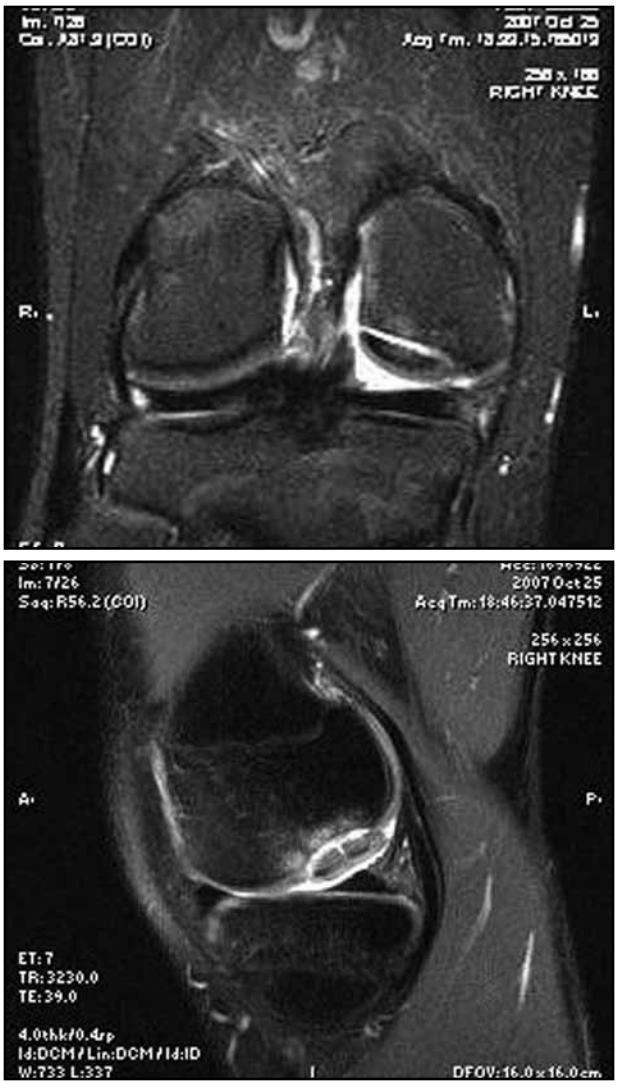
Osteochondritis Dissecans of the Elbow

CARL W. NISSEN, MD

OSTEOCHONDRITIS dissecans (OCD) is a musculoskeletal problem occurring primarily in the maturing skeleton. Early descriptions of the problem came from the surgeons who opened the knee joint looking for the cause of catching and locking symptoms. In these first cases, large loose OCD fragments were found and removed, making the patients significantly better in the short run. These individuals, however, then went on to have significant problems and poor outcomes. Since that time improved imaging ability has advanced our understanding and ability to treat the problem. However, there are still many unanswered questions with regard to both the etiology and the best treatment options for OCD when diagnosed.

The most common location for OCD's is within the maturing knee along the lateral border of the medial femoral condyle(Fig. 1A & 1B). The overall incidence of these lesions has been reported between 15 and 29/100,000[1,2] with an asymptomatic incidence approaching 40% and a 2:1 prevalence for boys as compared to girls. This incidence is most certainly rising and age at presentation is decreasing. This is due to both the increased awareness of the disease as well as the increasing involvement of young athletes in competitive athletics.[3,4] This same increasing incidence of OCD is found in other joints such as the ankle, elbow, shoulder, and hip. One of these—the elbow in particular—has a rising incidence as well as increased interest and investigation.

The recent increased interest in elbow OCD likely has occurred due to the increased competitive involvement of young athletes as mentioned above. Increased



Figures 1A & 1B.—MRI of a significant medial femoral condyle OCD.

CARL W. NISSEN, MD, Director, Elite Sports Medicine, Connecticut Children's Medical Center. Address correspondence to: Carl W. Nissen, MD, 399 Farmington Ave., Farmington, CT 06032; 860-284-0220; cnissen@ccmckids.org.

Figure 2.—X-ray of young gymnast with OCD of the humeral capitellum.

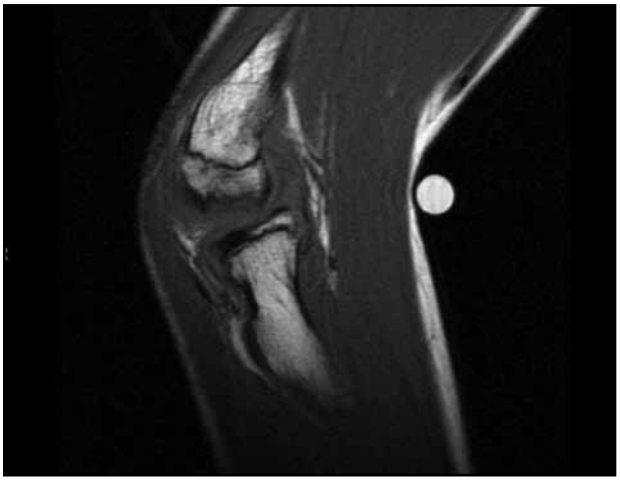


Figure 3.—MRI scan of the same patient as seen in Fig. 2 with more extensive involvement of the humeral capitellum.

year-round participation in gymnastics and baseball as well as the advent and use of high resolution MRI's have increased the awareness and diagnosis of the problem. The increased awareness also is due in part to the better understanding of the diagnosis and the differences between capitellar OCD's osteonecrosis, osteochondrosis, hereditary epiphyseal dysplasia, Little Leaguer's elbow, and most importantly, Panner's Disease with which it is often confused.[5] Panner's disease presents similarly to a capitellar OCD but is a self-limited disease usually occuring in patients under the age of 10 (Fig. 2 & 3).[6,7] Elbow OCD, which also has been reported in the trochlea, radial head, and olecranon, usually is seen in slightly older patients, in athletes involved in upper-extremity dominant sports. These sports place repetitive weight-bearing stresses on the elbow—such as gymnastics—or repetitive demands—such as baseball, softball, and javelin throwers. These repetitive-stress sports lead to early changes in the articular cartilage and stress reaction of the subchondral bone. If allowed to continue before the stress reaction "heals," these stresses are believed to be one of the causes of OCD. As opposed to Panner's Disease where good outcomes are relatively common, the outcome is not always good for OCD with the prognosis and outcome dependent on patient age, location and severity at the time of diagnosis.[8–10]

Etiology

Many causes of OCD are suspected; often the true etiology is unknown. Originally thought to be inflammatory in origin, Konig's 1887 theory, which he referred to as osteochondritis dissecans, seems not to be correct. The etiology of knee OCD is sometimes reported to be secondary to microtrauma or macrotrauma. In the elbow, especially given the high correlation between these lesions and the involvement in baseball and gymnastics, the etiology of elbow OCD seems even more likely to be repetitive trauma. Given the tenuous blood supply of the capitellum demonstrated by Haraldsson it seems more likely in this case (as opposed to the knee) that the repetitive nature of overhead athletes and gymnasts placing exuberant stresses on the elbow that microtrauma is at least partially to blame.[5,11]

Evaluation

Athletes with capitellar OCD often have diffuse, non-specific complaints related to activity and they often complain of mild, inflammatory-like symptoms after exercise. Rest and anti-inflammatory treatment are often effective for their symptoms early in the disease process, which is often the reason that early diagnosis of these lesions is frequently missed. Athletes will often wait to seek medical advice until they feel catching or locking and sharp pain during their activity. At this point their performance is starting to suffer and they may have an effusion as well as a loss of terminal extension. Occasionally if the lesion is advanced and a loose fragment exists, a noticeable click or even locking intermittently may occur.

Physical examination centers on looking for evidence of chondral or osseous irregularities. Range-of-motion including supination and pronation should be checked and followed over time as the loss of extension especially is a bad omen. Occasionally an effusion can be felt as well as an area of focal tenderness. Both of these, when present, are most commonly found in the posterolateral corner of the elbow—the so-called soft spot. While difficult, a ligamentous examination should also be performed as laxity in overhead athletes can lead to many of the symptoms of OCD.

Standard elbow x-rays should be taken including oblique views and radial head views to determine if early necrosis of the capitellum exists as well as fragmentation of the lesion. Occasionally a CT scan will be helpful to better define the condition of the subchondral bone. The

hallmark for imaging and further diagnosis is the MRI. The MRI allows an evaluation of both the articular cartilage and underlying bone with determination of the separation of the bone island from the native bone if it has occurred. High field MRIs with cartilage sequences are recommended and the increasing availability of 3.0 Tesla MRIs is helpful in the evaluation.

Nonoperative Treatment

Nonoperative treatment when OCD is diagnosed at an early stage can be successful. Reduction or elimination of all stress on the capitellum for a period of at least six weeks allows the subchondral bone to stabilize and support the overlying cartilage. After this initial rest period, a slow return to daily activities and then athletic activities can be allowed. Most authors suggest that this time-line is perhaps as long as six months in order to allow complete healing.[9] Though not well established in the elbow, it is thought that when the MRI does not show separation of the fragment or synovial fluid within the OCD, that rest will result in a full functional recovery in 50% or more of the cases. This is certainly true in the treatment of knee OCD and the results are further improved in younger, prepubescent athletes with wide-open physes.[12]

When rest is difficult to accomplish, bracing, use of a sling, or even a period of casting is utilized. Return to activities is appropriate only after there is complete resolution of symptoms and the athlete has regained full range-of-motion and strength not only about the elbow but of the shoulder and shoulder girdle.[13]

Operative Treatment

When nonoperative means are unsuccessful or the evaluation determines that a fragment is loose, operative treatment is appropriate. This usually starts with an arthroscopy of both the anterior and posterior compartments of the elbow. Small, loose fragments are removed and synovitis is treated as need be. The OCD itself is then treated. Appropriate treatment is determined both by future demands of the patient as well as the preoperative symptoms, appearance on imaging studies, and arthroscopic appearance of the lesion. Many options exist though few controlled trials exist to help determine the best option.[14]

In cases when the lesion is in an early stage of development, most options center on helping the subchondral bone to "heal." When there is no break in the articular surface, drilling of the reactive bone has been reported to achieve excellent results. The drilling can be done either antegrade or retrograde depending on the accessibility of the lesion and its extent. The elbow must be allowed to rest after the drilling so that the bone stabilizes before weight bearing or repetitive activities are instituted. When done early in the disease process, these lesions do very well and a full return to premorbid levels of activity is normally achieved.[15]

When the lesion is further along the continuum and there are articular cartilage fissures and/or the OCD fragment appears separating or is separating from the native bone, fixation of the fragment is recommended (Fig. 4). This can be achieved with a myriad of devices including bioabsorbable pins or screws, metal screws, bone dowels, or direct suturing of the fragment.[14,16] Similarly, if the fragment is loose and synovial fluid has seeped between the fragment and the native bone, preparation of the bed and bone grafting is often necessary. Though possible arthroscopically, making an arthrotomy to perform open-bone grafting and repair is usually performed.[1,7]

When the fragment is loose, unable to be fixed or has little to no bone on it, excision of the fragment and meticulous debridement is performed to remove fibrocartilage and enhance the chance for the lesion to fill in.

Figure 4.—Initial arthroscopic appearance of a humeral capitellar OCD. Fragment is obviously loose but grossly in place.

Figure 5.—Arthroscopic appearance of significant capitellar OCD. View is from the posterior compartment with radial head at the top of the picture. This is a contained lesion which did well after removal of the fragment.

Figure 6.—Humeral capitellar OCD with minimal bone involvement.

This does seem to provide good pain relief, at least in the short run, and improvement of function when the lesion is contained (Fig. 5).[18] However, when the lesion does not have intact edges or the lesion wraps around the edge of the capitellum, poorer results from debridement are seen. In these cases, some authors have reported good results with osteochondral autografting or allografting procedures. Long-term follow-up of these procedures are not yet known.[19,20]

Discussion

The presentation of capitellar OCD's is variable and the duration of symptoms prior to presenting to the physician's office is often quite long. After diagnosis, rest is the mainstay of treatment and provided the lesion is not advanced along the continuum of disease, good results can be anticipated. Unfortunately, however, these lesions often present late in their course and often require surgical intervention. Recurrent clicking or locking of the elbow often indicates that the OCD fragment is loose or free within the joint. In this situation as well as when x-ray or MRI imaging determine that the fragment is unstable rarely have good outcomes when treated nonoperatively (Fig. 6). Surgery in these cases, when it is possible to stabilize the fragment and allow it to heal, generally yields good results. However, when the fragment is not fixable, while surgical treatment may provide symptomatic relief, results are variable and the long-term results are unknown. Elbow capitellar OCD lesions are being diagnosed more often. This is perhaps due to the increased specialization of young athletes or the increased ability to diagnose them. In either case, when annoying, aching elbow pain exists in young athletes—certainly when a history of locking exists—examination to determine the presence or absence of an OCD lesion is appropriate. When diagnosed in the early stages, treatment is commonly successful with a full return to daily and sporting activities.

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