



Arthroscopic Biopin Fixation for Paediatric Knee OCD – A Case Report.

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(Received: 16 July 2025

Revised: 20 August 2025

Accepted: 02 September 2025)

KEYWORDS

Osteochondritis dissecans, paediatric, arthroscopy, bioabsorbable pins, knee

ABSTRACT

Introduction: Osteochondritis dissecans (OCD) represents a significant cause of knee pain and dysfunction in paediatric patients.

Methods: We present a case of successful arthroscopic bioabsorbable pin fixation in a skeletally immature patient with unstable knee OCD.

Result: This minimally invasive approach demonstrated excellent clinical and radiographic outcomes with complete lesion healing at follow-up.

Conclusion: The case illustrates the efficacy of bioabsorbable pin fixation as a preferred treatment modality for unstable juvenile OCD lesions.

1. Introduction

Osteochondritis dissecans is a focal osteochondral condition affecting children and adolescents, characterized by the separation of a bone fragment and its overlying cartilage from the surrounding healthy tissue due to compromised vascular supply ¹. The condition predominantly affects the lateral aspect of the medial femoral condyle in the knee joint, with an estimated prevalence of 15-30 per 100,000 individuals ².

The etiology of OCD remains multifactorial, involving genetic predisposition, repetitive microtrauma, ischemic events, and abnormal ossification patterns ³. In pediatric populations, the condition is classified into juvenile (open physes) and adult forms, with different healing potentials and treatment approaches.

Conservative management remains the first-line treatment for stable juvenile OCD lesions, with success

rates of 50-94% in skeletally immature patients ⁴. However, unstable lesions or those failing conservative treatment require surgical intervention ⁵. Traditional surgical options include drilling, fixation with various implants, or osteochondral grafting procedures ^{6, 7}.

Arthroscopic fixation with bioabsorbable pins has emerged as a preferred approach due to reduced surgical morbidity and faster recovery compared to open procedures (6). Recent systematic reviews demonstrate complete healing or significant improvement in 94.86% of cases treated with bioabsorbable implants, supporting this minimally invasive approach ⁸.

This case report presents the successful management of an unstable juvenile OCD lesion using arthroscopic bioabsorbable pin fixation, contributing to the growing evidence supporting this treatment modality.

2. Case report

A 16-year-old female athlete presented with a 6-month history of progressive right knee pain and intermittent swelling. The pain was activity-related, particularly during running and jumping activities, with mechanical symptoms including occasional locking sensations. The patient had no significant past medical history or previous knee injuries.

Physical examination revealed mild knee effusion, tenderness over the medial femoral condyle, and a positive Wilson's sign. Range of motion was slightly limited in terminal flexion due to pain. There were no signs of ligamentous instability or meniscal pathology.

Plain radiographs demonstrated a well-defined osteochondral lesion on the lateral aspect of the medial femoral condyle. (Fig: 1A & 1B)

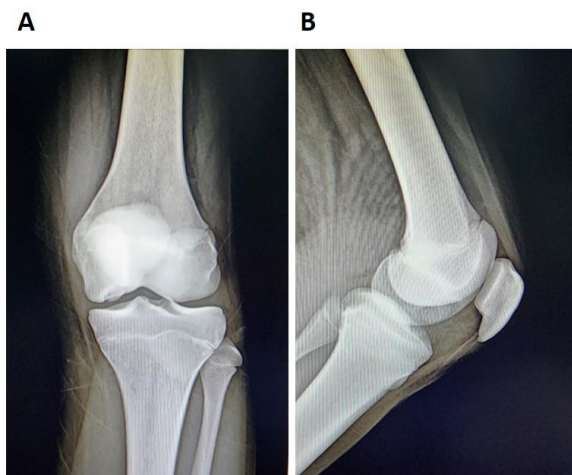


Fig 1: X-rays of the left knee joint. A: Anteroposterior radiograph of left knee joint showing osteochondral defect in the lateral aspect of medial femoral condyle; B: Lateral radiograph of left knee.

Magnetic resonance imaging (MRI) confirmed an unstable OCD lesion with T2 hyperintense signal around the fragment and a small effusion, classified as Grade III according to the Dipaola classification system (10). As confirmed by MRI the size of the defect was 14 x 6 x 4mm. (Fig 2 A, B & C)

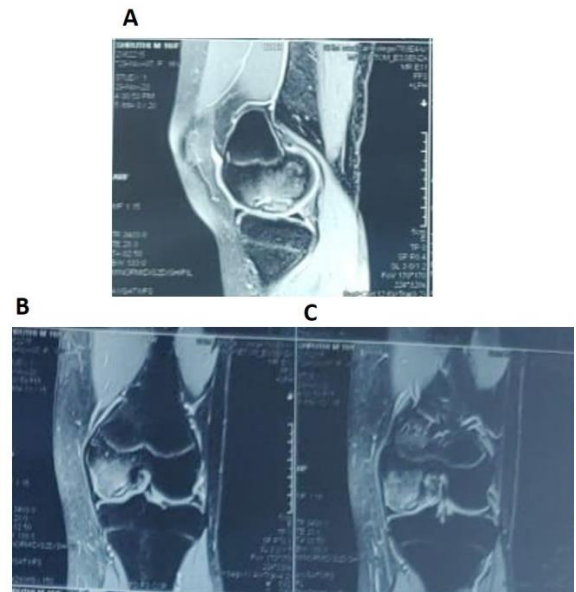


Fig 2: MRI of the left knee joint. A: The sagittal cut of the MRI showing a defect with sclerosis in the lateral aspect of medial femoral condyle with an undisplaced osteochondral fragment. B & C: Coronal cut of the MRI with sclerosis and a bony defect in the lateral aspect of the medial femoral condyle.

Given the unstable nature of the lesion and failure of 3 months of conservative management including activity modification and physiotherapy, surgical intervention was indicated. After obtaining informed consent, arthroscopic bioabsorbable pin fixation was planned.

3. Surgical Technique

The procedure was performed under general anaesthesia with the patient in supine position. Standard anteromedial and anterolateral arthroscopic portals were established. Diagnostic arthroscopy confirmed the unstable OCD fragment with intact overlying cartilage. The lesion margins were debrided to healthy bone, and the fragment was mobilized to assess stability.

Under arthroscopic visualization, two 2.0 mm bioabsorbable pins (poly-L-lactic acid composition) (Fig 3) were inserted perpendicular to the fragment surface using a cannulated technique. The pins were countersunk below the cartilage surface to prevent mechanical symptoms. Stable fixation was confirmed arthroscopically with direct manipulation of the fragment.



Fig 3: Bioabsorbable pin system with cannulated device.

The procedure was completed without complications. Post-operatively, the patient was placed in a hinged knee brace and remained non-weight bearing for 6 weeks, followed by progressive rehabilitation.

3. Follow-up and Outcomes

At 6 weeks post-operatively, the patient reported significant pain improvement. Physical examination showed resolved effusion and full range of motion. Radiographs demonstrated maintained fragment position without displacement. (Fig. 4A and 4B)

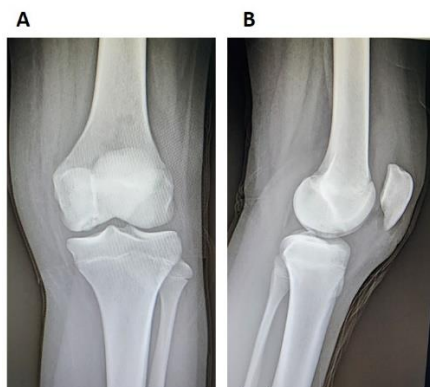


Fig 4: X-ray of left knee joint: A: Anteroposterior radiograph of left knee joint showing fragment in

position without displacement, B: Lateral radiograph of Left knee joint

Six months post-operatively patient had returned to full athletic activities without symptoms. Clinical evaluation showed no tenderness, full range of motion, and negative Wilson's sign.

At final follow-up of 18 months, the patient remained asymptomatic with no activity limitations.

4. Discussion

This case demonstrates the successful application of arthroscopic bioabsorbable pin fixation for unstable juvenile OCD of the knee. The treatment approach aligns with current evidence supporting minimally invasive fixation techniques for unstable lesions in skeletally immature patients^{1, 5}.

The fixation of unstable juvenile osteochondritis dissecans lesions with bioabsorbable pins has demonstrated improved clinical outcomes and high radiographic healing rates at long-term follow-up^{8, 5}. Studies show that retrograde drilling combined with bioabsorbable pin fixation provides good to excellent outcomes in juvenile patients with high healing rates^{9, 10}.

The advantages of bioabsorbable pins include elimination of implant removal procedures, reduced risk of growth disturbances, and maintenance of the joint's natural biomechanics during healing. Recent studies report 87.2% of adolescents cleared for full return to activity following bioabsorbable fixation, with failure rates remaining low at 8.5%⁸.

The selection of bioabsorbable pins over other fixation methods was based on several factors. The lesion size and location were appropriate for pin fixation, avoiding the need for more complex procedures such as osteochondral grafting¹¹. The patient's age and skeletal maturity favored the healing potential associated with juvenile OCD^{1, 4}.

Initial experiences with bioabsorbable pins for OCD refixation in adolescents are promising, with MRI providing excellent monitoring of healing^{9, 12}. The staged rehabilitation protocol allowed for biological



healing while preventing mechanical overload during the critical healing period⁴.

Potential complications of bioabsorbable pin fixation include incomplete healing, fragment displacement, and implant-related reactions. However, these complications are relatively rare, and the benefits typically outweigh the risks in appropriately selected patients⁸.

The success of this case emphasizes the importance of proper patient selection, surgical technique, and post-operative management^{1, 5}. Early recognition and treatment of unstable juvenile OCD lesions can prevent progression to more complex osteochondral defects requiring advanced reconstruction procedures⁷.

Future directions in OCD management include the development of biological enhancement techniques, improved imaging modalities for lesion assessment, and longer-term studies evaluating the durability of bioabsorbable fixation outcomes².

5. Conclusion

Arthroscopic bioabsorbable pin fixation represents an effective treatment option for unstable juvenile osteochondritis dissecans of the knee type III and IV. This case demonstrates excellent clinical and radiographic outcomes with complete lesion healing and return to full activity. The minimally invasive approach offers advantages including reduced surgical morbidity, preservation of growth potential, and elimination of implant removal procedures.

The success of this treatment modality depends on appropriate patient selection, precise surgical technique, and adherence to structured rehabilitation protocols. Long-term follow-up continues to support the use of bioabsorbable pin fixation as a reliable treatment option for unstable juvenile OCD lesions.

Conflict of interest

The authors declare no conflict of interest.

Acknowledgment(s)

We would like to thank SRM Medical College and Research Centre for the cordial support of our study and

Dr. Vishnupriya. S, research writer, SRM Medical College and Research Centre, for assisting in this preparation of case report.

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