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# A Study for Evaluation of Results of Proximal Fibular Osteotomy in Cases of Medial Compartment Osteoarthritis Knee Joint

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**ABSTRACT**

One of humanity's oldest ailments is osteoarthritis (OA). Its stigma has been discovered even in prehistoric creatures. Ruffer in 1921 mentioned its existence in the mummies of ancient Egypt. Aetiology of this disease has for years remained the subject of speculation and controversy. In this study we have planned to evaluate the functional outcome of proximal fibular osteotomy in medial compartment osteoarthritis of knee joint. To compare merits of the procedure by means of Visual Analogue Scale, American Knee Society Score, Femoro-tibial axis, medial and lateral joint space, Knee Range of Motion before and after operation. To compare this study with existing studies done till date. In the current study, 124 adult patients with medial compartment osteoarthritis or medial bicompartment (medial unicompartment and patella-femoral) osteoarthritis with genu varum deformity were included. Patient's ages ranged from 40-65. They all attended orthopaedics outpatient at Medical College and Hospitals in Kolkata from November 1, 2017, to October 31, 2018, a period of one year. They were all given proximal fibular osteotomies. Patients who had gross bicompartment osteoarthritis as evidenced by radiography were disqualified from the research. We observed that, lower number of patients had AKSS Range in PRE OP Patients [9 (18.0%)] compared to POST OP Patients [26 (52.0%)]. It was found that, lower number of patients had Range of functional score in PRE OP Patients [3 (6.0%)] compared to POST OP Patients [35 (70.0%)]. In our study, higher number of [29 (58.0%)] patients had Femoro-tibial angle in PRE OP Patients compared to POST OP Patients [3 (6.0%)]. We found that, significantly higher of patients had Good (AKSS71-89 and FS>70) [40 (80.0%)]. We observed that, more number of patient's Range of Motion (ROM) had in no Of Range of Motion (ROM) [17 (34.0%)] compared to no of knee Post-operative [12 (24.0%)]. However, at 6-12 months, these did not demonstrate any appreciable improvement. At a year's worth of follow-up the alignment of the knee remains unchanged. The authors come to the conclusion that individuals with medial compartment knee osteoarthritis only experience transient alleviation after proximal fibular osteotomy.

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**Key Words**
Osteoarthritis knee joint, proximal fibular osteotomy, visual analogue scale, american knee society score, femoro-tibial axis, medial and lateral joint space

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## INTRODUCTION

One of humanity's oldest ailments is osteoarthritis (OA). Its stigma has been discovered even in prehistoric creatures. Ruffer in 1921 mentioned its existence in the mummies of ancient Egypt. Aetiology of this disease has for years remained the subject of speculation and controversy. It is now thought to be predominantly a cartilage disease caused by inherent biomechanical and mechanical changes. It is currently the most frequent illness afflicting humanity. In 5% of cases, it arises in young people. Disease is usually oligo-articular but may be generalized. Knee OA is the most common cause of chronic disability among elderly in developing countries. Joint pain and loss of mobility are among the most common causes of impairment of the affected[1].

The mechanical axis of the lower limb normally passes through the centre of knee joint and called the neutral mechanical axis. Due to its anatomical exposure to the environment, susceptibility to trauma and function of weight bearing it frequently undergoes various internal derangements. Osteoarthritis of knee joint is a common clinical condition presenting with pain and debilitation. It causes alteration of the weight bearing axis, mainly varus. Even modest degrees of varus or valgus knee deformity vary the stress on the femoral and tibial condyles, which can lead to degenerative changes over time. As a result of the loss of articular cartilage (and subchondral bone in more severe instances), a vicious cycle is established, with the increased overloading of tissues and resulting degeneration increasing the varus (Coventry).

Most patients should be managed nonsurgically at first, which may involve physical therapy, bracing, orthoses, ambulatory aids, nonsteroidal antiinflammatory drugs, intraarticular injections of a steroid or hyaluronic acid and analgesics. Changes in daily, job, and leisure activities may also be required. Because of the disease's degenerative nature, many people with knee osteoarthritis eventually require surgical therapy.

A number of surgical techniques for treating osteoarthritic knees have been documented, including arthroscopic debridement, osteochondral or chondrocyte transplantation, high tibial osteotomy, distal femoral osteotomy, arthroplasty and arthrodesis. The technique chosen is determined on the patient's age and activity level the severity of the illness and the number of knee compartments affected[2].

HTO is a major operations which needs expertise, well equipped setup, instruments, implants, well- trained assistant. It also needs motivated patients with grade 1-3 osteoarthritis, significant monitory preparation and pre-operative counselling regarding infection, non-union, neurological complications, implant related complications-peri-implant osteolysis, failure, loosening, prominence, exposure, skin dehiscence and reflex sympathetic dystrophy etc.

40% of patients require complete knee arthroplasty 10-15 years following proximal tibial osteotomy[3]. Most series of total knee arthroplasty following proximal tibial osteotomies show somewhat lower rates of satisfactory and outstanding clinical outcomes than original total knee arthroplasty. Total knee arthroplasty following high tibial osteotomy is a technically challenging and time-consuming surgical operation.

Other operative options in unicompartmental osteoarthritis are unicompartmental arthroplasty, condyle specific arthroplasty and lastly total knee arthroplasty which are usually indicated at old aged patients often as a last resort.

In this scenario proximal fibular osteotomy is a newly invented surgery indicated for relatively younger age group with various advantages and unexpectedly good results. It is an operation with relatively lower expenditure, minor intervention, less hospital stay, no implant and related complications, lower rate on nerve injury, lower alteration of anatomy, no problems of future arthroplasty, less chance of DVT etc. and overall extremely less morbidity.

## MATERIALS AND METHODS

The present study comprise of 100 knees adult patients, age group between 40-65 years, with medial compartment osteoarthritis or medial bicompartment (i.e. medial unicompartment and patella-femoral) osteoarthritis with genu varum deformity. All of them attended through one year period. All of them treated with Proximal Fibular Osteotomy. The research excluded patients with radiographic indications of gross bicompartmental osteoarthritis.

**Study period:** Study was done from November 2021 to October 2022 i.e. 1 year.

**Sample size:** 100.

**Sample design:** Patients with medial unicompartmental osteoarthritis of knee joint of aged 40-65 years are selected from out-patient department of Medical College and Hospitals, Kolkata. Patients with other co-morbid condition affecting prognosis were excluded from the study.

**Study design:** It was a prospective research with no control group. Patients were extensively assessed, with a focus on their functional and radiological state. Operative intervention done in due course and patient were followed-up post operatively for at least 6 months. Pre and postoperative clinical, radiological and functional parameter were compared.

**Study tools:** Measuring tape, Goniometers etc. Radiographs.

**Inclusion criteria:**

- Patient 40-65 years of age
- Evidence on weight bearing radiograph of degenerative arthritis that is confined mainly to medial compartment producing varus in knee
- Grade (1-3) osteoarthritis of knee

**Exclusion criteria:**

- Patients less than 40 and more than 65 years of age
- Tricompartmental osteoarthritis (Kellgren-Lawrence grade IV)
- Anatomical deformities/stiffness of the limb Congenital deformities of the lower extremity
- Other causes of arthritis (rheumatoid arthritis, posttraumatic arthritis, joint infection, history of ligament or meniscus injury and significant abnormality of the lateral compartment etc.)
- Patients who refuse to give consent

**Surgical procedures:** After proper pre-operative assessment and anaesthetic fitness, all patients were treated with proximal fibular osteotomy. Patients were prepared 24 hrs prior to surgery. Limb was cleansed thoroughly with surgical scrub solution. Injection Ceftriaxone (1 gm) was administered after proper skin test in all cases 12 hrs pre-operatively as well as per-operatively.

**Anaesthesia:** All cases were operated under spinal anesthesia.

## RESULTS

In pre op patients, 9 patients (18%) had an AKSS Range of 70-89, 19 patients (38%) had an AKSS Range of 60-69 and 22 patients (44%) had an AKSS Range of 60. In post op patients, AKSS Ranges of 90, 70-89 and 60-69 were seen in 11 (22%) patients, 26 (52%) patients and 13 (26%) patients, respectively. In PRE-OP patients, 3 (6%) patients had a range of functional score of 80 or higher, 20 (40%) patients had a range of functional score of 70, 18 (36%) patients had a range of functional score of 60 and 9 (18%) patients had a range of functional score of 60. In post op patients, 35 patients (or 70%) had a range of functional scores over 80, while 15 patients (or 30%) had a range of functional scores below 70. Femoro-tibial angles of 177-180 degrees, 181-185 degrees and 185-190 degrees were seen in 9 (18%), 29 (58%) and 12 (24%) respectively in pre-operative patients. Femoro-tibial angles of 171-176 degrees, 177-180 degrees, and 181-185 degrees were seen in 11 (22%) patients who were Post Op patients, 36 (72%) patients and 3 (6%), respectively. In our study, 40 patients (80%) had functional outcomes that were Good (AKSS71-89 and FS>70) and 10 patients (20.0%) had functional results that were Excellent (AKSS>90 and FS>80). In terms of range of motion (ROM), 5 (10%) patients had preoperative and postoperative ROM 120-124, 11 (22%) patients had preoperative and postoperative ROM 125-129, 17 (34%) patients had preoperative and postoperative ROM 130-134, 12 (24%) patients had preoperative and postoperative ROM 135-139 and 5 (10%) patients had preoperative and postoperative ROM 140-144. 20 (40%) patients had preoperative and postoperative range of motion (ROM) 135-139, 8 (16%) patients had preoperative and postoperative range of motion (ROM) 140-144 and 6 (12%) patients had preoperative and postoperative range of motion (ROM) 145 in knee post-operative.

## DISCUSSIONS

Proximal fibular osteotomy is well-documented procedure that produces satisfactory clinical results. Considering on one hand the complication of replacement surgery and achievement of high demand and knee in young individuals with good range of movement on the hand, proximal fibular osteotomy promises a great hope in the management of knee OA in the enthusiastic field of arthroplasty.

In study of Proximal fibular osteotomy of Qin *et al*.[4] also had similar involvement of similar percentage. In studies of Liu *et al.*[5] and Yang *et al.*[6] on Proximal fibular osteotomy had 84-69% female population respectively.

We observed that, lower number of patients had AKSS Range in PRE OP Patients [9 (18.0%)] compared to POST OP Patients [26 (52.0%)].

Kumar *et al*.[7] Clinical and functional AKSS increased from 56.49 6.95 to 72.71 9.87 and 48.24 14.31-71.46 15.18 (p 0.001). The AKSS evaluates the outcome as poor (60), fair (60-69), good (70-79), or exceptional (>80) and Wang *et al*.[8] found a decent AKSS outcome in their study's function subgroup.

It was found that, lower number of patients had Range of functional score in PRE OP Patients [3 (6.0%)] compared to Post OP Patients [35 (70.0%)]. AKSS Functional scoring is a separate sheet for scoring to be filled up by patients. In current study the results are encouraging. There is significant increase in functional score in all patients at the end of six months follow up. Only thing to mention that most of our patients were illiterate and could not fill up their forms by their own and got help of their family members or health stuff etc.

In our study, higher number of [29 (58.0%)] patients had Femoro-tibial angle in PRE OP Patients compared to POST OP Patients [3 (6.0%)]. Femoro-Tibial Angle (FTA) is normally 176±2°. There is

progressive increase in this angle as varus deformity progress. In the current study there is significant (<0.01) decrease in the value i.e. reversal of varus angle. The mean preoperative and postoperative values of FTA (i.e. 183.66±1.88 and 178.50±1.53 respectively). Subash *et al.*[9] preoperative and postoperative 182±1.8º, 178±1.9º and Yang *et al.*[6] preoperative and postoperative182.7±2º and 179.4±1.8º.

We found that, significantly higher of patients had Good (AKSS71-89 and FS>70) [40 (80.0%)].

In study by Qin *et al*.[4] Pre-operative 80.52±10.38° and Post-operative-113.66±21.33°. We observed that, more number of patient's Range of Motion (ROM) had in NO OF Range Of Motion(ROM) [17 (34.0%)] compared to no of knee post-operative [12 (24.0%)].

## CONCLUSION

However, at 6-12 months, these did not demonstrate any appreciable improvement. At a year's worth of follow-up the alignment of the knee remains unchanged. The authors come to the conclusion that individuals with medial compartment knee osteoarthritis only experience transient alleviation after proximal fibular osteotomy.

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