in weight bearing xrays.
5. A motivated patient, who understands that this is a simple procedure that buys time and delays knee replacement surgery.
6. Patients who are medically fit and willing for surgery.
7. Patients with BMI less than 23.
8. Patients in whom conservative management has failed and who have radiographic evidence of significant Varus.

Exclusion criteria

1. Patients with post traumatic knee osteoarthritis or inflammatory joint disease.
2. Patients with history of previous operations or fractures of knee joint.
3. Kellgren- Lawrence Grade 4 osteoarthritis.
4. Septic or tubercular arthritis and genu valgus of knee joint.
5. Local infection.
6. Anatomic anomalies.
7. Patients refusing informed consent.
8. Patients with irregular follow up.

Results

In our study, the youngest patient was 40 years and the oldest patient was 76 years. The mean age was 57.9 years. The different age groups were categorized into 40-50, 51-60, >60years.

Table 1: Distribution of Cases According to Age

Age (YRS)	N	Percent
40-50	21	16.7
51-60	63	50
>60	42	33.3
Total	126	100

Out of 126 knees, 70 were females and 56 were males. Females constituted 55.5% of cases and males were 45.5% of cases.

Table 2: Distributions of Cases According to Sex

Sex	N	Percent
Male	56	45.5
Female	70	55.5
Total	126	100

Among 126 knees, 60 were right knees and 66 were left knees.

Table 3: Distribution of Cases According to Side

Side	N	Percent
Left	66	52.3
Right	60	47.7
Total	126	100

Patients were also divided based on their presentation i.e. duration of pain suggesting chronicity in years. The mean duration of pain suffered in years was 2.4 years.

Table 4: Distribution of cases according to years of pain

Years of Pain	N	Percent
1	37	30
2	37	30
3	25	20
4	20	16.7
>4	5	3.3
Total	126	100

The diagnosis of stage of osteoarthritis was done by using Kellgren and Lawrence classification system. Among 126 knees, 53.3% cases were in Stage 2, 43.3% cases were in Stage 3 and 3.3% cases were in Stage 4.

Table 5: Distribution of Cases According to Staging (K&L)

Staging (K&L)	N	Percent
Stage 2	67	53.3
Stage 3	55	43.3
Stage 4	4	3.4
Total	126	100

Discussion

The mean age of the patient at the time of surgery was 57.9 years, with the range of 40 to 76 years. Majority of studies showed that the fifth and sixth decades are the most affected age group. The following table compares the incidence of age observed by various authors to that of our study.

Table 6: Comparison of Age Incidence

Study	Year of Study	Mean Age
Zong-You Yang, Y Zhang *et al.* [7]	2015	59.2 years (Range 47-69 years)
Xioahu Wang, Lei Wei *et al.* [8]	2016	63.96+-7.48 years (Range 48-78 years)
Guoping Zou, Weibin Lan *et al.* [9]	2017	62.3+-13.5 years
Y. Zhang, Y. Yu *et al.* [10]	2017	61.8 years (Range 49-76 years)
DI Qin, Wei Chen *et al.* [10]	2018	62.5+-6.7 years
Present Study	2023-2024	57.9 years (Range 40-76 years)

In our study, out of 126 patients, 70 patients (55.5%) were females whereas 56 patients (45.5%) were males. Our findings for sex incidence were comparable to the results in various studies done all over the world.

The following table compares the sex incidence by various authors to that of our findings.

Table 7: Comparison of Sex Incidence

Study	Year of Study	Sex	
		Male	Female
Zong-you Yang , Y Zhang *et al.* [7]	2015	34 (30.9%)	76 (69.1%)
Xioahu Wang, Lei Wei *et al.* [8]	2016	12 (25.53%)	35 (74.47%)
Guoping Zou, Weibin Lan *et al.* [9]	2017	12 (30%)	28 (70%)
Y. Zhang, Y. Yu *et al.* [10]	2017	1 (12.5%)	7 (87.5%)
Di Qin, Wei Chen *et al.* [11]	2018	7 (13.46%)	45 (86.54%)
Present Study	2023-2024	56(45.5%)	70 (55.5%)

In our study we found that right side had higher incidence as compared to the left. Various studies have difference in side predominance that is evident from the following table.

Table 8: Comparison of Side Involvement

Study	**Year of Study**	**Side**	
		Right	**Left**
Zong-You Yang, Y Zhang *et al.* [7]	2015	62 (56.36%)	48 (43.63%)
Di Qin, Wei Chen *et al.* [11]	2018	35 (52.24%)	32 (47.76%)
Present Study	2023-2024	60 (47.7%)	66 (52.3%)

The stage of osteoarthritis was diagnosed by help of the Kellgren and Lawrence scoring system. In our study, the majority (96%) of the patients belongs to type 2 and type 3 of osteoarthritis. The pre-operative stage of osteoarthritis is associated with the functional outcome after appropriate intervention. In our study, the patients belonging to stage 2 and stage 3 were chosen for Proximal Fibular Osteotomy and prospectively they performed better which is demonstrated in our upcoming study.

Our study is comparable with the following studies.

Table 9: Incidence of Stage of Osteoarthritis

Study	**Year of Study**	**Stage**	
		I And IV	**II and III**
Guoping Zou, Weibin Lan *et al.* [7]	2017	30 (75%)	10 (25%)
Y. Zhang, Y. Yu *et al.* [10]	2017	0 (0%)	8 (100%)
Di Qin, Wei Chen *et al.* [11]	2018	0 (0%)	67 (100%)
Present Study	2023-2024	4(3.3%)	122 (96.7%)

Conclusion

This was a cross sectional study done at a tertiary care Orthopaedic center in South India aiming to study the clinical profile of patients with medial compartment knee osteoarthritis planned for proximal fibular osteotomy.

- Maximum number of cases were in the age group of 51 to 60 years (50%) with an average age of 57.9 years.
- Female outnumbered male (Female 70 knees, Male 66 knees)
- Incidence among left knee was more common (52.3%) than right knee (47.7%)
- Stage 2 OA was found to be more (53.3%) than Stage 3(43.4%) and Stage 4(3.3%).

The prevalence of Knee Osteoarthritis is a considerable disease burden to the society.Effective surgical treatment strategies are necessary to mitigate the same. In our upcoming study,we aim to study the efficacy of Proximal Fibular Osteotomy in the management of Medial Compartmental Knee Osteoarthritis.

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