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## A study on assessment of proximal fibular osteotomy as a treatment of medial compartment knee osteoarthritis

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### Abstract

Knee osteoarthritis is a common chronic, progressive, degenerative disease in older individuals. Unicompartmental osteoarthritis accounts for one third of the cases. High tibial osteotomy, unicompartment arthroplasty and total knee arthroplasty are the methods used for treatment. However, HTO can be a technically demanding procedure and may result in complications.

Based on recent clinical studies, the authors believe that the lateral support provided to the osteoporotic tibia by the fibula–soft tissue complex may lead to the nonuniform settlement and degeneration of the plateau bilaterally [6, 7]. This may result in aggravating the progression of medial compartment OA. Using this logic, the authors have performed a proximal fibular osteotomy for treatment of medial compartment OA of the knee joint as described in reference studies.

It is a hospital based prospective study done at New Hospital Medical College Kota. The Sample size was calculated to be 34 subjects at  $\alpha$ -error 0.05 and study power 80%. Functional scores were calculated using Knee Rating Scale Score [8] (JOA), Visual analogue scale score (VAS) [9] and Womac score.

Proximal fibular osteotomy may reduce knee pain significantly in the varus osteoarthritic knee and improve the functional recovery of the knee joint. The results in our study are encouraging. It is a safe, simple, and effective procedure that is an alternative to HTO.

**Keywords:** Knee osteoarthritis, high tibial osteotomy, proximal fibular osteotomy

### Introduction

Knee osteoarthritis (OA) is a common chronic, progressive, degenerative disease in older individuals [1]. Unicompartmental osteoarthritis accounts for one third cases with one third of these further being medial compartmental OA. The risk of developing OA substantially increases with each decade after the age of 45 years [2].

High tibial osteotomy, unicompartment arthroplasty and total knee arthroplasty are the methods used for treatment. In 1958, Jackson [3] was first to describe HTO as a treatment for osteoarthritis knee and later on was modified and popularised by many. The biomechanical rationale for osteotomy is “unloading” of the involved compartment by correcting the malalignment and redistributing the stresses on the joint. However, HTO can be a technically demanding procedure and may result in complications, including neurovascular injury, iatrogenic fracture, and nonunion [4]. In recent years, natural history studies of primary knee OA have revealed a link between alignment and subsequent OA progression [5]

Based on recent clinical studies, the authors believe that the lateral support provided to the osteoporotic tibia by the fibula–soft tissue complex may lead to the nonuniform settlement and degeneration of the plateau bilaterally [6, 7]. This may result in the load from the normal distribution shifting farther medially to the medial plateau and consequently lead to knee varus, aggravating the progression of medial compartment OA. Using this logic, the authors have performed a proximal fibular osteotomy to relieve the increased loading force on the medial compartment for treatment of medial compartment OA of the knee joint.

### Materials and Methods

It is a hospital based prospective pre and post interventional study done at New Hospital Medical College Kota between 2017 and 2020. The Sample size was calculated to be 34 subjects at  $\alpha$ -error 0.05 and study power 80%.

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Hence for purpose of this study 35 subjects were taken. All patients with moderate to severe symptomatic medial compartment OA of the knee, having indication for a surgical procedure and consented were included in the study. Exclusion criteria were post traumatic or inflammatory arthritis, previous fractures, ligamentous instability and bi or tricompartmental OA.

Institutional ethical committee clearance was taken and all patient underwent same surgery. Pain being single most important factor of functional outcome, was assessed using the Visual analogue scale. Preoperatively and postoperatively functional scores were calculated using Knee Rating Scale Score [8] (JOA), Visual analogue scale score (VAS) [9] and Womac score

Statistical analysis was performed with the SPSS, version 21 for Windows statistical software package (SPSS inc., Chicago, IL, USA). The Categorical data was presented as numbers (percent) and were compared among groups using Chi square test. The quantitative data was presented as mean and standard deviation and were compared by students t-test. Probability was considered to be significant if less than 0.05.

**Observations And Results**

31.42% of the patients were in 39-50 years age group and 40% were in 51-60 years age group and 28.57% were in 61-72 years age group. The average age was 55.34 years ± 8.47 and range is 39 to 72. Females predominant 57.14% were females while 42.85% were males. Seventeen left knee (48.57%) operated while eighteen right knee (51.42%) operated.

**Table 1:** age distribution

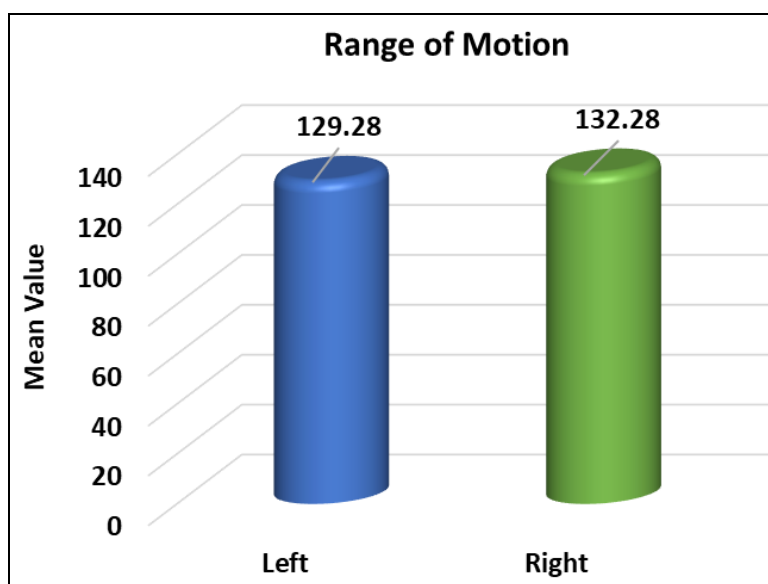
Age(years)	Number of Cases	Percentage (%)
39-50	11	31.42
51-60	14	40.00
61-72	10	28.57
Total	35	100.00
Mean±SD	55.34±8.47	
Range	[39-72]	

The mean follow up period was 8.82 months with standard deviation of 3.30 with maximum of 17 months and minimum of 6 months follow up duration. Maximum number of patients have follow up of 7 months.

**Table 2:** follow up duration (Months)

Follow UP	Number of Cases	Percentage (%)
6 Month	8	22.85
7 Month	12	34.28
8 Month	3	8.57
9 Month	3	8.57
12 Month	2	5.71
13 Month	2	5.71
14 Month	2	5.71
15 Month	1	2.85
16 Month	1	2.85
17 Month	1	2.85
Mean±SD	8.82±3.30	

Preoperative range of motion was 0-129.28° and postoperatively range of motion was 0-132.28. The change was statistically nonsignificant with p value of 0.068.



**Fig 1:** Range of motion

The mean preoperatively value of womac score was 46.37 with standard deviation 3.69 and mean postoperative value of

womac score was 23.8 with standard deviation 3.90 and p value was 0.0003.

**Table 3:** Womac Score

Womac score	Mean	SD	P value
Pre	46.37	3.69	0.0003
Post	23.8	3.90	

The mean preoperative value of VAS score was 7.54 with standard deviation 0.56 and mean postoperative value of VAS score was 1.65 with standard deviation 1.10 and p value was 0.0004.

The mean preoperative value of Knee rating scale score

(JOA) was 46.85 with standard deviation 4.71 and mean

postoperative value of Knee rating scale score (JOA) was 75.71 with standard deviation 6.43 and p value was 0.0004.

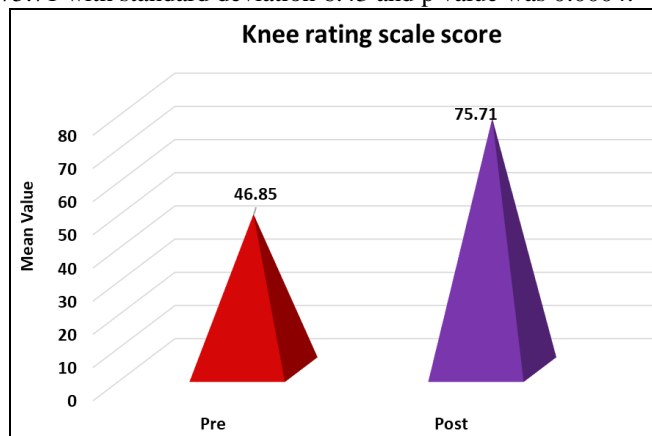


Fig 2: Knee rating scale score

Table 6: Complication

Complications		Number of Cases	Percentage (%)
Superficial peroneal nerve palsy	Yes	6	17.14
	No	29	82.85
common peroneal nerve palsy	Yes	2	5.71
	No	33	94.28

The most frequent complication in this series was superficial peroneal nerve palsy. A total of 6 patients got superficial peroneal nerve palsy of the 35 that were applied amounting to 17.14%. All of these complications were completely recovered within 6 months. A total of 2 patients got common peroneal nerve palsy out of 35 amounting 5.71%. Both were completely recovered.

**Discussion**

TKA very effectively relieves pain and improves knee function in patients with late-stage knee osteoarthritis. However, TKA is expensive and complex, and some patients need a second revision. HTO has been the surgical treatment of choice for young patients with osteoarthritis of the medial compartment of the knee, and it is aimed at correcting alignment so as to ease degenerative changes. However, HTO also has some disadvantages, including a delayed time to full weight bearing and risks of nonunion or delayed union, peroneal nerve paralysis and wound infection.

The major advantage described of PFO is that it allows unlimited activity to the patient. Thus, for patients who have an occupation requiring vigorous activity or who wish to continue playing sports, an osteotomy is a reasonable procedure that in no way precludes a later total knee arthroplasty.

In our study average age of patients was 55.34 years which correlates well with Zong-You Yang *et al.* (2015)<sup>[10]</sup> as 59.2 years, Xiaohu Wang *et al.* (2017)<sup>[12]</sup> as 63.96 years, Guoping Zou *et al.* (2017)<sup>[13]</sup> as 62.3 years.

Male to female ratio was 1:1.33 i.e. 20 were females and 15 were males. In the study of Zong-You Yang *et al.* (2015)<sup>[10]</sup> it was 1:2.23, and in Guoping Zou *et al.* (2017)<sup>[13]</sup>, 1:2.33, which all showed female predominance.

In our study mean preoperative range of motion was 129.28° ± 6.20° which increased to 132.28 ± 7.31° postoperatively the change was statistically non significant.

In our study mean preoperative VAS score was 7.54 ± 0.56 and postoperative VAS score was 1.65 ± 1.10 decrease was statistically significant with p value of 0.0004. In the study by

Xiaohu Wang *et al.* (2017)<sup>[12]</sup> the mean VAS scores significantly decreased from 8.02±1.50 preoperatively to 2.74±2.34 postoperatively with p value <.001. In the study by Guoping Zou *et al.* (2017)<sup>[13]</sup> mean VAS scores significantly decreased from 4.6 ± 1.3preoperatively to 0.5 ± 0.2 postoperatively. In the study by Zong-You Yang *et al.* (2015)<sup>[10]</sup> mean VAS score and interquartile range at final follow-up were 2.0 and 2.0, respectively, which were significantly lower than the preoperative data (7 and 1.0, respectively; P<0.001.

In our study analysis of Knee rating scale score revealed statistically significant improvement in the scores at final follow up with p value of 0.0004 with the mean preoperative score being 46.85 ± 4.71 and the mean postoperative score of 75.71 ± 6.43.

Also, In our study, the mean preoperatively value of WOMAC score was 46.37 with standard deviation 3.69 and mean postoperative value of WOMAC score was 23.8 with standard deviation 3.90 and p value was 0.0003.

In the study by Guoping Zou *et al.* (2017)<sup>[13]</sup> uses JOA score for evaluation of functional results. Mean JOA at final follow-up was 89.2 ± 13.6, significantly higher than the mean preoperative score 66.5 ± 10.2.

In the present study the mean follow up period was 8.82 months with standard deviation of 3.30 with maximum of 17 months and minimum of 6 months follow up duration. Maximum number of patients have follow up of 7 months.

In the study by Zong-You Yang *et al.* (2015)<sup>[10]</sup>, 4 (3.6%) patients reported numbness in the ipsilateral lower leg due to common peroneal nerve palsy (n=2) and superficial peroneal nerve injury (n=2). Xiaohu Wang *et al.* (2017)<sup>[12]</sup> no postoperative complications were observed, including wound infection, delayed healing or nerve damage. The most frequent complication in our series was superficial peroneal nerve palsy amounting to 17.14%. All of these complications were completely recovered within 6 months. A total of 2 patients got common peroneal nerve palsy out of 35 amounting 5.71%. Both were completely recovered.

**Conclusion**

Proximal fibular osteotomy may reduce knee pain significantly in the varus osteoarthritic knee and improve the functional recovery of the knee joint. The results in our study are encouraging and comparable with that of other established studies. It is a safe, simple, and effective procedure that is an alternative to HTO and may delay or even negate the need for total knee arthroplasty for ideally selected patient of medial compartment OA of the knee joint. Care must be taken to avoid potential nerve injuries. Also, the long term effect of osteotomy of degenerative changes is not studied because long follow up is required for this assessment.

**References**

1. Qin D, Chen W, Wang J LV, Ma H, Dong W, Zang TY. Mechanism and influencing factors of proximal fibular osteotomy for treatment of medial compartment knee osteoarthritis: A prospective study. The journal of international medical research. 46(8):3114-3123.
2. Lawrence RC, Felson DT, Helmick CG, *et al.* Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. Arthritis & Rheumatism. 2008;58(1):26-35. [PubMed: 18163497]
3. Jackson JP. Osteotomy for Osteoarthritis of the Knee. In Proceedings of the Sheffield Regional Orthopaedic Club: J Bone Joint Surg [Br] 1958;40-B:826.
4. Sprenger TR, Doerzbacher JF. Tibial osteot-omy for the

- treatment of varus gonarthrosis: survival and failure analysis to twenty-two years. *J Bone Joint Surg Am.* 2003;85:469-474.
5. Brouwer GM, van Tol AW, Bergink AP, *et al.* Association between Valgus and Varus Alignment and the Development and Progression of Radiographic Osteoarthritis of the Knee. *Arthritis Rheum.* 2007;56:1204-1211. [PubMed: 17393449]
  6. Zhang Y, Li C, Li J, *et al.* The pathogenesis research of non-uniform settlement of the tibial plateau in knee degeneration and varus. *J Hebei Med Univ.* 2014;35(2):218-219.
  7. Zheng Z, Sun Y, Zhang X, Chen W, Li S, Zhang Y. The pathogenesis and clinical ima-geology research of the knee osteoarthritis. *J Hebei Med Univ.* 2014;35(5):599-600.
  8. Yasuda K, Majima T, Suchida T, Kaneda K. A ten to fifteen year followup observation of high tibial osteotomy in medial compartment osteoarthritis. *Clin Orthop Relat Res.* 1992;282:186-95.
  9. Huskisson E. Measurement of pain. *Lancet.* 1974; 304:1127-1131.
  10. Yang ZY, Chen W, Li CX, *et al.* Medial compartment decompression by fibular osteotomy to treat medial compartment knee osteoarthritis: a pilot study. *Orthopedics.* 2015;38:e1110-e1114.
  11. Yeshwanth S, Gunalan KN. The role of proximal fibular osteotomy in the management of medial compartment osteoarthritis of the knee. *International Journal of Orthopaedics Sciences.* 4(3):369-372.
  12. Xiaohu Wang, Lei Wei. Proximal fibular osteotomy: a new surgery for pain relief and improvement of joint function in patients with knee osteoarthritis; *Journal of International Medical Research.* 2017;45(1):282-289.
  13. Guoping Zou, Weibin Lan. Early clinical effect of proximal fibular osteotomy on knee osteoarthritis. *Biomedical Research.* 2017;28(21):9291-9294.