



Osteochondritis Dissecans: Ten Years After Autologous Chondrocyte Transplantation

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Abstract

Osteochondritis dissecans is defined as a necrosis that affects the bone and cartilage of the joints. It is located in a segment of the bone tissue adjacent to the joint. The joint fragment may not consolidate correctly, resulting in a free fragment that can lead to premature osteoarthritis. It most often occurs in the knee, elbow, or ankle of the school-age child or adolescent. It usually presents with pain that worsens with exercise. There may be crepitus, contracture, or locking of the joint in advanced cases, especially if there is a loose piece of bone or cartilage in the joint. This article presents a clinical case of a 32-year-old male patient who underwent autologous chondrocyte auto transplantation 10 years ago and currently presents with pain and functional limitation of the knee.

Keywords: Knee pain, Osteochondritis dissecans, Chondrocyte transplantation

Introduction

Osteochondritis dissecans (OCD) is defined as osteonecrosis of the subchondral bone.¹ Specifically, it is a localized injury in which a segment of subchondral bone and articular cartilage separates from the underlying bone, leaving a stable or unstable fragment that can lead to early osteoarthritis.²⁻⁴ The cause is often unknown. Proposed etiologies include repetitive microtrauma, vascular insufficiency around cartilage, local ischemia after focal injury, and genetic predisposition. The juvenile type is associated with a high level of activity in children and adolescents of school age, favoring repetitive trauma as the main mechanism. With the initial trauma, a focal area of bone necrosis and collapse develops, which can lead to cartilage damage. As the injury progresses, areas of demineralization and repeated loading forces cause detachment of adjacent tissue. It can also develop after an isolated injury, such as inversion of the ankle or a direct blow to the knee or elbow. OCD injuries of

the elbow are thought to be due, at least in part, to chronic valgus strain of the elbow that compromises the tenuous blood supply to the capitellum and chronic compressive microtrauma during overhead activities like throwing, gymnastics.⁵

OCD injuries are a rare cause of joint pain. Depending on age, men are two to four times more likely to be affected than women.⁶⁻⁹ In children, the global prevalence of OCD lesions, especially in the knee, is estimated to be 15 to 29 per 100,000 patients.^{7,10} According to a large observational study, the overall incidence of the pediatric disease is 9.5 per 100,000, with the highest incidence in patients 12 to 19 years of age. In adults 20 to 45 years of age, the incidence of OCD is approximately 3.4 per 100,000 person-years; ankle injuries are the most commonly affected joints.¹¹

Repeated trauma or overuse is frequently reported. Sport-specific risk factors by anatomic region include sports associated with

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high frequencies of knee or ankle injury (eg, soccer, football, basketball) and, for the elbow, the athlete throwing above head (eg, baseball pitcher) or gymnast.^{12,13}

Typical locations of an OCD lesion with relative frequencies are as follows.^{2,4,5}

- I. Knee: 75 percent of patients, with a distribution of approximately two thirds in the medial femoral condyle and one third in the lateral condyle. Both knees are affected in approximately 7 percent of patients.¹⁴
- II. Elbow: 6 percent of patients, usually located in the capitellum.
- III. Ankle: 4 percent of patients, particularly the dome of the talus (57 percent medial and 43 percent lateral).
- IV. Other joints: approximately 15 percent.
- V. The specific age of presentation also depends on the location of the OCD lesion.^{15,16}
- VI. The prevalence of OCD injuries of the knee peaks in the pre-teen years, but can occur at any age.
- VII. OCD injuries of the elbow are typically found in adolescent athletes after the physis has closed.
- VIII. Ankle OCD injury is rare in the pediatric population, occurring mainly in adults with a mean age of 21 years. There is an association with ankle trauma, particularly lateral talar dome injuries.

OCD typically presents with knee, elbow, or ankle pain that may begin with a specific injury or may develop over several months in highly active patients.¹⁷⁻¹⁹ The pain worsens with exercise. Crepitus, catching, or locking of the joint can occur during the later stages of OCD, especially if there is a loose foreign body in the joint. Diagnosis can often be made by clinical findings and judicious use of imaging.

Plain radiographs are often diagnostic, although magnetic resonance imaging is often necessary to further study the lesion. The differential diagnosis should be established mainly with osteonecrosis. This can be primary, secondary and post-arthroscopic:

Primary: It is the most frequent, typical of women over 60 years of age with genu varus, obesity and osteoporosis with involvement of the internal femoral condyle. It has been related to tears of the posterior horn of the medial meniscus.

Secondary: Related to taking corticosteroids, alcohol, Gaucher, SLE, HIV, sickle cell disease, etc. It is more common in men under 45 years of age and is characteristically bilateral. It does not respond to conservative treatment nor is it a subsidiary of unicondylar arthroplasty, osteotomies or osteochondral grafts.

Post-arthroscopic: Infrequent subchondral collapse unrelated

to age or sex. It could be due to a biomechanical alteration. It is never bilateral and usually affects the medial condyle more.¹⁹

Objectives

Review of the literature on the treatment of osteochondritis dissecans.

Material and Methodology

A clinical case of a 32-year-old male with pain and functional limitation of the right knee is presented. As background of interest, he underwent two-stage autologous chondrocyte transplantation (MACI) ten years ago. Initially, the result was good, allowing active sports practice, but in recent months the patient reports pain in the lateral area of the knee that limits his daily life. On examination, the knee shows good joint balance without effusion. He refers pain in the lateral interline area. The meniscal maneuvers are negative and the drawer, Lachman test and Pivot shift negative. A simple radiological study and magnetic resonance imaging was performed, which is shown in the Figure 1.

External femoral condyle shows bone edema and subchondral geodes that may be related to detachment of the previous graft due to lack of consolidation. There is a focal cartilage defect in the external femoral condyle in its internal portion compatible with grade IV chondropathy. All this is associated with degenerative meniscopathy of the anterior horn of the medial meniscus and with tendinopathy of the distal portion of the patellar tendon.

For the preparation of this work, the main scientific bases such as Pubmed and abstract databases such as Up to Date have been consulted.

Discussion

The treatment of OCD is controversial. Recommendations are based on retrospective study or expert opinion. The goal of surgery should be to revascularize the fragment and prevent its detachment. The need for referral to a specialist in Orthopedic Surgery depends primarily on the skeletal maturity of the patient, the size and stability of the injury, and the affected joint. Children and adolescents with stable injuries often do well with conservative treatment. On the other hand, if the lesion is large or affects older patients, surgery is usually required.^{18,19}

In the juvenile form and with a stable fragment, spontaneous healing is usual. Initial treatment consists of rest, nonsteroidal anti-inflammatory drugs, avoiding sports activities, and physical therapy. Initially, immobilization and offloading of the extremity is usually recommended for a period of 4 to 6 weeks. Before returning to sports, the patient should be pain free, regain full active range of motion, and regain lost strength. Full consolidation can take between 6 and 12 months.⁵ There are multiple surgical techniques for

this problem. For stable and small lesions:

- 1) Retrograde or anterograde arthroscopic perforation: Cure 90% of cases.
- 2) Fixing with biodegradable screws if there are doubts about its stability. If the injury is larger or unstable:
- 3) Curettage of the bed and fixation with biodegradable screws: Cure between 70-80% Auto transplantation of previously cultured chondrocytes.
- 4) The osteochondral graft from another joint area.
- 5) Osteochondral transplant from a donor.



Figure 1

In the most innovative procedures in this type of injury we can find the use of biomimetic scaffolds. Its scientific evidence is still poor. Completely cured patients show recovery of joint function. This is more common in young patients with stable knee or elbow

injuries. In contrast, adult patients with unstable injuries have worse outcomes and approximately half will have chronic pain, mechanical symptoms, and osteoarthritis.^{20,21}

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Conflicts of Interest

Author declares that there is no conflict of interest.

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