Osteochondritis Dissecans: Clinical Breakdown

Pathophysiology, Subchondral Bone Lesions, Staging Classifications, Clinical Presentation, and Therapeutic Management

Osteochondritis Dissecans (OCD) is a joint disorder in which cracks form in the articular cartilage and the underlying subchondral bone. This condition most frequently affects the knee (specifically the femoral condyle), elbow, and ankle. It occurs when a localized area of bone loses its blood supply, leading to bone necrosis and the potential detachment of a loose osteochondral fragment ("joint mouse").

> **Core Clinical Principle:** OCD lesions are classified as stable or unstable. Unstable lesions with detached or partially attached loose fragments often cause mechanical locking, catching, and progressive joint degeneration if left untreated.

1. Staging Classifications of Osteochondritis Dissecans

Arthroscopic and MRI staging systems guide clinical decision-making by evaluating lesion integrity and stability.

Lesion Stage	Arthroscopic / MRI Characteristics	Primary Management Approach
Stage I	Articular cartilage is intact, but thickened or softened with a stable subchondral bone lesion.	Non-surgical rest, activity modification, and protected weight-bearing (common in skeletally immature patients).
Stage II & III	Stage II shows partial discontinuity of articular cartilage; Stage III shows complete detachment of a stable fragment in situ.	Rigid immobilization, specialized physical therapy, or surgical fixation if healing potential is poor.
Stage IV	Completely detached loose body within the joint space ("joint mouse") creating an empty crater in bone.	Surgical removal or fixation of the loose fragment combined with cartilage repair techniques.

2. Etiology & Pathophysiology

While the exact primary trigger remains multifactorial, several key mechanisms contribute to lesion development.

- **Repetitive Microtrauma:** High-impact athletic activities, repetitive jumping, or torsional joint stress cause repetitive micro-fractures in the subchondral bone plate.
- **Local Ischemia & Vascular Disruption:** Interruption of terminal blood vessels supplying the developing bone epiphysis leads to avascular necrosis and separation of the overlying cartilage-bone unit.
- **Juvenile vs. Adult Presentation:** Juvenile OCD (occurring before growth plates close) generally exhibits high healing potential with conservative management, whereas adult OCD has a significantly lower spontaneous healing rate.

3. Clinical Presentation & Management Principles

Recognizing mechanical joint symptoms and selecting appropriate conservative versus surgical interventions preserves long-term joint health.

- **Symptoms & Signs:** Joint pain exacerbated by activity, swelling, tenderness over the affected joint line, and mechanical symptoms such as catching, locking, or giving way when a loose body interferes with joint motion.
- **Management Strategy:** Conservative care (activity restriction, bracing, physical therapy) for stable lesions in youth; surgical options (drilling to stimulate blood flow, fragment fixation, microfracture, or osteochondral autograft transfer) for unstable or loose fragments.