

Evaluation and Treatment of Osteochondritis Dissecans Lesions of the Knee

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ABSTRACT: Osteochondritis dissecans (OCD) is a condition affecting the subchondral bone of joints with secondary effects on articular cartilage that results in pain, effusions, loose-body formation, and mechanical symptoms. Left untreated, OCD can lead to the development of degenerative arthritis secondary to joint incongruity and abnormal wear patterns. This article discusses the etiology of knee OCD lesions, clinical presentation, proper evaluation, and treatment options. Treatment of OCD may include nonoperative

measures or operative procedures ranging from drilling or fixation of fragments to complex reconstruction procedures such as autologous chondrocyte implantation, osteochondral autograft, and fresh osteochondral allograft. Physicians must consider many factors, including the patient's age and skeletal maturity, as well as size, location, and stability of OCD lesions to determine the proper course of treatment.

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INTRODUCTION

Osteochondritis dissecans (OCD) is a relatively common source of knee pain in children and adolescents. Hughston et al²⁷ reported a prevalence of 15 to 21 cases per 100,000. Osteochondritis dissecans is an acquired condition in which the subchondral bone becomes avascular.²³ If healing does not occur, this bone-cartilage complex can become loose from its osseous bed. This can cause a defect in the articular cartilage and result in loose bodies within the joint, causing pain, loss of motion, destruction of articular cartilage, and further mechanical symptoms from joint pathology. Although OCD most commonly occurs in the knee, it can affect multiple joints including the

elbow, shoulder, ankle, and hip.³⁹ Osteochondritis dissecans is typically a unilateral condition; however, it may present bilaterally.¹⁹

ETIOLOGY

Frequently, the cause of OCD is idiopathic. Etiologic factors for OCD include trauma (either macrotrauma or repetitive microtrauma), endocrinopathies, and vascular insults. Genetic predisposition may play a role, but this is unclear. Notable in cases of OCD is whether the physis of the bone involved is open or closed. If open, the term juvenile OCD (JOCD) is used. Overlap between OCD and JOCD occurs when a lesion first presents with the physis still open and does not heal by the time of physeal closure. Juvenile osteochondritis dissecans is believed to be caused by either a macrotraumatic episode or multiple microtraumatic episodes, causing continued stress to subchondral bone and resulting in subchondral stress fractures.

Similar to adult OCD, genetics, endocrine causes, ligamentous laxity (and its associated conditions), and ischemia are possible etiologic factors in JOCD.^{11,13,19,23,39} In 204 patients with JOCD of the knee, Cahill¹¹ noted many

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did not report a single traumatic episode, but rather noted a long history of sports and exercise. For this reason, Cahill concluded an emphasis on exercise may be a causative factor of JOCD.

Osteochondritis dissecans is seen most commonly in patients between the ages of 13 and 21 years,¹⁵ and the most commonly affected site is the lateral aspect of the medial femoral condyle, accounting for 70% to 80% of OCD lesions.^{24,38} The lateral femoral condyle is involved in only 15% to 20% of cases, and patellar involvement is even less common (5% to 10%)⁴ (Figure 1). The location of the lesion has a direct effect on the possibility of resulting degenerative changes within the knee joint. Lesions of the medial femoral condyle tend to be located anteriorly and therefore do not usually affect the tibiofemoral articular surface. However, lesions of the lateral femoral condyle tend to be more posterior along the weight-bearing portion of the tibiofemoral articulation; as a result, these lesions can cause degenerative changes within the cartilage²¹ (Figure 2). Additionally, OCD of the lateral femoral condyle generally involves a larger area than does OCD on the medial femoral condyle.

CLINICAL PRESENTATION

The clinical presentation of OCD of the knee may vary depending on the severity and stability of the lesion. Minimal pain to overt mechanical symptoms such as catching, clicking, or giving way have been reported. Initially, patients may report vague, poorly localized pain around the affected condyle. Symptoms may become mechanical with time as a stable lesion (one that is still attached to the femoral condyle) becomes unstable. Furthermore, effusion may be present depending on the severity and stability of the lesion.

PHYSICAL EXAMINATION

The Wilson test has been used to evaluate for medial OCD lesions.⁴² This test is performed with an examiner holding a patient's foot in internal rotation with the knee flexed at 90°. The patient then extends his or her leg against resistance. The test is considered positive when the patient feels pain at approximately 30° of flexion. The discomfort is believed to result from impingement of the tibial spine against the lesion. Pain usually is relieved when the leg is allowed to come out of internal rotation. However, a full knee examination still should be performed to evaluate for any other pathology. It has been noted that patients occasionally will walk with the affected extremity externally rotated to relieve pressure on the lesion. In addition, thigh girth atrophy frequently has been noted with OCD lesions secondary to relative disuse.⁴¹

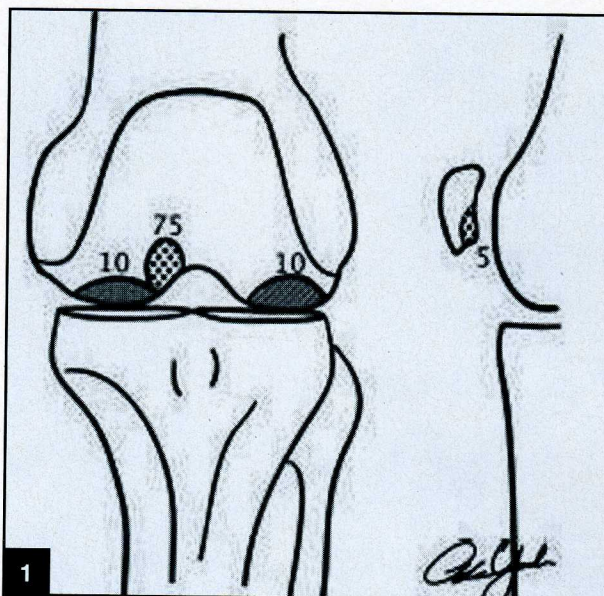


Figure 1. Illustration showing the typical distribution of osteochondritis dissecans lesions around the knee.

DIAGNOSTIC IMAGING

After the physical examination has been performed, plain radiographs should be obtained. Views include weight-bearing anteroposterior and posteroanterior tunnel views (taken at 45° of knee flexion), as well as lateral and Merchant views. Comparison views in a skeletally immature individual may be useful. The purpose of plain radiographs is to localize the lesion, determine its size, and evaluate the status of the distal femoral physis. Osteochondritis dissecans lesions may or may not be visualized depending on the lesion's stage. A tunnel view best demonstrates the presence of OCD lesions because it permits better visualization of the femoral condyles, which is where most lesions are located. In some cases, a radiolucent line can be visualized between the fragment and femoral condyle; this occurs during advanced stages of the disease. It is important to obtain the tunnel view as lesions may be detected only in this view in some patients.

Often, magnetic resonance imaging (MRI) is the imaging modality of choice in the evaluation of OCD. Magnetic resonance imaging is useful in determining the size and location of a lesion not evident on plain radiographs (Figure 3). It also is helpful in evaluating the condition of the articular cartilage and subchondral bone. Of prognostic importance is the ability of MRI to assess the stability of the OCD lesion. De Smet et al¹⁸ described the following 4 MRI criteria on T2-weighted images for OCD lesions:

- Line of high signal intensity ≥ 5 mm in length between the OCD lesion and bone.

