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# To evaluate the functional outcomes of proximal fibular osteotomy in osteoarthritis knee: A study of 30 cases

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**Abstract**
**Background:** Osteoarthritis (OA) is the most common form of arthritis in the world. Proximal fibular osteotomy (PFO) is an alternative treatment to high tibial osteotomy (HTO). It is a surgical procedure for medial compartment knee osteoarthritis (KOA). Hence; the present study was undertaken for assessing the functional outcomes of proximal fibular osteotomy in osteoarthritis knee.
**Materials & Methods:** A total of 30 patients were assessed. The patients were placed in the supine position after administration of spinal anaesthesia. An approximately 5-cm longitudinal incision was made over the lateral aspect of the proximal fibula, and the fibula exposed between the peroneus muscle and soleus muscle. Knee pain was assessed using a Visual analogue scale. Medical joint space and the hip knee-ankle angle was measured. based on the whole lower extremity radiograph.
**Results:** Significant improvement was observed in the mean VAS improved from preoperative value of 8.23 to 2.1 at 9 months postoperative follow-up. Significant improvement was observed in the Mean knee joint space from preoperative value of 0.35 to 0.58 at 9 months postoperative follow-up. Significant improvement was observed in the mean hip knee ankle angle from preoperative value of 184.2 to 177.3 at 9 months postoperative follow-up.
**Conclusion:** PFO is a novel alternative method in the management of medial compartment arthritis of the knee.

**Keywords:** Proximal fibular osteotomy, Osteo-arthiritis

## 1. Introduction
Osteoarthritis (OA) is the most common form of arthritis in the world. It can be classified into 2 categories: primary osteoarthritis and secondary osteoarthritis. Classically, OA presents with joint pain and loss of function; however, the disease is clinically very variable and can present merely as an asymptomatic incidental finding to a devastating and permanently disabling disorder [1].
Knee osteoarthritis (OA), also known as degenerative joint disease, is typically the result of wear and tear and progressive loss of articular cartilage leading to radiologically decreased joint space. It is most common in elderly women and men. Knee osteoarthritis can be divided into two types, primary and secondary. Females, particularly those ≥55 years, tended to have more severe OA in the knee but not in other sites. The results of this study demonstrated sex differences incidence of knee OA particularly after menopausal age [2, 3].
Although the diagnosis of knee OA in most cases can be made by the clinical findings and physical examination, the identification of joint damages are necessary for both diagnostic confirmation as well as extent of joint involvement. Conventional plain radiographs are the first diagnostic procedure as usually required to demonstrate the structure-pain relationship in knee OA. Radiographic examination has several limitations whereas MRI has the capability to visualize all the structures within the knee joint. There is a growing use of MRI to examine the correlation between structural findings and symptoms. Conventional radiography predominantly visualizes bone whereas MRI has the ability to directly visualize all the structures of a joint, including soft tissue, cartilage and subchondral bone marrow lesions [4-6].
Proximal fibular osteotomy (PFO) is an alternative treatment to high tibial osteotomy (HTO). It is a surgical procedure for medial compartment knee osteoarthritis (KOA).

Compared to HTO, PFO has several advantages. First, the surgical technique is simple and easily performed. Second, it is less invasive with a very short incision, requires limited tissue dissection and no internal fixation is implanted. The postoperative recovery period is also shorter than with HTO. In addition, the complications associated with HTO can be a major problem that contributes to a poor prognosis and TKR can be comfortably carried out without worrying about the incision [7-9] Hence; under the light of above mentioned data, the present study was undertaken for assessing the functional outcomes of proximal fibular osteotomy in osteoarthritis knee.

## Materials & methods

The present study was conducted in the Department of orthopaedics, Government Medical College and it included evaluation of the Functional outcomes of proximal fibular osteotomy in osteoarthritis of knee in 30 patients, selected from Orthopaedic outpatient department. A total of 30 patients were assessed. The patients were placed in the supine position after administration of spinal anaesthesia. An approximately 5-cm longitudinal incision was made over the lateral aspect of the proximal fibula, and the fibula exposed between the peroneus muscle and soleus muscle. PFO was performed by removing a 2 to 3 cm length of fibula at a site 6 to 10 cm distal to the caput fibulae. Full weight bearing and free mobilization was allowed postoperatively. Knee pain was assessed using a Visual analogue scale. Medical joint space and the hip knee-ankle angle was measured. based on the whole lower extremity radiograph. Line A was drawn from the centre of the femur head to the centre of the knee, and line B was drawn from the centre of the knee to the centre of the ankle. The hip-knee-ankle angle was the intersection angle a between lines A and B. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software version 18.0. Chi- square test and Mann Whitney U test were used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

## Results

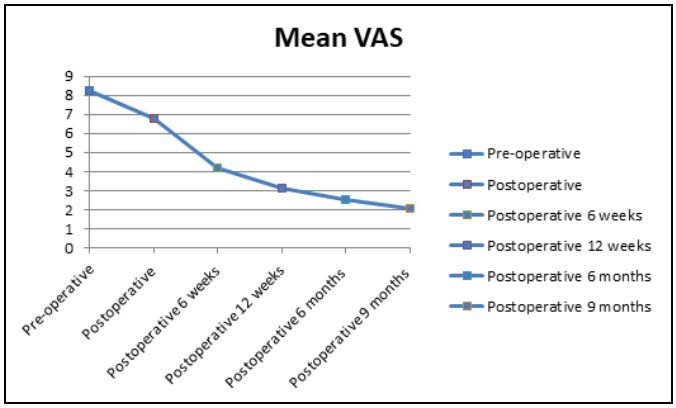
Mean age of the patients with OA of knee was 58 years. 56.67 percent of the patients (17 patients) belonged to the age group of 56 to 65 years. 66.67 percent of the patients (20 patients) of the present study were females while the remaining 33.33 percent were males. 56.67 percent of the patients were of Kellgren and Lawrence Grade II, while the remaining 43.33 percent of the patients were of Kellgren and Lawrence Grade III. Significant improvement was observed in the mean VAS improved from preoperative value of 8.23 to 2.1 at 9 months postoperative follow-up. Significant improvement was observed in the Mean knee joint space from preoperative value of 0.35 to 0.58 at 9 months postoperative follow-up. Significant improvement was observed in the mean hip knee ankle angle from preoperative value of 184.2 to 177.3 at 9 months postoperative follow-up.

**Table 1:** Age-wise distribution of patients

| Age group (years) | Number of patients | Percentage of patients |
|---|---|---|
| 45 to 55 | 8 | 26.67 |
| 56 to 65 | 17 | 56.67 |
| More than 65 | 5 | 16.66 |
| Total | 30 | 100 |

**Table 2:** Mean VAS score at different time intervals

| Time interval | Mean VAS | SD | p- value |
|---|---|---|---|
| Pre-operative | 8.23 | 0.67 | 0.010 (Significant) |
| Postoperative | 6.8 | 0.99 | |
| Postoperative 6 weeks | 4.2 | 0.48 | |
| Postoperative 12 weeks | 3.1 | 0.60 | |
| Postoperative 6 months | 2.5 | 0.57 | |
| Postoperative 9 months | 2.1 | 0.31 | |




**Graph 1:** Mean VAS score at different time intervals

**Table 3:** Mean knee joint space at different time intervals

| Time interval | Mean joint space | SD | p- value |
|---|---|---|---|
| Pre-operative | 0.35 | 0.011 | 0.000 (Significant) |
| Postoperative | 0.39 | 0.012 | |
| Postoperative 6 weeks | 0.42 | 0.014 | |
| Postoperative 12 weeks | 0.47 | 0.020 | |
| Postoperative 6 months | 0.53 | 0.013 | |
| Postoperative 9 months | 0.58 | 0.019 | |

**Table 4:** Mean hip knee ankle angle at different time intervals

| Time interval | Mean hip knee ankle angle | SD | p- value |
|---|---|---|---|
| Pre-operative | 184.2 | 0.79 | 0.033 (Significant) |
| Postoperative | 182.3 | 0.70 | |
| Postoperative 6 weeks | 180.4 | 0.81 | |
| Postoperative 12 weeks | 179.3 | 0.95 | |
| Postoperative 6 months | 178 | 0.87 | |
| Postoperative 9 months | 177.3 | 0.88 | |


Preoperative X-Ray

Postoperative X-Ray

## Discussion

Osteoarthritis (OA) is a chronic degenerative disorder of multifactorial etiology characterized by the loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis, and range of biochemical and morphological alterations of the synovial membrane and joint capsule [10- 12].

In the present study, mean age of the patients with OA of knee was 58 years. Majority of the patients belonged to the age group of 56 to 65 years. Our results were in concordance with the results obtained by previous authors who also reported similar age range of patients with OA in their respective studies. Literature from the past studies also shows that OA indeterminately occurs in elderly age group [13, 14].

We observed a significant improvement in the mean VAS improved from preoperative value of 8.23 to 2.1 at 9 months postoperative follow-up. Similar results were observed in the studies conducted by Subash Y *et al* and Prakash L *et al* who also observed similar findings [15, 16]. We observed a significant improvement in the Mean knee joint space and hip knee able postoperatively. Our results were in concordance with the results obtained by Sukumaran S *et al* and Subash Y *et al*. [15- 17]

Rai AK *et al* evaluated the effect of proximal fibular osteotomy in relieving pain and functional improvement in patients of osteoarthritis knee. They selected 38 patients with KOA, out of which 30 patients gave written informed consent and underwent proximal fibular osteotomy. The median time of follow-up was 13.3 months. Pain relief was observed in almost all patients after proximal fibular osteotomy. Weight-bearing lower extremity radiographs showed significant change in tibio-femoral angle an average increase in the postoperative medial knee joint space. Additionally, obvious change in alignment was observed in the whole lower extremity radiographs in 24 out of 30 patients. In three patients tibio-femoral angle showed progressive more varus alignment after proximal fibulectomy [18].

PFO has emerged as a new surgery to relieve pain and improve joint function in patients with knee osteoarthritis. The most striking findings in the present study included medial pain relief and an improvement in the medial joint space. The majority of patients in our study had significant pain relief immediately after PFO, although the mechanism was unclear and the follow-up was short. Interestingly, the pain relief continued to improve, and some patients even reported no pain at the last follow-up. Postoperative ambulation (i.e. walking) was also obviously improved when compared with the preoperative state. PFO also improved the axial alignment of the lower extremity in some patients, especially in those with severe genu varus [17, 18].

## Conclusion

PFO is a novel alternative method in the management of medial compartment arthritis of the knee. Further studies are recommended.

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