

ORIGINAL ARTICLE

Treatment of Medial Compartment Osteoarthritis Knee Using Medial Open Wedge High Tibial Osteotomy Combined with Knee Arthroscopy: A 3 Year Follow-Up Study

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Abstract

Background: Osteoarthritis knee the most common disease affecting the elderly in both western world as well as India. High tibial osteotomy is a very popular surgical technique being easy, cheap alternative to arthroplasty with good results. Combined with knee arthroscopy the medial open wedge high tibial osteotomy corrects varus knee deformities as well as provides diagnostic and therapeutic advantage of arthroscopy and improves the functional outcome of the surgery. **Materials & Methods:** Total 32 patients were studied, diagnosed clinically and radiologically with medial compartmental osteoarthritis knee. All patients were operated with diagnostic or therapeutic knee arthroscopy with standard anteromedial and anterolateral portals followed standard medial open wedge high tibial osteotomy with or without bone grafting and fixed using a wedge plate. **Results:** Out of 32 patients 26 were female. Most common indication was medial compartment osteoarthritis knee. At 3 years follow-up excellent results were seen in 14 patients, good results in 17, fair result in 1 patient. 7 patients showed degenerative tears in posterior horn of medial meniscus while 5 showed intercondylar notch synovitis, these were managed with arthroscopic debridement. All these patients showed significant improvement. All osteotomies united with average duration of 4 -6 months. One patient developed superficial skin infection and paresthesia over great toe. **Conclusion:** Combined knee arthroscopy with medial open wedge osteotomy provides additional advantage to tackle any intra-articular pathology with correction of mal alignment and yields excellent functional outcome. This provides an effective alternative option to joint replacement surgery at young age.

Keywords: Medial Compartment Osteoarthritis, Knee Arthroscopy, High Tibial Osteotomy

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Introduction

High tibial osteotomy is an accepted surgical technique for treatment of medial compartment arthritis of knee in younger patients. The biomechanical principle of high tibial osteotomy is to redistribute the weight bearing forces from the worn medial compartment to the lateral compartment thereby relieving pain and slowing the progression of disease¹.

Role of arthroscopy in arthroscopically assisted high tibial osteotomy is diagnostic as well as therapeutic. The symptoms of osteoarthritis of

the knee are due to the effects of loose articular cartilage fragments, debris, denuding subchondral bone, degenerative meniscal tears, loose bodies, osteophytes, synovitis, joint effusion and limited motion caused by contracters, pain and malalignment². These can be visualized with arthroscope and can be taken care with arthroscopic lavage or debridement. Arthroscopic lavage includes the injection of saline solution into the knee joint under vision and the removal of the fluid while arthroscopic debridement includes the introduction of saline into the joint and articular cartilage debridement, lavage, meniscectomy, removal of

osteophytes and articular abrasion³. Lavage washes out or dilutes the joint fluid thereby reducing the concentrations of degenerative enzymes in the knee and ultimately reducing the catabolism of proteoglycans and collagen⁴. Debridement also includes excision of damaged portions of articular cartilage, synovial membrane or ligaments found within the joint. The debridement removes source of irritation of synovial tissue and improves symptoms⁵. Thus medial open wedge osteotomy will yield improved results when combined with knee arthroscopy. In our study 32 patients were followed up for 3 years with this treatment.

Materials and Methods

The study was performed after permission from ethics committee at B.Y.L Nair Ch. Hospital and Topiwala National Medical College, Mumbai from January 2014 to January 2017, total 32 patients with medial compartment osteoarthritis knee were included in study who met following inclusion and exclusion criterias.

Inclusion criteria

- 1) Patients with medial compartment osteoarthritis knee clinically and radiologically
- 2) Age below 65yrs
- 3) Knee flexion more than 90 degrees
- 4) Flexion contracture not more than 15 degrees.

Exclusion criteria

- 1) The patients with bicompartamental and tricompartmental osteoarthritis clinically
- 2) Bilateral osteoarthritis knee
- 3) Requiring deformity correction of more than 20 degree.

All patients were assessed preoperatively clinically as well as radiologically. Varus mal alignment and desired correction was calculated using Miniacci Method preoperatively and using cable method intraoperatively⁶.

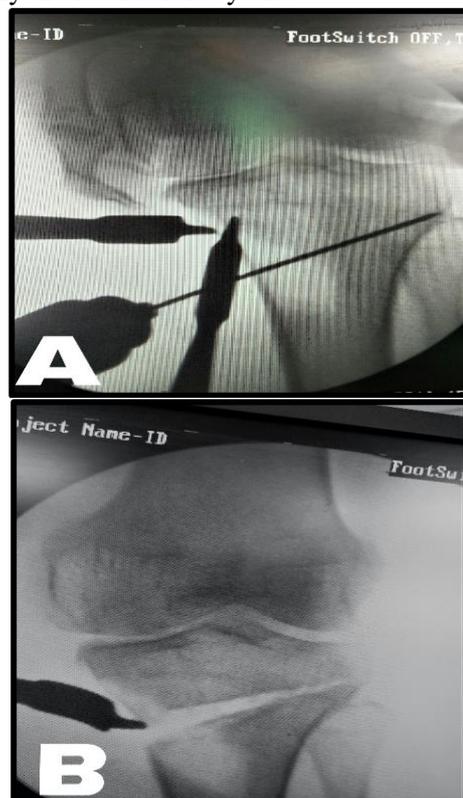
Operative Technique

Under spinal anesthesia with tourniquet applied over mid-thigh patients were positioned in supine position on radioluscent table. After exsanguinating leg tourniquet was inflated; using standard anteromedial and anterolateral portals diagnostic arthroscopy was done. Any

synovitis or degenerative medial meniscal tears were managed with debridement.

With the knee at 90° of flexion, a 6 to 8 cm oblique incision 4-5 cm distal to the joint line was taken over medial aspect of tibia extending from the medial aspect of the tibial tuberosity to the posterior border of the tibial plateau. The knee is then extended and two 2 mm Kirschner wires passed from medial to lateral marking the oblique direction of osteotomy (Figure A) starting just proximal to the pes anserinus 4-5 cm distal to the joint line towards the tip of fibula. The oblique osteotomy is performed (Figure B) while leaving a 8-10-mm lateral bone bridge intact. Osteotomy then opened with calibrated wedge spreader. The alignment is checked with the knee extended using cable method. Osteotomy is then fixed in desired alignment with appropriate size wedge plate (Figure C). We used bone grafts where osteotomy was more than 8mm.

Patients were given limb elevation and ice packs post operatively with knee range of motion upto tolerance, partial weight bearing was the allowed after 3 weeks and full weight bearing after 6 weeks. Patients were followed up for knee society scoring at 6 month, 1year and yearly afterwards for 3 years.





Results

Total 32 patients were studied with 81.3 % female patients. All patients were assessed preoperatively with respect to knee society score. Preoperatively 26 patients had poor knee society score while 6 patients had fair. On diagnostic arthroscopy grade 3 medial compartment osteoarthritis was seen in 59.3% patients, grade 2 in 21.8% patients, grade 4 in 18.8% patients. 2 patients showed grade 1 osteoarthritis in lateral compartment..

Patients were followed up post operatively for 3 years. Patients were assessed periodically with knee society scoring system. Functional outcome was graded as depicted in table-1.

Average varus deformity addressed was 15.4° with average post operative deformity correction of 6.7° valgus alignment. All osteotomies united with average duration of 4-6 months. One patient developed complication in the form of superficial skin infection and paresthesia over great toe and one patient showed deterioration knee score at the end of 3 years.

Table-2 shows that results are better in grade 2 & 3 medial compartment osteoarthritis as compared to grade 4. Total 7 patients were found to have degenerative medial meniscus tears 4 were associated with grade 4 medial compartment osteoarthritis while 3 were seen in grade 3 osteoarthritis of medial compartment. Intercondylar notch synovitis was seen in 5 patients with grade 4 osteoarthritis. All patient with medial meniscus tear and synovitis showed significant improvement postoperatively.

Table-1: Percentage of patients showing improvement in knee society score over 3 years

Outcome	Preoperative	At 6month	At 1year	At 2years	At 3 years
Excellent	-	21.9%	43.8%	53.1%	53.1%
Good	-	62.5%	46.9%	37.5%	34.4%
Fair	18.7%	15.6%	9.4%	6.3%	9.4%
Poor	81.3%	-	-	-	-

Table- 2: Variable response to combined knee arthroscopy and high tibial osteotomy depending upon the grade of osteoarthritis in medial compartment

Medial compartment Osteoarthritis grade	Outcome at 3 years of follow-up		
	Excellent	Good	Fair
Grade 2(Total 7)	7	0	0
Grade 3/(Total 19)	15	4	0
Grade 4(Total 6)	2	3	1

Discussion

Osteoarthritis knee is very common degenerative condition resulting in pain, fatigue and loss of function⁷. The knee is the most common site for osteoarthritis⁸. The changes due to osteoarthritis are frequently seen in the medial compartment than in the lateral compartment of the knee and the loads transferred through the medial compartment during walking are substantially more & higher than loads transferred through the lateral compartment.

The prevalence of knee osteoarthritis has found to increase with the age and there is a growing recognition that osteoarthritis affects people at young age with females being affected more than males. In our study 81.3% were females and 18.8% were males. Bohnsack M et al⁹ in 2002, reported 23% prevalence of degenerative meniscal tears in arthroscopy of osteoarthritis knee. In our study we found 21.9% incidence of degenerative meniscal tears. We also noticed that degenerative medial meniscus tears were more common with higher grades of osteoarthritis. X.Ayral¹⁰ et al in 2005 reported

50% prevalence of synovial abnormalities in medial compartment osteoarthritis knee, their study included 422 patients. In our study we encountered with intercondylar notch synovitis in 15.5% cases. We also found chondromalaciae patellae in 12.5% patients. Synovitis and degenerative meniscal tears were managed with arthroscopic debridement.

The meniscal tears, synovitis, degenerative inflammatory mediators are significantly associated with knee pain in patients with medial compartmental osteoarthritis. Traditionally only high tibial osteotomy is performed for medial compartment osteoarthritis which aims to correct malalignment. Combined with knee arthroscopy it gives added advantage to diagnose any intraarticular pathology and tackle it at the same time with simultaneous joint lavage.

Various high tibial osteotomy techniques are in commonly practiced. Common procedures are medial opening wedge and lateral closing wedge tibial osteotomies. The lateral closing wedge technique is a primarily stable correction with a high rate of consolidation but has the disadvantage of bone loss and change in offset of tibial condyles. The medial opening wedge technique does not result in any bone loss but needs to be fixed with a plate and may cause tibial slope and medial collateral ligament tightening. Thus has beneficial effects in future total knee arthroplasty.

In 2009 Ryohei Takeuchi et al performed medial open wedge high tibial osteotomy in 57 knees in 52 patients and found excellent results. In our study we found comparable results at long term follow-up. Preoperatively 81.3% patients had poor knee society score and 18.8% had fair which was improved to excellent in 53.1%, good in 34.4% and fair in 9.4% patients. The patients who underwent arthroscopic debridement also showed significant improvement in symptoms. The patient with early changes of osteoarthritis in lateral compartment showed fair results. One patient developed superficial skin infection and and paresthesia over great toe which resolved with medical treatment.

Conclusion

Combined knee arthroscopy with medial open wedge osteotomy is an effective alternative to joint replacement surgeries in young patients.

Results are comparatively better with early grades of osteoarthritis thus accurate and timely selection of patients will yield favorable long term results. Arthroscopy provides additional advantage in the form of joint lavage and option of simultaneous joint debridement which yields early improvement in symptoms.

Conflict of Interest: None declared

Source of Support: Nil

Ethical Permission: Obtained

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