



# International Journal of Biological & Pharmaceutical Research

e- ISSN 0976 - 3651  
Print ISSN 2229 - 7480

www.ijbpr.com

Research Article

## TO STUDY PROXIMAL FIBULAR OSTEOTOMY IN MEDIAL COMPARTMENT OSTEOARTHRITIS OF THE KNEE AND TO PERFORM EFFECTIVE AND INEXPENSIVE AND PAIN RELIEF POSTOPERATIVELY

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### ABSTRACT

**Introduction:** Osteoarthritis is a chronic progressive disease accompanied by joint pain, stiffness and deformity. Surgical treatment currently includes high tibial osteotomy (HTO), uni-compartmental knee arthroplasty (UKA) and total knee arthroplasty (TKA). These are expensive procedure with serious complications. Proximal fibular osteotomy (PFO) is a simple and safe procedure that also has a brief recovery period. **Objective:** To evaluate the effectiveness of proximal fibular osteotomy as an upcoming surgery for improvement in pain and medial joint space in patients with medial compartment osteoarthritis of the knee. **Methods:** A total of 30 patients (38 knees; 8 bilateral cases) underwent proximal fibular osteotomy for medial compartment knee osteoarthritis from January 2014 to December 2016 at Sree Balaji Medical College and Hospital, Chrompet, Chennai and were regularly followed up. Both pre and postoperative full weight bearing radiographs were compared for the medial and lateral joint space along with the visual analogue scale (VAS) score and the American knee society score (KSS). **Results:** All of the 30 patients were followed up. Among them 11 were male and 19 were female. The mean age of participants was 56 years. 34 of the knees were grade 2 based on Kellgren Lawrence classification and 4 were grade 3. The average preoperative and postoperative VAS score were 76.5 and 2.7 points respectively and the average preoperative and postoperative KSS scores were 33.6 and 83.8 points respectively. The medial joint space also improved significantly from an average of 1.14mm to 3.02mm. **Conclusion:** In conclusion we would like to say that PFO is an excellent alternate surgery for management of medial compartment osteoarthritis of the knee. It is simple, inexpensive, effective procedure that is also associated with lesser complications and shorter recovery period as compared to HTO, UKA or TKA.

**Key Words:** Osteoarthritis, proximal fibular osteotomy (PFO), high tibial osteotomy (HTO), uni-compartmental knee arthroplasty (UKA).

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Received:20.01.2017

Revised:22.01.2017

Accepted:15.02.2017

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### INTRODUCTION

Knee OA (KOA) is the commonest type of osteoarthritis seen among all the joints of the body and is the most common cause of disability in the geriatric population. (Grazio S *et al.*, 2009) Among the three

compartments in the knee the chances of developing primary medial KOA is 10 times higher than that of developing primary lateral KOA and every individual has a 44% lifetime risk of developing knee osteoarthritis. (Felson D *et al.*, 2012) Surgical treatment commonly includes different osteotomies, uni-compartmental knee arthroplasty (UKA) and total knee arthroplasty (TKA).

(Yang ZY *et al.*, 2015) The treatment prescribed to the patient depends on the degree of degeneration at the time of presentation, age, associated co-morbidities, previous treatment taken by the patient, patient's expectations and the financial status of the patient.

The non-uniform lateral and medial supports in varus knees is because of osteoporosis which leads to a three-cortex support laterally and a single cortical support medially. This results in non-uniform settlement which causes a medial shift of load from the normal distribution leading to even more varus thereby enhancing the progression of medial compartment KOA. (Preston CF *et al.*, 2005) Proximal fibular osteotomy (PFO) is a simple and safe procedure, that addresses the biomechanical changes that the knee goes through, especially as the osteoporosis ensues. Relief in pain is seen in almost all of the patients. Our aim is to evaluate the efficacy of proximal fibular osteotomy for treatment of medial compartment knee osteoarthritis.

## MATERIAL & METHODS

1. Study design: Prospective study
2. Study setting: Department of Orthopaedic Surgery, Sree Balaji Medical College and Hospital, Chrompet, Chennai
3. Study duration: from January 2014 to December 2016
4. Sample size: 30
5. Study population: All the patients visiting the Ortho OPD of Sree Balaji Medical College and Hospital with medial compartment osteoarthritis of the knee willing to be a part of the study.
6. Follow up: All the patients were followed up at 1 month, 3 months, 6 months and 1 year after the surgery.

### Inclusion criteria:

1. Patients with medial compartment OA (KG Grade II or III) willing to give consent to be a part of the study
2. Predominance of self-reported pain over medial compartment of the knee
3. Knee pain unresponsive to conventional medical treatments for at least 3 months

### Exclusion criteria:

1. Patients with involvement of lateral tibio-femoral

joint or patellofemoral joint

2. Patients with valgus deformities of knee
3. Patients with post traumatic OA
4. Patients with history of previous infection in the knee
5. Patients with inflammatory arthritis
6. Patients with medical co-morbidities leading to osteoporosis (hepatic or renal)
7. History of prior knee replacement surgery or high tibial osteotomy
8. Patients with history of intra articular steroid injections within a period of 6 months

All the patients were assessed preoperatively for the knee pain with the help of visual analogue scale (VAS), for the knee ambulation activities with the help of American Knee Severity Score (KSS) and the medial and lateral joint spaces were also measured on weight-bearing lower limb radiographs and their ratios calculated. After obtaining the pre-operative assessment the surgery was performed under spinal anaesthesia with the patient in supine position. The osteotomy was done 7 to 9 cm distal to the most prominent part of the fibular head depending on the height of the patient and a fragment that is 1.5 to 2 cm was removed followed by thorough wash and routine closure. Patients were made to stand as soon as the effect of anaesthesia wore off and were discharged on the third postoperative day and examining the wound. (Liu B, Chen W *et al.*, 2012) Sutures were removed on post-operative day 12. X-rays and knee scores were repeated at 1 month, 3 months, 6 months and 12 months after the surgery.

Complications – EHL weakness leading to toe drop was seen in 2 of the patients. Some patients, during the surgery showed profuse bleeding from the osteotomy site which was dealt with the help of bone wax to plug the medullary cavity of the fibula.

## RESULTS

In our study PFO was performed on 38 knees of 30 patients whose mean age was 56 years. At each follow up visit which happened at 1 month, 3 months, 6 months and 12 months post op, all the patients were analysed for complications and their functional outcome was compared with their previous status. The maximum number of the patients were in the 51 - 60 years of age group with accounted for 63.3% of patients in our study. The youngest subject was of 47 years whereas the oldest was 68 years old. A total of 19 patients out of the 30 were female which accounts for 63.3% indicating that a higher female preponderance of female patients suffering from osteoarthritis. (Kellgren JH *et al.*, 1957)

A total of 10 patients had Right OA knee and 12 had it in the Left whereas 8 patients had both the knees affected. In this study most of the knees operated on (89.5%) had Grade 2 osteoarthritis and 10.5% had Grade 3 OA according to Kellgren and Lawrence classification.

Most of the patients who were a part of the study were over weight (60%). 10 out of the 30 patients were of in the normal category.

In my study it was found that the average pre-operative KSS was 33.6 which improved to 83.8 in the immediate post-operative period which indicates towards significant improvement in the disability of the patient.

Patients reported significant improvement in pain as the VAS score reduced drastically from 6.5 to 2.7 in the immediate post-operative period indicating towards

the impact this procedure than have in reducing the symptoms of the patient.

It was found that due to the procedure the medial joint space had opened up on an average from 1.14 mm to 3.02 mm and the lateral joint space reduced from 5.77 mm to 5.43 mm.

The ratio of the medial joint space to the lateral joint space had reduced from 0.20 mm to 0.56 mm which is found to be significant and indicates towards opening up of the medial joint space thereby relieving the patient off of his/her symptoms

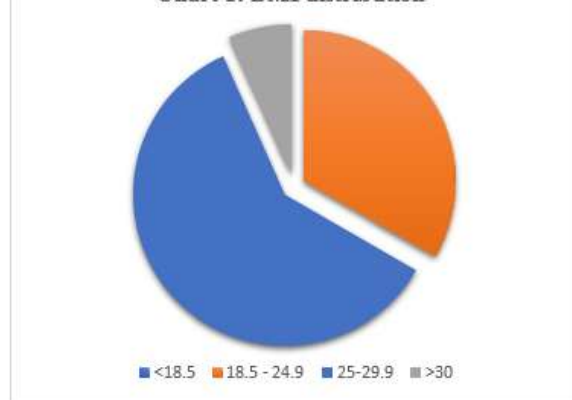
**Figure 1: Preoperative bilateral weight bearing knee x-ray (AP view)**



**Figure 2: Postoperative bilateral weight bearing knee x-ray (AP view)**



**Chart 1: BMI distribution**



**Chart 2: American Knee Society**

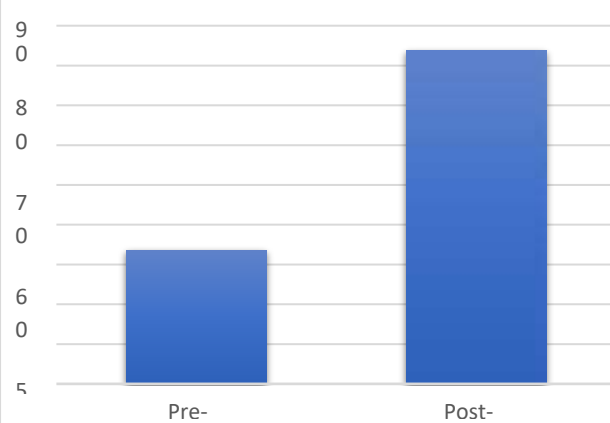


Chart 3: Visual Analogue

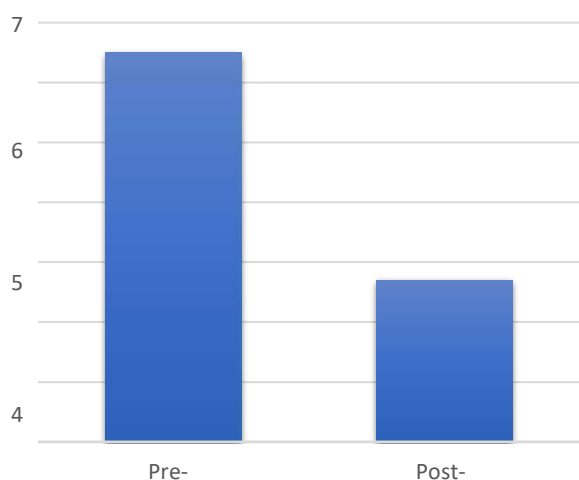
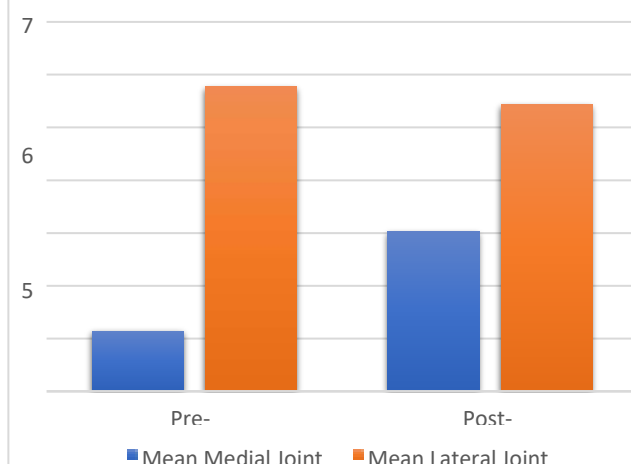


Chart 4: Medial &amp; Lateral



## DISCUSSION

Our study included 30 patients (38 knees) which predominantly had osteoarthritis of the medial compartment of the knee, coming under grade 2 and grade 3 Kellgren and Lawrence classification. These individuals were managed by proximal fibular osteotomy and were followed up for a minimum period of 1 year. Majority of the patients in this study belonged to the age group of 51-60 years. (L Prakash *et al.*, 2015) There was an increased preponderance of female patients in our study which correlates with the usual incidence of the disease. 60% of the patients were over-weight which indicates that an increased weight increases the load transmitted through the medial joint and also cause varus at the knee. Following the surgery there was an immediate improvement in the American Knee Society Score (KSS) from 83.8 to 33.6.

Patients reported a dramatic relief of pain which was assessed with help of a visual analogue scale (VAS). VAS dropped from 6.5 to 2.7 postoperatively. An increase in the medial joint space was noted after the surgery from an average of 1.14mm to 3.02mm and the

lateral joint space decreased on an average from 5.69mm to 5.3mm. This indicates a shift of the stress to a more neutral point. (Wang X, *et al.*, 2014) Two of the 30 patients developed a toe drop due to extensor hallucis longus weakness in the postoperative period after an uneventful surgery which eventually got recovered over a period of 3 to 6 months.

## CONCLUSION

PFO is easy to perform, is effective, is inexpensive and gives excellent pain relief postoperatively makes the future of this procedure even more exciting. It is also associated with lesser complications and has a much shorter post-operative and recovery period when compared to high tibial osteotomy and unicompartmental knee arthroplasty. A much longer period of follow up is needed to assess whether the benefits of proximal fibular osteotomy are actually sustainable over a period of time and if it can replace unicompartmental knee replacement or at the very least buy time comparable to high tibial osteotomy before a unicompartmental or a total knee arthroplasty is needed.

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**Cite this article:**

John Shaheed Shaik, Venkata Raveendra Reddy. To Study Proximal Fibular Osteotomy In Medial Compartment Osteoarthritis Of The Knee And To Perform Effective And Inexpensive And Pain Relief Postoperatively. *International Journal of Biological & Pharmaceutical Research*. 2017; 8(4):217-221.



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