Research

Knee Joint Preservation Surgeries

Mohan Kumar J, Vijay Kulkarni, Chandrakanth

Department of Orthopaedics, Kauvery Hospital, Electronic City, Bengaluru

Abstract

With increasing life expectancy, there is a growing demand for the preservation of native articular cartilage to delay prosthetic joint replacements, especially in younger, active patients. Damage to the hyaline cartilage of a joint has a limited intrinsic capacity to heal. This can lead to accelerated degeneration of the joint and early-onset osteoarthritis. Treatment in the past was limited, but now with evolving surgical treatment options it may allow restoration of the natural biology of the articular cartilage. We present two such cases of knee preservation surgeries performed at Kauvery Hospital, ECB.

Background

Knee Preservation is a general term used to describe different techniques and procedures to manage knee pain without replacing it. These methods can be either surgical or non-surgical. The idea of knee preservation is to treat specific pathologies or problems in the knee so that patients experience less pain and may return to their active lifestyle with their native knee. This is especially so for younger and more active patients for whom a knee replacement is not appropriate.

We present two such cases of knee preservation surgeries done at our centre.

Case Presentation

Case 1

A 43-year-old male patient presented to us with knee pain for two years. On examination he had a medial joint line tenderness with full range of movements. Weight bearing radiographs showed a medial compartment Osteoarthritis (Fig. 1). Given his age prosthetic joint replacement was not an option, so we decided on a joint preserving surgery, High tibial osteotomy in which we change the axis of weight bearing such that the weight transfer happens through the normal cartilage surface of the lateral aspect of the joint. We performed a medial open wedge osteotomy and fixed with a HTO plate (Fig. 2). Intra operatively axis correction was confirmed with a cautery wire technique (Fig. 3). Post operatively patient was started on partial weight-bearing walking and range of movements also started as tolerated by the

patient. Osteotomy healed in 6 months and the patient was pain-free.

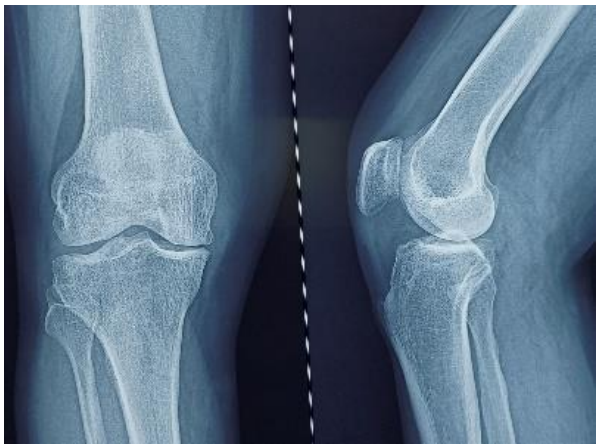

Fig. 1. Pre op Radiograph showing medial compartment OA.

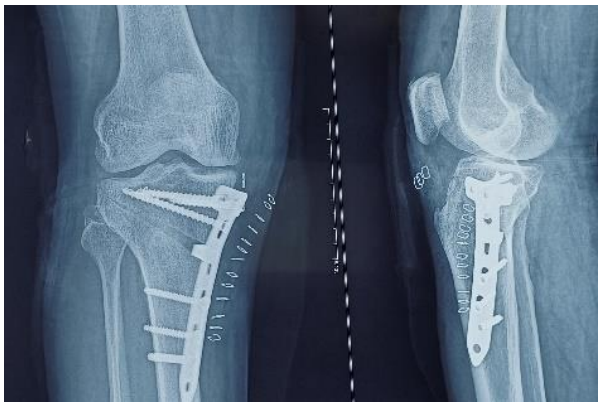

Fig. 2. Post op radiograph with HTO plate.

Fig. 3. Mechanical axis with cautery wire.

Case 2

A 49-year-old female presented with sudden onset pain in her left knee for 1 month, on examination tenderness present over postero medial aspect of knee. Radiograph showed minimal medial compartment osteoarthritis, MRI showed a posterior root tear of medial meniscus (Fig. 4). Literature reviews show that a root tear is as good as total meniscectomy in terms of load distribution on the knee joint. Since her joint was relatively normal we decided to perform an arthroscopic root repair of the medial meniscus. Using a suture pull out technique we performed the posterior root repair of the medial meniscus arthroscopically (Fig. 5). Post operatively patient was kept non weight bearing and no knee bending for 3 weeks. She was progressively rehabilitated and achieved full pain free range of movements by 3 months.

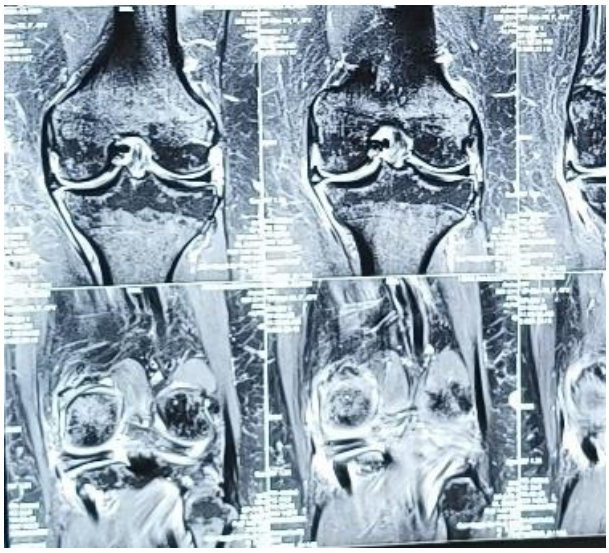

Fig. 4. MRI showing medial meniscus root tear with extrusion of meniscus.

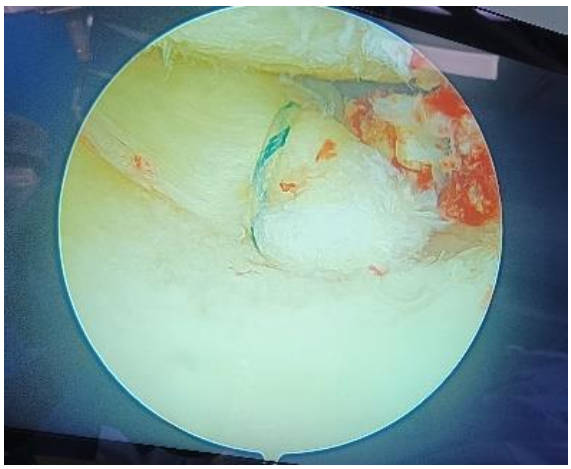

Fig. 5. Arthroscopic image showing a repaired posterior root with suture pull out.

Discussion

Younger patients with cartilage damage or joint arthritis pose a difficult scenario for joint preservation techniques. Total or unicompartmental arthroplasties in young patients come with the risk of accelerated prosthetic wear and may subject patients to revision surgeries.[1] An alternative to arthroplasty for younger individuals (<60 years) with unicompartmental knee arthritis is a periarticular osteotomy. For medial compartment wear, high tibial osteotomies create genu valgum to decrease joint-reactive forces across the medial side of the knee, effectively offloading this compartment.[2,3] This can delay or prevent the need for an eventual arthroplasty.[3] The ideal candidates are younger, active individuals (<60 years old) with unicompartmental medial knee arthritis, no ligamentous instability, and good range of motion.[2] Medial opening-wedge osteotomies avoid risk of damage to the peroneal nerve and are generally thought to be less technically challenging than lateral closing-wedge osteotomies.[4] The menisci play a vital role in the knee, as they are used to distribute loads evenly across the joint. Additionally, they provide lubrication, contribute to proprioception, and impart secondary stabilization.[5] Damage to these crucial structures inevitably leads to joint deterioration and, ultimately, arthritis. Advances in repair techniques have allowed surgeons to preserve previously unsalvageable menisci.

Conclusion

Knee preservation describes surgical and non-surgical techniques that help restore the function of the knee joint so that patients may return to their hobbies and active lifestyles. They also help postpone the prosthetic joint replacements which have life of their own. In carefully selected patients these knee preservation surgeries produce good to excellent results.

References

[1] Nagel A, et al. Proximal tibial osteotomy. A subjective outcome study. J Bone Joint Surg Am. 1996;78:1353-1358.

[2] Amendola A, et al. Results of high tibial osteotomy: review of the literature. Int Orthop. 2010;34:155-160.

[3] LaPrade RF, et al. Prospective outcomes of young and middle-aged adults with medial compartment osteoarthritis treated with a proximal tibial opening wedge osteotomy. Arthroscopy. 2012;28:354-364.

[4] Kahlenberg CA, et al. 3rd Analysis of outcomes for high tibial osteotomies performed with cartilage restoration techniques. Arthroscopy. 2017;33:486-492.

[5] Makris EA, et al. The knee meniscus: structure-function, pathophysiology, current repair techniques, and prospects for regeneration. Biomaterials. 2011;32:7411-7431.