

# ORTHOSPORTS

QUESTION FOR PHYSIOTHERAPISTS

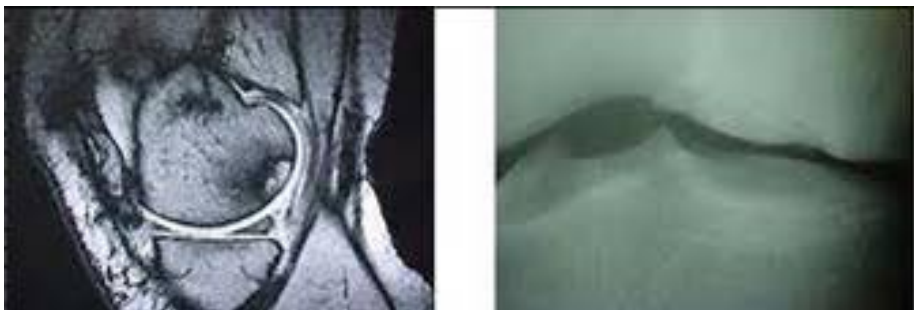


**QUESTION | I HAVE A 16 YEAR OLD FEMALE ATHLETE WHO PRESENTED WITH A VAGUE HISTORY OF KNEE PAIN WHEN RUNNING – X RAY SHOWED AN OCD LESION. WHAT IS THE BEST TREATMENT FOR HER?**

**ANSWER |**

Osteochondritis dissecans of the knee predominantly affects adolescent and young adult patients. Many of these patients are involved in athletic pursuits and this condition can have a dramatic impact on them. OCD can lead to pain, swelling, mechanical symptoms and inability to continue to play sports and is the most common cause of a loose body in the knee in adolescents. Clinical findings are often subtle so diagnosis requires a high index of suspicion and limited range of motion may be the only clinical sign. Most patients provide a history of trauma as their reason for their presentation but this is usually minor and probably not relevant. In some patients the affected femoral condyle is tender on palpation and the patient may walk with the leg externally rotated in order to avoid impingement of the lesion on the medial femoral condyle.

The diagnosis is made on xray but MRI has a key role in determining the stability of the lesion. Conservative management is the mainstay of treatment for stable lesions. The majority of patients respond to conservative treatment but those with unstable lesions require arthroscopic management. Unfortunately the affected knee may progress to degenerative arthritis while the patient is still young.



## **MRI AND X-RAY**

The etiology of OCD remains unknown, although several possibilities—including family history, repetitive micro-trauma, growth disorders, and ischaemia have been proposed. OCD is characterized by a focal area of subchondral bone that undergoes necrosis. The true incidence is unknown but is higher in males than females (29 per 100,000 in males and 18 per 100,000 in females). OCD can involve other joints including the shoulder, elbow, hip, and ankle, but the knee is the most commonly affected. The natural history of OCD of the knee remains unclear and distinguishing between those lesions that may go on to heal and those that will not heal remains a challenge. High quality

diagnostic, prognostic, and therapeutic studies that reported data separately for adults and children are rare. Many of the publications dealing with OCD of the knee are level IV evidence (case series).

The primary goals of treatment are to relieve pain, improve knee function, and prevent progression of the degenerative joint process. As with all surgical procedures the risks include infection, bleeding, dvt and persistent pain. The newer arthroscopic approaches have a relatively low risk compared to more invasive approaches but the more invasive treatments to salvage and/or reconstruct the cartilage and/or bone are still sometimes required. Nonsurgical treatment also presents challenges because it is difficult to predict which stable juvenile OCD lesions will heal.

### **Definition and Pathology:**

OCD refers to a focal area of subchondral bone that undergoes necrosis. The overlying cartilage remains intact to variable degrees, receiving nourishment from the synovial fluid. As the necrotic bone is resorbed, the cartilage loses its supporting structure and the fragment can displace into the joint. There are two main types of OCD: the adult form, which occurs after the physis closes; and the juvenile form, which occurs in patients with an open epiphyseal plate (some people believe that the adult form is undiagnosed persistent juvenile OCD).

The most commonly affected areas are: the femoral condyles, talar dome and capitellum of the humerus. The knee is involved about 75 percent of the time. The lateral (mainly nonweight-bearing) part of the medial femoral condyle is the location in 85 percent of cases of OCD of the knee. OCD should be ruled out in the contralateral joint because 20 to 30 percent of cases are bilateral. Multiple lesions are rare but possible. Less frequent locations include the patella, femoral head, glenoid of the scapula, tibial plateau, head of the talus and vertebrae. Capitellar lesions of the humerus are common in adolescent baseball pitchers and gymnasts but while they look the same are probably a different disease process.

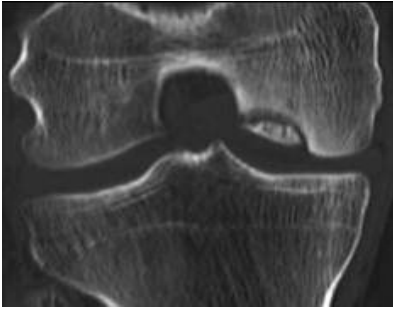
### **Pathophysiology:**

Our understanding of the pathophysiology of OCD has not advanced much over the past 100 years. Genetic predisposition, ischemia, repetitive trauma and abnormal ossification have all been proposed as causes of OCD. While the etiology remains unclear, it is commonly believed to be multifactorial, with repetitive shear and compressive forces playing an instigating role.

Many patients have no history of significant trauma so one theory is that repetitive microtrauma during running leads to subchondral bone stress (Impaction or impingement of the tibial spine and patella on fragments of the femoral condyle). Since there is a high incidence of nonweight-bearing areas affected and of being bilateral, nontraumatic etiologies are more likely. Ischaemia caused by vascular spasm, fat emboli, infection or thrombosis may play a role.

### **Imaging:**

OCD is a radiologic diagnosis. If OCD of the knee is suspected, AP, lateral, notch-view (knee in flexion) and skyline patella xrays should be ordered. AP films alone may miss a lesion on the posterior aspect of the medial femoral condyle. If a lesion is seen the contralateral knee should also be xrayed. Plain films will detect a circumscribed area of necrosis but are a poor method of assessing articular cartilage and cannot be used to determine stability. If the xrays are normal the diagnosis is almost certainly not OCD.



### CT Scan showing OCD Lesion

This is clearly seen on plain x-ray and the CT does not help in deciding stability of the Lesion. This is not a useful test for this condition.

All OCD lesions seen on xray should be staged for stability with MRI. MRI has a 97 percent sensitivity for detecting unstable lesions. Other than arthroscopy, MRI is the most accurate method for staging lesions with Stages I and II being stable. Stages III and IV are unstable lesions with the cartilage breached and synovial fluid entering between the fragment and underlying bone.

On MRI, the presence of high-signal changes on T2 images signifies the presence of fluid between the fragment and intact bone. The overlying articular cartilage can still be intact in an unstable fragment. Distinguishing between stages II and III is important in planning for surgery. If the MRI demonstrates an unstable lesion (stage III or IV) then arthroscopy should be used to check the cartilage surface.



### MRI of lesion showing no fluid behind the fragment.

classification: (from Clanton and DeLee CORR 1982)

- I: depressed osteochondral fracture;
- II: osteochondral fragment attached by an osseous bridge;
- III: detached non-displaced fragment;
- IV: displaced fragment;

### Clinical Management

Conservative treatment of stable lesions is the general rule but there are no prospective randomized clinical trials proving that this is the right thing to do. The existing literature often groups studies of the adult and juvenile forms of OCD, as well as the variety of joints affected, making evidence-based conclusions difficult. Prognosis worsens with age and physis closure. Therefore, the goal of management of juvenile OCD is to promote resolution of the lesion before physis closure and unstable lesions are managed surgically. In the adult form, therapy is aimed at preserving function and preventing the development of early osteoarthritis.

Factors such as location of the lesion, relationship to weight-bearing surface, stability, physis closure and clinical presentation should be considered. Approximately 50% of lesions resolve over a period of 10 to 18 months with conservative measures. Girls younger than 11 years of age and boys younger than 13 have an excellent chance of complete resolution. Patients over 20 years of age tend to have poorer outcomes and the likelihood of requiring surgery is increased. Unstable lesions (stages III and IV) in patients with a closed physis have a particularly poor prognosis and more aggressive intervention is indicated in older symptomatic patients.

### **Nonsurgical management**

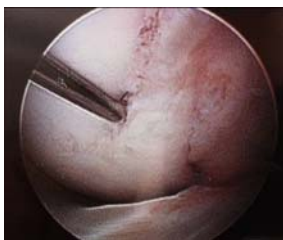
Running and jumping sports should be avoided for six to eight weeks with the goal of activity modification being to allow symptom-free activities of daily living. Conditioning exercises and quadriceps strengthening may help and if the patient remains symptomatic a period of non weight bearing on crutches may be indicated. Immobilisation is no longer used as prolonged splinting leads to quadriceps atrophy and stiffness which may complicate the condition. Persistent symptoms in a compliant patient (or complaints of joint catching or grinding suggesting detachment and a loose body) are an indication for arthroscopy.

### **Surgery**

Depending on surgical findings, a loose body may be removed, a fragment excised, cartilage debrided or a lesion drilled to promote revascularization. Small fragments (<5mm) or multiple OCD defects are typically removed and the base of lesion drilled to create bleeding to encourage fibrocartilage formation. Larger fragments (>5mm) in weight bearing areas are reduced and fixed where possible. This is usually done with resorbable Kirschner wires or pins. MACI (cartilage) grafting is indicated for very large symptomatic lesions (2x2cm) and while it works very well to relieve day to day symptoms it rarely gets the patient back to competitive running sports.



**Stable Edge**



**Unstable Edge**

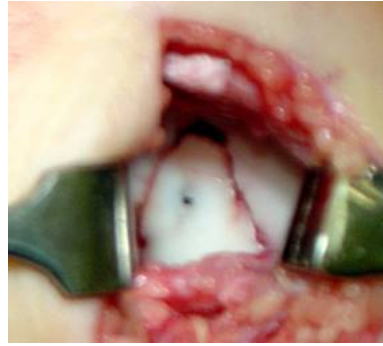


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Following surgery, range-of-motion exercises should be initiated early. Quadriceps strengthening helps promote overall knee stability and wellbeing. Weight bearing is usually restricted for 6 weeks to allow healing of the bone. Patients should be examined at three-month intervals until symptoms resolve and imaging studies are indicated for evaluation of clinical deterioration only.



**OCD lesion defect with fragment missing**



**OCD fragment fixed back in place**

### **Conclusion:**

OCD is a relatively rare disorder but is an important cause of joint pain in active adolescents. Xray is a simple inexpensive test which provides the diagnosis and should be performed in any adolescent complaining of problems with their knee. MRI scanning and a surgical opinion should be sought for all patients with OCD lesions even though most will be treated conservatively.

### **Key Points:**

- Osteochondritis dissecans of the knee predominantly affects adolescent and young adult patients.
- Clinical findings are often subtle so diagnosis requires a high index of suspicion and limited range of motion may be the only clinical sign
- The diagnosis is made on xray but MRI has a key role in determining the stability of the lesion
- The majority of patients respond to conservative treatment but those with unstable lesions require arthroscopic management
- A surgical opinion should be sought for all patients with OCD lesions even though most will be treated conservatively.

### **References:**

#### **Osteochondritis Dissecans History, Pathophysiology and Current Treatment Concepts**

Clanton, Thomas O.; DeLee, Jesse C.

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**Dr Doron Sher**