1International Journal of Medical and Health Research
ISSN: 2454-9142
Received: 01-11-2019; Accepted: 03-12-2019
www.medicalsciencejournal.com
Volume 6; Issue 1; January 2020; Page No. 01-04

Evaluating the role of proximal fibular osteotomy in medial compartment osteoarthritis of Knee

Dr. Gagan Khanna[1], Dr. Aarti Dewan[2], Dr. Arshi Raunaq Singh[3*], Dr. Raman Attri[4]
[1] Professor, Dept of Orthopaedics, Sri Guru Ram Das Institute of Medical Sciences, Amritsar, Punjab, India
[2]Associate Professor, Dept of Orthopaedics, Sri Guru Ram Das Institute of Medical Sciences, Amritsar, Punjab, India
[3,4] Junior Resident, Dept of Orthopaedics, Sri Guru Ram Das Institute of Medical Sciences, Amritsar, Punjab, India

Abstract
Objective: to analyze the early clinical effect of proximal fibular osteotomy on medial compartment knee osteoarthritis.
Methodology: present study includes 30 knees with medial compartment osteoarthritis of knee with Kellgren-Lawrence Grades between 1 to 3 based on x ray findings who visited our hospital between June 2017 and June 2019 and underwent PFO. Patients were followed up till 6 months. Review of the patients with regards to their VAS Score, Oxford Knee Score and weight bearing radiographs was done with follow ups at 1, 3 and 6 months post operatively.
Result: Significant improvement in mean visual analogue pain score (VAS), from 6.83 preoperative to 3.20 at the final follow up was observed (p-value <0.001). Medial joint space opening from 2.81 to 3.74 at final follow up was observed. Oxford knee society score showed significant improvements at final follow up (p-value < 0.001).
Conclusion: The functional outcome after proximal fibular osteotomy were satisfactory. With correct patient selection and meticulous adherence to basics, Proximal fibular osteotomy offers an excellent alternative to tedious and extensive procedures like High tibial osteotomy (HTO) and Uni-compartmental Knee Arthroplasty (UKA).

Keywords: PFO, osteoarthritis, vas score, oxford knee score, HTO, UKA

Introduction
Osteoarthritis (OA), the most common joint disease, affects an estimated 18% of women and 10% of men over 60 years of age [1]. Osteoarthritis is the second most common rheumatologic problem and it is the most frequent joint disease with a prevalence of 22% to 39% in India [2, 3]. OA is more common in women than men, but the prevalence increases dramatically with age. Nearly, 45% of women over the age of 65 years have symptoms while radiological evidence is found in 70% of those over 65 years [4].
The cause of OA remains unknown, thought there is clear evidence for major risk factors, such as age, obesity, joint trauma, and heavy work load [5]. The risk factors can be divided into systemic (for e.g. age, gender, genetics, and overweight) and local biomechanical factors, such as joint injury and malalignment, overweight, and muscle weakness. Abnormal mechanical loading in various sport activities or during heavy work may activate the biochemical cascade that leads to joint degeneration and pain, but also even in normal mechanical loading if the cartilage is impaired [6].
Various conservative methods and routines are followed for treatment, especially in younger patients with up to moderate grade of Osteoarthritis which include physiotherapy, analgesics, intraarticular steroid or PRP injections [7-10]. Surgical modalities like High Tibial Osteotomy (HTO) and Unicompartmental Knee Arthroplasty (UKA) are also advocated but are expensive and require prolonged rehabilitation.
Elderly patients, especially with tricompartmental arthritis, ideally would need to undergo Total Knee Arthroplasty for pain relief but the procedure has its own set of complications [11] and is expensive to undergo especially in Low to Middle Income Countries (LMICs). This necessitates the need for a simpler yet effective method to relieve pain, especially in younger patients. Hence, PFO emerges as a suitable surgical option in most LMICs that lack financial and medical resources. It is cost effective in relatively younger patients with early medial joint osteoarthritis and can stand alone as an appropriate alternative to costly procedures like High Tibial Osteotomy (HTO) and unicompartmental or total joint replacement (TKA) surgery in the Low- & Middle-Income Countries (LMICs) [12]. The present study analyses the early clinical effect of proximal fibular osteotomy on medial compartment knee osteoarthritis.

Methods
Our study includes 30 knees with medial compartment osteoarthritis of knee with Kellgren-Lawrence Grades between 1 to 3 based on x ray findings who visited our hospital between June 2017 and June 2019 and underwent PFO. The inclusion criteria was predominantly medial compartment arthritis with varus knees with good lateral joint space in weight bearing films. At least 2mm gap in AP x-rays and patients with BMI less than 30 who understand that this is a procedure that buys time, and delays knee replacement surgery. The exclusion criteria was patients with advanced and tricompartmental osteoarthritis, rheumatoid or polyarticular arthritis, symptomatic hip osteoarthritis, significant joint swelling or clinical signs of acute inflammation (possible infection), valgus malalignment, patella-femoral tracking or treated instability. Pre-operative Oxford Knee Score and VAS score were obtained.
Surgery was performed under spinal anaesthesia with tourniquet. With patient in supine position, painting and draping was done under all aseptic precautions. The tip of head of fibula was palpated and using a scale, a mark was

made at 7 cms. A 5 cms incision is made at the marked level, extending 2.5 cms proximally and distally. Subcutaneous issue is separated and a plane is created between the Peroneus and Soleus muscle to reveal the fibula. Care was taken to gently retract the tissues using Hohmann retractors. Multiple drill holes were made and using an oscillating saw, a 1 – 2 cms piece of fibula is resected. As Fibula tends to bleed, both the ends of the bone were sealed with bone wax. Thorough lavage of the wound was done with normal saline and closure done in layers. Post operatively the patients were mobilised in the evening of the same day of the surgery and weight bearing x rays were obtained. All patients were discharged on the 2nd post-operative day under oral antibiotic cover with regular follow up for wound assessment until 12th post op day when sutures were removed. Review of the patients with regards to their VAS Score, Oxford Knee Score and weight bearing radiographs was done with follow ups at 1, 3 and 6 months post operatively. Data obtained was analysed and a P Value of < 0.05 was considered to be statistically significant.

Fig 1: Pre Op Weight Bearing X-ray (AP View)

Fig 2: Post Op Weight Bearing X-ray (AP View)

Fig 3: Exposing the Fibula

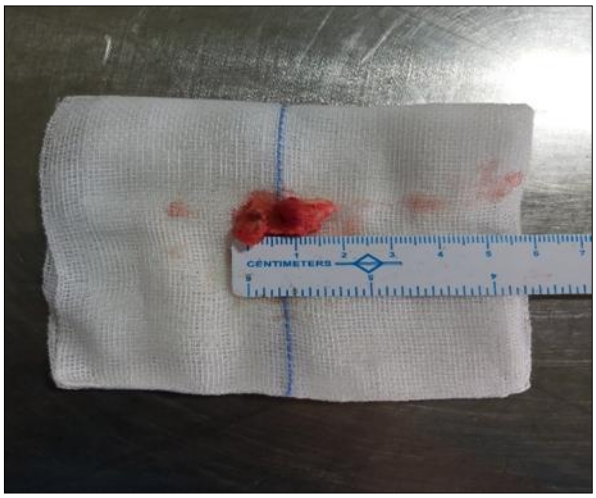

Fig 4: Resected Fibula Piece

Results

The study included 25 patients and 30 knees who underwent PFO and were regularly followed up at 1, 3 and 6 months post operatively and none of the patients were lost in follow up. The study revealed a significant amount of reduction in pain in knee joint following the procedure, which was the primary indication to undergo PFO.

The study included 14 females and 11 males with males mostly belonging to the farming community and females being home makers. The age distribution ranged from 40 yrs. to 72 yrs. of age with a mean age of 57.68±9.22yrs. The mean BMI was found to be 27.12±1.77.

Table 1

	Minimum	Maximum	Mean
Age [yrs.]	40	72	57.68±9.22
BMI	23.90	29.2	27.12±1.77

The Mean VAS Score pre-operatively was 6.83 which showed a significant post-operative reduction to 3.20. (p = 0.004).

Table 2

Scoring System	Pre Op	Post Op
VAS Score	6.83	3.20

The medial joint space measured pre-operatively ranged from 2 mm to 3.5 mm with the mean being 2.81 mm and the post-operative values ranged from 2.6 mm to 4.9 mm with the mean being 3.74 mm. The average lateral joint space reduced from 5.93 mm to 5.34 mm after the procedure. (p = 0.001).

Table 3

Joint Space [in mm]	Pre Op	Post Op
Medial Joint Space	2.81	3.74
Lateral Joint Space	5.93	5.34

The Oxford Knee Score, with a range of 16 to 36 pre-operatively and a mean of 27.53 increased to average of 36.93 at post op 1 month, 36.70 at 3 months and 36.23 at 6 months, which was found to be statistically significant. (p = 0.001).

Table 4

	Pre Op	Post Op – 1 Month	Post Op – 3 Months	Post Op – 6 Months
Oxford Knee Score	27.53	36.93	36.70	36.23

4 Patients reported to have paraesthesia over the dorsum of foot which improved with time with none reporting it at 6 months follow up. None of the patients had foot drop or surgical site infection.

Discussion

PFO is a relatively simple surgical procedure with advantages such as short operating time and easy surgical technique. Moreover, it is an economical procedure without the necessity of any expensive implants.

The first study regarding PFO in the literature by Yang *et al*. demonstrated improved radiographic and functional results of 110 patients after more than two years follow-up.[13]The authors attributed this satisfying result to the shift of the loading forces from medial to the lateral compartment as a result of elimination lateral fibular support and correction of varus deformity. They suggested that the nonuniform settlement of the tibial plateau, which is caused by lateral support of the fibula, is the main factor responsible for mechanical axis shift and subsequent degenerative changes and fibular osteotomy and resection would solve this nonuniform settlement and varus deformity caused by this lateral support [14]. A study of 47 patients with medial knee pain who underwent PFO also demonstrated that PFO effectively relieves pain and improves joint function at a mean of 13.38 months postoperatively [12].

In contrast to HTO, which has a variety of surgical methods and whose angle of osteotomy could be controlled, the number of PFO surgical methods is less, so patient selection has become a crucial factor for further identification of the operative indications. The objective of this study was to observe the effects of preoperative clinical and radiographic factors on short-term postoperative outcome to guide the selection of surgical patients, to further clarify the indications for surgery and to improve postoperative curative effect.

In our study we found that age of the patient did not play an important role in outcome of pain relief with patients >60 years also having a dramatic relief in pain post operatively. The significant decrease in VAS score indicates that the procedure goes well in hand with its primary indication of pain relief with a significant improvement in the Oxford knee scores as well. The increase in the Medial Joint Space corresponds to the proposed mechanism of elimination of lateral fibular support and correction of varus deformity. However, a slight decreasing trend in the Oxford knee score during the regular follow ups could be a matter of concern as to the long-term effects and feasibility of the procedure.

The limitations of this study were that the sample size was relatively small and the follow-up time was short, thereby making it difficult to determine the relationship between factors studied and long-term postoperative outcome of PFO. Further trials are warranted to truly know the duration to which the pain relief can be extended and also to study the effects of PFO in patients who may later on undergo Total Knee Arthroplasty.

Conclusion

PFO has proved to be a simple yet effective procedure with little complications, lesser operative time, for younger patients with medial compartment Osteoarthritis of knee. The ability to mobilize the patient on the day of surgery itself and its cost effectiveness are an added advantage when compared to other surgical modalities like HTO and UKA. This procedure is also advisable to patients with long term history of analgesic therapy or repeated intra-articular steroidal or PRP injections with unsatisfactory results in terms of pain relief.

References

1. Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. Bull World Health Organ. 2003; 81:646-56.
2. Silman AJ, Hochberg MC. 2nd ed. Oxford: Oxford University Press. Epidemiology of the Rheumatic Diseases, 2001.
3. Symmons D, Mathers C, Pfleger B. Global Burden of Osteoarthritis in year 2000: Global burden of disease 2000 study. World health report, 2002, 5(2).
4. Davis MA, Ettinger WH, Neuhaus JM, Hauck WW. Sex differences in osteoarthritis of the knee. The role of obesity. Am J Epidemiol. 1988; 127:1019–30. [PubMed: 3358403]
5. Arokoski J, Malmivaara A, Manninen M, Moilanen E, Ojala R, Paavolainen P, *et al*. Polvi- ja lonkkanivelrikon hoito, Kaypa hoito - suositus. Duodecim. 2007; 123:601-620.
6. Nuki G, Salter D. The impact of mechanical stress on the pathophysiology of osteoarthritis. In: Sharma L & Berenbaum F (eds). Osteoarthritis. Philadelphia: Mosby, 2007, p33-52.
7. Kon E, Filardo G, Drobnic M, Madry H, Jelic M, Dijk N, *et al*. Non-surgical management of early knee osteoarthritis. Knee Surg Sports Traumatol Arthrosc. 2012; 20:436-9.
8. Michael JW, Schluter-Brust KU, Eysel P. The epidemiology, etiology, diagnosis, and treatment of

osteoarthritis of the knee. Dtsch Arztebl Int. 2010; 107:152-62.
9. Page CJ, Hinman RS, Bennell KL. Physiotherapy management of knee osteoarthritis. Int J Rheum Dis. 2011; 14:145-51.
10. Seed SM, Dunican KC, Lynch AM. Treatment options for osteoarthritis: considerations for older adults. Hosp Pract (Minneap). 2011; 39:62-73.
11. Quinn RH, Murray JN, Pezold R, Sevarino KS. Surgical Management of Osteoarthritis of the Knee. The Journal of the American Academy of Orthopaedic Surgeons. 2018; 26:e191-e3.
12. 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.
13. 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.
14. Zhang Y, Li C, Li J. The pathogenesis research of non-uniform settlement of the tibial plateau in knee degeneration and varus. J Hebei Med Univ. 2014; 35:218-219.