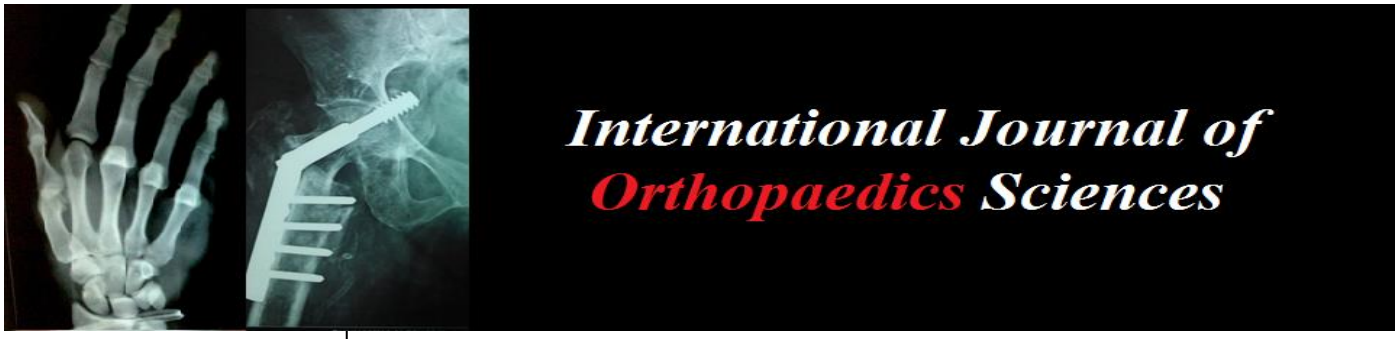

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Study of functional outcome of proximal fibular osteotomy in medial compartment osteoarthritis of knee

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Abstract
Aim: To explore the effects of proximal fibular osteotomy as a new surgery for pain relief and improvement of medial joint space and function in patients with knee osteoarthritis.
Methods: From September 2017 to December 2020, 24 patients (six cases were bilateral so total 30 knees) who underwent proximal fibular osteotomy for medial compartment osteoarthritis in Bapuji Hospital and Chigateri hospital attached to JJM Medical college, were followed up. Preoperative and postoperative weight-bearing and whole lower extremity radiographs were obtained to analyze the alignment of the lower extremity and ratio of the knee joint space (medial/lateral compartment). Knee pain was assessed using a visual analogue scale, and knee ambulation activities were evaluated using the KSS score.
Results: A total of 22 patients and 30 knees were followed-up. Of these, 7 were male and 15 were female patient. The average age was 57.15 years. The average preoperational VAS score, KSS functional score were 6.3 points, 33.5 points, respectively. According to KL grading, there were 18 knees of grade 2 and 2 knees of grade 3. The average post-operational VAS score, KSS functional score were 2.8 points and 83.7 points respectively. the medial joint space has improved significantly from preoperatively 1.15mm to postoperatively 3.4mm.
Conclusion: We thereby conclude by stating that PFO is a promising alternative procedure in the management of medial compartment arthritis of the knee. It is a simple, effective, easy to perform procedure which is cost effective and gives excellent pain relief postoperatively. It is associated with lesser complications and a shorter recovery period as compared to High tibial osteotomy and Unicondylar knee replacement.

Keywords: proximal fibular osteotomy, medial compartment, osteoarthritis of knee

Introduction
Knee osteoarthritis (OA) is a chronic, progressive degenerative disease with joint pain, stiffness, and deformity. Knee OA is a common joint disease, with an incidence of 30% of the population older than 60 years. Medial compartment OA is very common, almost the commonest non communicable disease in India, and around 50% of Indian Population have Varus knees [1]. In healthy knees, the medial compartment bears 60% to 80% of the load as the mechanical axis is more frequently medial to the center of the knee joint.
Knee varus deformities, characterised by a mechanical femorotibial axis of less than 180° on full-leg standing anteroposterior (AP) radiographs and narrowed medial joint space, are common in patients with knee OA [2]. High tibial osteotomy and total knee arthroplasty are the 2 commonly used methods for treating knee OA [3].
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 some patients need a second knee revision after the first surgery [4, 5]
Non uniform medial and lateral supports in Varus knees is because of osteoporotic tibia medially and three cortex supports laterally. This leads to the nonuniform settlement which 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 of the knee joint [6].

In our study we use a simpler procedure proximal fibular osteotomy to treat medial compartment osteoarthritis knee. It may delay or even negate the need for unicompartmental knee arthroplasty [3].

It is a safe, simple and effective procedure that is an alternative to unicompartmental knee arthroplasty for medial compartment OA of the knee joint [3]. The goal is to assess and include it in the treatment algorithm of knee osteoarthritis in our institute.

Method and Methodology

Adults with medial compartment osteoarthritis of knee admitted to Chigateri General Hospital and Bapuji Hospital attached to J.J.M Medical College, Davangere in the period from September 2017 to December 2020. Clinical, Blood and radiological investigations will be carried out to get fitness for surgery. Patients will undergo proximal fibular osteotomy for medial compartment osteoarthritis of knee. Patients will be followed up at 1 month, 3 month, 6 months, 1 year after surgery. A minimum of 30 cases will be studied without any sampling procedure.

Inclusion Criteria

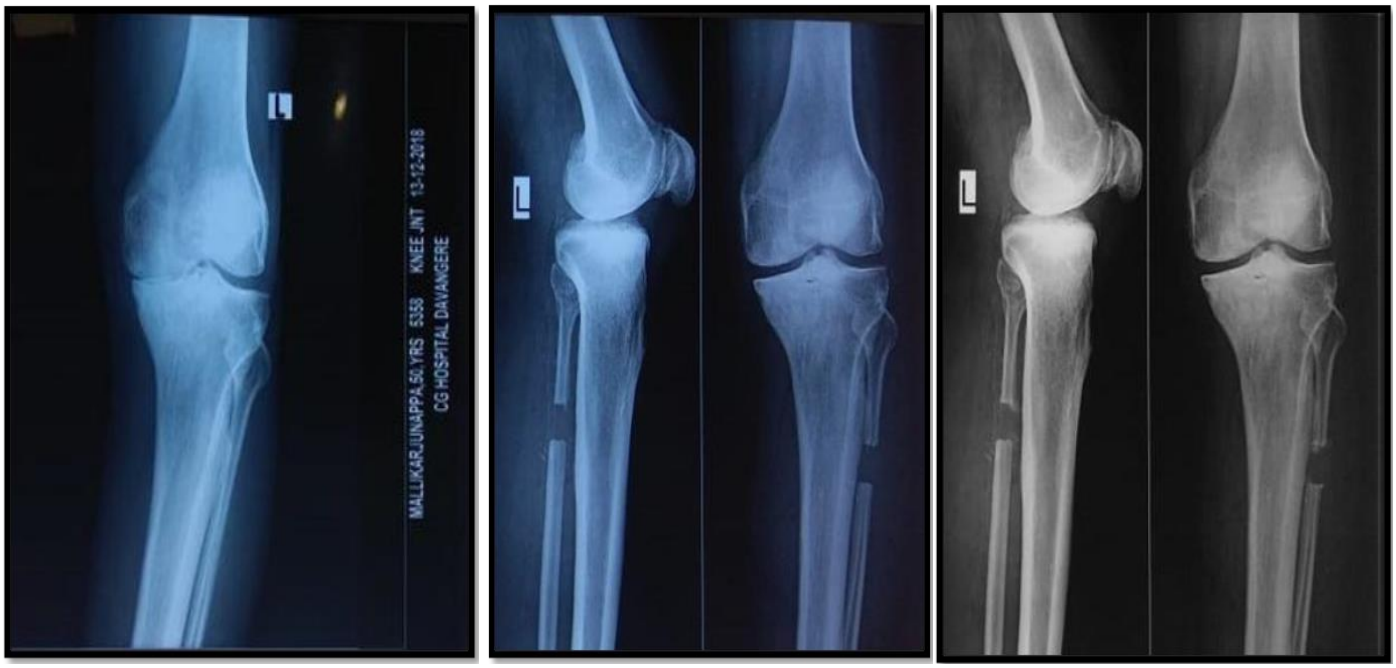
- Medial compartment arthritis with varus knee
- Grade 2 and grade 3 OA knee in Kellgren and Lawrence classification
- Good lateral joint space in weight bearing X-ray films.
- Patients aged more than 20 years
- Patients willing for treatment and given – informed written consent

Exclusion Criteria

- Severe osteoarthritis
- Genu valgus deformity
- Acute major trauma
- Grade 0, 1 and 4 OA knee in Kellgren and Lawrence classification
- Lateral compartment osteoarthritis of knee
- Patients medically unfit for surgery
- Patients not willing for treatment.
- Lateral joint space less than medial joint space

Surgical Technique

After obtaining informed consent and anaesthetic fitness, the patients were taken up for the procedure. The surgery was performed with the patient in the supine position under spinal anaesthesia with antibiotic cover. Tourniquet was not used routinely in our series. The fibular head was marked and the osteotomy site was determined to be 7 to 9 cm from the head of fibula. The rationale behind choosing this level of osteotomy is that an osteotomy at a higher level would be likely to cause an injury to the common peroneal nerve while if it was done any lower down that the effect of the osteotomy on the medial compartment arthritis would be lost. A 5-8 cm lateral incision was made overlying the chosen site of osteotomy and dissection was carried out through the skin and subcutaneous tissues. The peroneus and soleus muscles were then separated to expose the periosteum of the fibula which was then incised and a 1.5 to 2 cm of fibula was then resected with the help of an osscilating saw after placing a few drill holes at the osteotomy site. Curved homann retractors were placed behind the fibula prior to osteotomy and care was taken not to stretch the soft tissues too much in order to protect the nerve from potential damage. Occasionally after the osteotomy some of the fibulae tend to bleed quite profusely and in that situation bone wax was used to seal the cut ends of the bone. After ensuring heamostasis and giving wound wash, closure was done in layers and sterile dressing and compression bandage applied. All patients were encouraged to stand and walk on the same evening of surgery and were discharged on the third postoperative day after the first wound inspection.



Pre-operative | Immediate post-op | 1 yr follow up

Clinical Images at Final Follow Up

Sitting Crossed

Leg Squatting

Result

Proximal Fibular osteotomy using was performed in 30 knees of 22 patients with minimum age of 45 and maximum age of 68 and the average age is 56.5 years. All the patients were followed up at 1 month, 3 month, 6 month and 12 month. Patients were analysed for any complications and their functional outcome was compared with their previous status. The majority of the patients were from the age group of 50-65 years which accounts for 75 % of patients in our study. The youngest patient was 47 years of age and the oldest patient was 68 years. The mean age was 57.15 years. There was a female predominance in our study accounting for 68.18% of the total patients. Most of the patients (90%) operated were having grade 2 and (10%) were of grade 3 osteoarthritis of knee according to Kellgre-Lawrence classification. In my study the mean pre-op Knee society score(KSS) score was 33.5 which has improved post operatively to 83.57, which falls under excellent result, VAS score has significantly reduced post operatively from mean 6.3 to 2.8 indicating patient got relieved of pain significantly. We assessed the medial joint space and lateral joint space in preop xrays as well as postop xrays. Here in our study the medial joint has opened up from mean 1.15mm to 3.4mm and lateral joint space has reduced from 5.69mm to 5.3mm. In our study the ratio of medial joint space to lateral joint space has reduced significantly from pre-op 0.20mm to 0.56mm post-op indicating opening up of medial joint space.

Discussion

In the study a total of 30 cases of medial compartment osteoarthritis of knee treated with proximal fibular osteotomy were evaluated. The theory behind the development of medial compartment suggests that there is an asymmetric load transmitted across both tibial plateaus with more stress being borne on the medial side which eventually becomes lower leading to the development of a varus deformity and arthritic changes occur with degeneration of the articular cartilage. PFO acts by weakening the support laterally, corrects the varus deformity and shifts the stress from the medial to the lateral. Proximal fibular osteotomy is performed to relieve pain and retard the radiological deterioration in knees with medial compartment osteoarthritis. The procedure aims to preserve joints [7].

In a study by Yang *et al*, 150 patients with medial compartment arthritis were followed up for a period of more than 2 years. The preoperative KSS score was 45±21.3 while postoperatively it was 92.3±31.7. The mean VAS score preoperatively was 7 which significantly decreased to 2 in the postoperative period. They stated that PFO dramatically improves the function of the knee and gives good pain relief [8].

In a study by Bo Liu *et al*, they had 84 patients with 111 knees being affected

by medial compartment arthritis. The average preoperative VAS score was 7.08±1.41.

The average preoperative KSS and functional scores were 49.14±10.95 and 44.97±17.1 while postoperatively it was 67.77±11.08 and 64.66±13.12 respectively.51 knees were associated with a satisfactory clinical outcome while 77 knees had a significant improvement [9].

A study on 110 patients followed up for 2 years found that proximal fibular osteotomy can significantly improve both the radiographic appearance and function of the affected knee joint and also achieve long-term pain relief. This procedure may be an alternative treatment option for medial compartment OA [10].

A study of 47 patients with medial knee pain who underwent PFO demonstrates that PFO effectively relieves pain and improves joint function at a mean of 13.38 months postoperatively. This new surgery is simple, safe 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 [11].

In our study, we had 30 patients (26 knees) predominantly involving medial compartment knee osteoarthritis coming under grade 2 and grade 3 kellgren and lawrence classification who were managed by PFO and were followed up for a minimum period of 1 year. Following the surgery all patients reported dramatic relief in pain with the VAS

dropping significantly form 6.3 in the preoperative period to 2.8 postoperatively. The average preoperative knee society score (KSS) also showed a significant improvement from 33.5 preoperatively to 83.5 in the postoperative period. We also noted an increase in the medial joint space from 1.15mm preoperatively to 3.4mm in the postoperative period. The only complication we noted in our study was the EHL weakness in two patients which eventually got recovered over a period of 4 weeks.

Proximal fibular osteotomy (PFO) is a very simple procedure that aims to remove the lateral deforming forces by resecting a small part of fibula. This is an excellent procedure which has shown to produce outstanding short term results in the form of pain relief and function restoration. However the indications are very specific and the band width of patients falling into the category of those who will benefit from this procedure is rather narrow. Improper case selection is doomed to failure, bringing an ill reputation to this otherwise excellent procedure. One more troubling aspect of this surgery is transient neuropraxia or weakness of Extensor Hallus Longus, which lasts from few weeks to few months. This can be avoided by very careful surgical technique and meticulous adherence to correct steps.

The advantages of PFO over the other procedures is that it is a simple and safe procedure which is cost effective and easy to perform. It gives dramatic pain relief postoperatively and is associated with a shorter recovery time. All patients can be mobilized with full weight bearing on the same day of surgery. If the procedure does not give good results in any situation then the need for performing a Total knee arthroplasty at a later date is not altered at all. The limitations of our study were a small sample of patients and relatively short follow up period. A longer period of follow up is necessary to evaluate whether the beneficial effects of PFO are sustained over a period of time.

Conclusion

The Proximal fibular osteotomy (PFO) is cost effective in the relatively young patients with early medial joint arthritis. The PFO can stand alone as an appropriate alternative to costly procedures like High Tibial Osteotomy (HTO) and unicompartmental knee arthroplasty (UKA) or total joint replacement (TKA) surgery. Compared with TKA or HTO, the PFO is a simple, safe, fast and affordable surgery that does not require insertion of additional implants, associated with lesser complications and a shorter recovery period. A longer period of follow up is necessary to evaluate whether the beneficial effects of PFO are sustained over a period of time.

Reference

1. Grazio S, Balen D. Obesity: Risk factor and predictors of osteoarthritis. Lijec Vjesn. 2009;131:22-6.
2. Ensini A, Catani F, Leardini A, Romagnoli M, Giannini S. Alignments and clinical results in conventional and navigated total knee arthroplasty. Clinical Orthopaedics and Related Research® 2007;457:156-62.
3. Yang ZY, Chen W, Li CX, Wang J, Hou ZY, Gao SJ, *et al*. Medial compartment decompression by fibular osteotomy to treat medial compartment knee osteoarthritis: a pilot study. Orthopedics. 2015;38(12):e1110-4.
4. Burnett RS, Bourne RB. Indications for patellar resurfacing in total knee arthroplasty. JBJS 2003;85(4):728-45.
5. Zhang YZ. Innovations in orthopedics and traumatology in China. Chinese medical journal 2015;128(21):2841.
6. Preston CF, Fulkerson EW, Meislin R, Di Cesare PE. Osteotomy About the Knee–Applications, Techniques, and Results. The journal of knee surgery 2005;18(04):258-72.
7. Prakash L. Proximal Fibular Osteotomy: Instructional Course Lectures. India: Indian Academy of Orthopaedic Surgeons 2016.
8. Ogilvie-Harris DJ, Fitsialos DP. Arthroscopic management of the degenerative knee. Arthroscopy: the journal of arthroscopic & related surgery 1991;7(2):151-7.
9. Widuchowski W, Lukasik P, Kwiatkowski G, Faltus R, Szyluk K, Widuchowski J *et al*. Isolated full thickness chondral injuries. Prevalance and outcome of treatment. A retrospective study of 5233 knee arthroscopies. Acta Chir OrthopTraumatol Cech 2008;75(5):382-6.
10. Yang ZY, Chen W, Li CX, Wang J, Shao DC, Hou ZY, *et al*. Medial Compartment Decompression by Fibular Osteotomy to Treat Medial Compartment Knee Osteoarthritis: A Pilot Study. Orthopedics 2015;38:e1110-1114.
11. Wang X, Wei L, Lv Z, Zhao B, Duan Z, Wu W *et al*. Proximal fibular osteotomy: a new surgery for pain relief and improvement of joint function in patients with knee osteoarthritis. The Journal of international medical research 2017;45:282-289.