

### **Results of Proximal Fibular Osteotomy for Medial Joint Space Osteoarthritis Knee**

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**Type of Publication:** Original Research Paper

**Conflicts of Interest:** Nil

#### **Introduction**

Arthritis is the most common cause of disability in the older population whether its about large joints [shoulder joint, knee joint, hip joint etc] or small joints. Disability is mainly caused by pain and limitations of movements. Osteoarthritis of knee is one of the common causes for disability in older population leading to opt for expensive treatments [conservative or surgical] by the patient. The pathological characteristics of Knee Osteoarthritis (KOA) include joint structure degradation and cartilage destruction and hyperplasia, with joint pain, dysfunction and joint deformity as the main clinical symptoms. Total knee arthroplasty (TKA), which aims to relieve pain and improve joint function and mobility, is the main surgical alternative in this patient population. However, TKA is expensive and complex, and have its own complications specially in young population. Many treatment modalities has been developed for joint preservation like arthroscopic debridement, HTO [High tibial osteotomy], PFO [proximal fibular osteotomy], SVF[stromal vascular fraction] therapy, PRP [platelet rich plasma] injection etc. Although high tibial osteotomy (HTO) is the first-choice treatment for young patients with osteoarthritis of the medial compartment of the knee, there are some potential disadvantages after surgery. Proximal fibular osteotomy (PFO) relieves pain and improves joint function in human knee osteoarthritis.<sup>2</sup> This new surgery is simple, safe with minimal trauma and affordable. Pain relief after surgery

occurs in almost all patients. PFO may delay or replace TKA in a subpopulation of patients with knee osteoarthritis. In the present study, we carefully evaluated the efficacy of PFO in terms of pain relief and improvement of joint function in a cohort of patients from our hospital.

#### **Materials & Methods**

From June 2016 to Oct 2017, 27 consecutive patients who underwent PFO at our hospital [Index medical college & research centre, indore] were followed retrospectively (n = 27; mean age, 61.76 ± 7.36 years; age range, 48–75 years; 18 female, 9 male). All patients were taken from routine OPD. Pre-op & post-op complete history were taken. All records were studied about each patient. Pre-op & repeated post-op clinical & radiological examination were noted

The inclusion criteria were knee pain with difficulty walking due to medial compartment osteoarthritis or genu varus. The exclusion criteria were genu valgus, acute major trauma, inflammatory joint disease, malignant tumours, and abnormal renal or liver function. Approval from the Institutional ethical board was obtained, and all patients provided informed consent prior to implementation of the study procedures.

The patients were placed in the supine position after administration of spinal anesthesia. An approximately 5-cm longitudinal incision measuring 6cm to 10cm from tip of fibula was made over the lateral skin of the proximal

fibula, and the fibula was exposed between the peroneus muscle and soleus muscle. PFO was performed by removing a 2- to 3-cm length of fibula at this site. Full weight bearing and free mobilization were allowed postoperatively.

Knee pain was assessed using a visual analogue scale. Knee ambulation activities were recorded using the oxford knee score preoperatively and postoperatively. Preoperative and postoperative weight-bearing and whole lower extremity radiographs were obtained in all patients to analyse the alignment of the lower extremity and the ratio of knee joint space (medial/lateral compartment). The hip-knee-ankle angle was measured based on the whole lower extremity radiograph.

### **Results**

One of 27 patients who underwent PFO was lost to follow-up, leaving 26 patients who were followed for a minimum of 12 months (range, 12–18 months). No postoperative complications were observed, including wound infection, delayed healing or nerve damage.

Medial pain relief was observed in almost all patients except 2 after PFO.

These two patients need total knee replacement for pain relief. The mean visual analogue scale scores significantly decreased from  $8.23 \pm 1.40$  preoperatively to  $2.57 \pm 2.69$  postoperatively. Preoperatively, the mean knee score was  $39.73 \pm 11.53$ . Postoperatively it significantly improved to  $68.32 \pm 13.47$ .

Regularly repeated radiographs of the weight-bearing lower extremity showed an average increase in the medial knee joint space postoperatively compared with preoperatively.

The ratio of the knee joint space (medial/lateral compartment) improved significantly. Additionally, correction of alignment in the whole-lower-extremity radiographs was observed in 4 of 27 patients.

### **Discussion**

Knee osteoarthritis is one of the most common joint disorders, and it causes severe pain and immobility. Total knee arthroplasty (TKA) is 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. Many treatment modalities has been developed for joint preservation like arthroscopic debridement, HTO [High tibial osteotomy], PFO [proximal fibular osteotomy], SVF[stromal vascular fraction] therapy, PRP [platelet rich plasma] injection etc. HTO is the first-choice treatment for young patients with osteoarthritis of the medial compartment of the knee. It is aimed at correcting alignment and delaying the time until TKA is required. Surgical effects of HTO are superior, but the excessively high osteotomy plane increases the risk of tibial plateau fracture and proximal necrosis. Hence, HTO is not recommended for the elderly or for patients with severe osteoporosis. Early complications of HTO include infection, deep vein thrombosis, insufficient correction, intra-articular fractures, peroneal nerve injury, osteofascial compartment syndrome and knee stiffness, whereas late complications of this procedure include delayed union or non-union, deformity recurrence and internal fixation failure.

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 increase 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. The key to fibular osteotomy is the accurate fibular

osteotomy height and length and the peroneal nerve protection. Performing fibular osteotomy in an area 4-7 cm away from the fibular head lowers the risk of peroneal nerve injury and produces satisfactory curative effects after operation. Postoperative ambulation (i.e. walking) was also improved when compared with the preoperative state. PFO also improved the axial alignment of the lower extremity in some patients.

Compared with TKA or HTO, PFO is a simple, safe, fast and affordable surgery that does not require insertion of additional implants. PFO decreased the operation time, bleeding amount during operation and drainage volume after operation while shortened the full weight-bearing time; decreased the pain VAS and FTA and increased the JOA score of the knee joint; and decreased the incidence of complications. As such, PFO is a suitable surgical option in most developing countries that lack financial and medical resources. This novel surgery can potentially become an alternative treatment method for osteoarthritis of the medial compartment of the knee, especially for patients who cannot undergo TKA because of medical comorbidities.

### Limitations

Several limitations to this study must be noted.

- Although the short-term results are encouraging, the follow-up time was relatively short, and whether these outcomes will remain unchanged at a longer follow-up time is unclear. Therefore, a longer follow-up study is warranted.
- The mechanism of the efficacy of PFO is unclear.
- The long-term side effects of PFO on other joints of the lower extremity, such as the hip and ankle, remain unknown. Therefore, the biomechanics of pain relief, increases in the medial joint space, and correction of alignment in patients who have undergone PFO need further study.

- The absence of a control group is another main limitation; however, a placebo control is difficult to include when performing this surgery because of the inability to exclude a placebo effect.

### References

1. Burnett RS, Bourne RB. Indications for patellar resurfacing in total knee arthroplasty. *J Bone Joint Surg* 2003; 85: 728–745.
2. Zhang YZ. Innovations in Orthopedics and Traumatology in China. *Chin Med J (Engl)* 2015; 128: 2841–2842. [PMC free article] [PubMed]
3. Duivenvoorden T, Brouwer RW, Baan A, et al. Comparison of closing-wedge and opening-wedge high tibial osteotomy for medial compartment osteoarthritis of the knee: a randomized controlled trial with a six-year follow-up. *J Bone Joint Surg Am* 2014; 96: 1425–1432. [PubMed]
4. Laprade RF, Spiridonov SI, Nystrom LM, et al. Prospective outcomes of young and middle-aged adults with medial compartment osteoarthritis treated with a proximal tibial opening wedge osteotomy. *Arthroscopy* 2012; 28: 354–364. [PubMed]
5. Sprenger TR, Doerzbacher JF. Tibial osteotomy for the treatment of varus gonarthrosis. Survival and failure analysis to twenty-two years. *J Bone Joint Surg Am* 2003; 85-A: 469–474. [PubMed]
6. W-Dahl A, Robertsson O, Lidgren V. Surgery for knee osteoarthritis in younger patients. *Acta Orthop* 2010; 81: 161–164. [PMC free article] [PubMed]
7. Altman R, Asch E, Bloch D, et al. Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and therapeutic criteria committee of the American rheumatism association. *Arthritis Rheum* 1986; 29: 1039–1049. [PubMed]

8. Wei XC, Wang XH, Li PC, et al. Proximal Fibular Osteotomy, A New Surgery For Pain Relief and Improvement of Joint Function in Human Knee Osteoarthritis: a Short-Term Clinical Study. Poster #: 1071. ORS 2016 Annual Meeting at the Disney's Coronado Springs Resort in Orlando, Florida, March 5–8.
9. 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. [PubMed]