OSTEOCHONDRITIS DISSECANS OF THE ELBOW

Osteochondritis Dissecans of the elbow is a condition that causes pain in the elbow of children 8 to14 years of age. It most commonly involves the portion of the humerus called the capitellum (Figure 1), which helps to form the elbow joint and allows the forearm to rotate, turning the palm up or down. This joint is particularly susceptible to injury during prolonged throwing or repetitive handstands. (Figure 2).

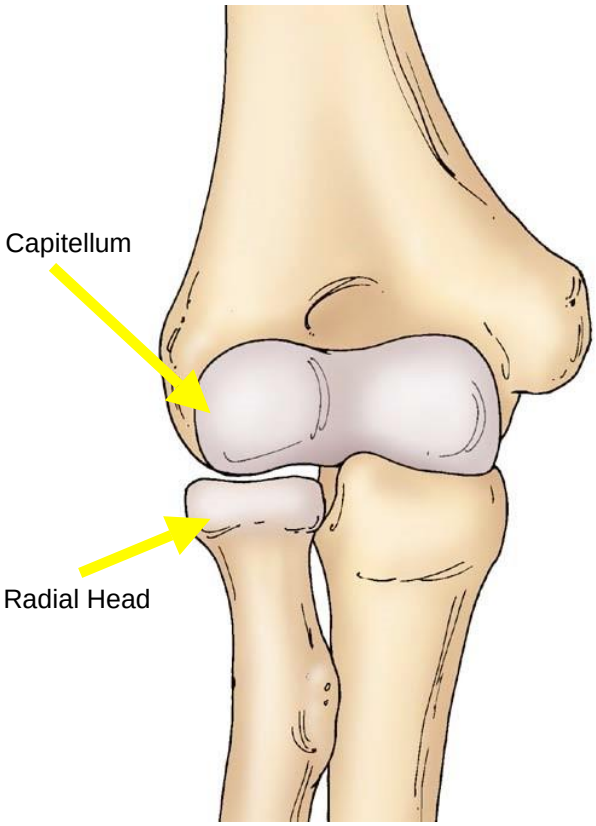


Figure 1: The capitellum and radial head form part of the elbow joint

Figure 2: Excessive pressure from throwing may lead to damage to the capitellum

The increased pressures on the joint cause repeated small fractures that are not able to heal properly before reinjury. This may result in abnormalities in the blood supply to the bone and an area of dead bone. This process is called **avascular necrosis**. Avascular necrosis can be seen on xray as a crater or hole in the capitellullm (Figure 3).

Most patients will present to the pediatric orthopedic surgeon for evaluation because of pain and swelling in the elbow with tenderness over the capitellulm and the inability to completely straighten the elbow. In addition to physical exam, x-rays and

MRI are used to determine the severity of the injury and the best course of treatment.
Vitamin D deficiency is common and will need to be treated.
Treatment options include non-operative treatment with immobilization and rest or surgical management of more severe injuries.

If the x-ray and MRI show that the overlying cartilage is intact then a prolonged period of rest, sometimes up to 12 months, may be required. The bone will be monitored during those 12 months for evidence that the hole in the capitellum is filling in with new bone. This is important because the underlying bone provides support for the cartilage, decreasing the risk for further damage. If there does not appear to be adequate healing of the underlying bone despite a period of appropriate rest then surgery may be necessary. In surgery a series of drill holes will be made in the bone to improve the blood supply in the injured area, which enhances bone healing (Figure 4). If there is evidence that the underlying bone is loose the special screws may be used to stabilize the bone fragment.

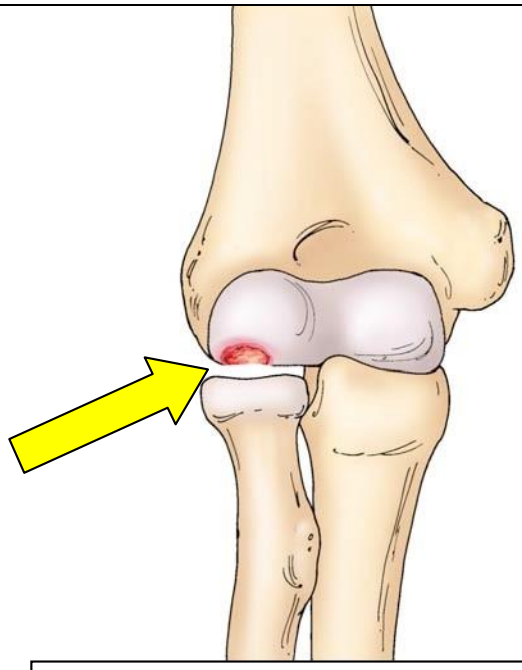


Figure 3: The area of damaged bone and cartilage is called osteochondritis dissecans

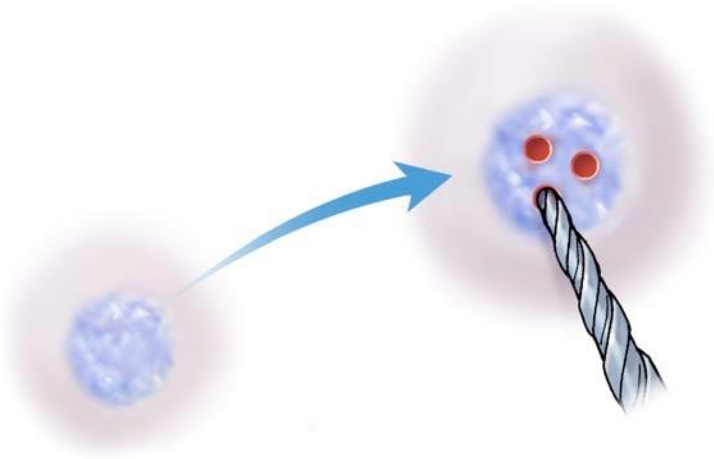


Figure 4: The drill is used to pierce the area of dead bone when the overlying cartilage is intact

Sometimes there is enough damage that the cartilage and a piece of the underlying bone become completely detached from the rest of the humerus. When this happens a hole in the bone with no cartilage over it can be seen at the time of surgery. This hole needs to be filled in with new bone and covered over with healthy cartilage in order for the elbow to function normally. (Figure 5).

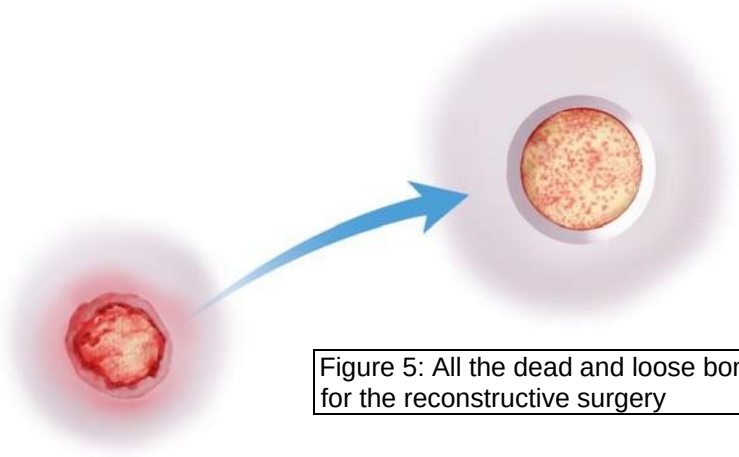


Figure 5: All the dead and loose bone is removed in preparation for the reconstructive surgery

One option for promoting this necessary healing process is to make small holes or micro fractures in the base of the crater (Figure 6). These holes allow growth of new blood vessels in to the defect, which bring in cells that help grow new bone and a type of cartilage called **fibro cartilage**. Fibro cartilage is not exactly the same as the cartilage that was lost but in many cases is sufficient coverage for normal use of the elbow.

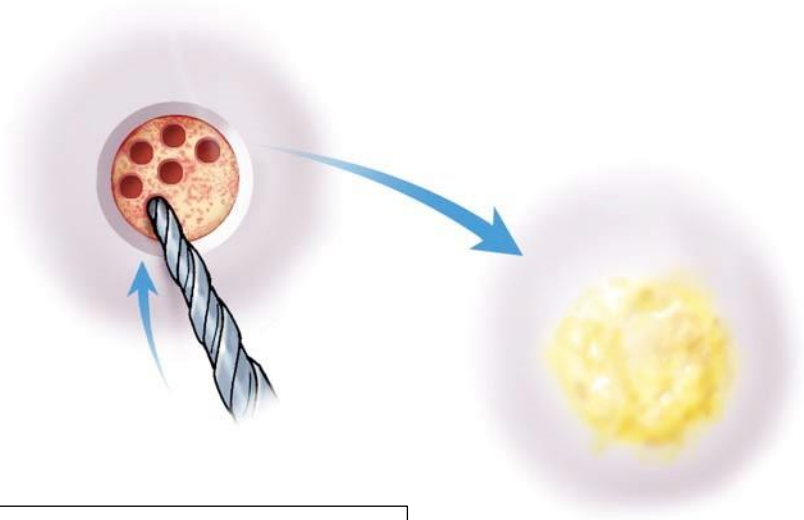
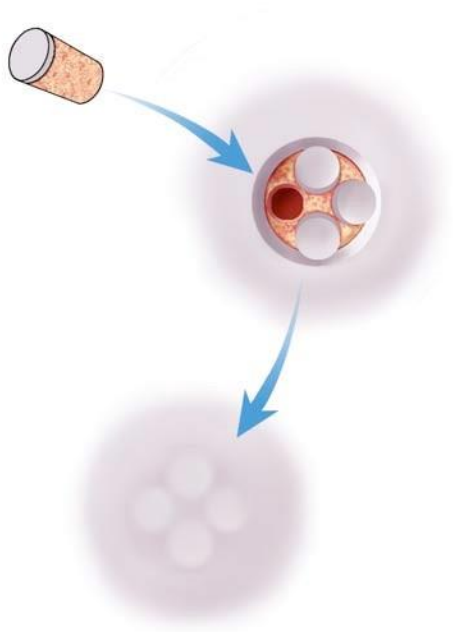


Figure 6: Micro fracture surgery creates small drill holes in the bed of healthy bone that can create healing of the bone defect



In children with a large area of injury it may be important to fill the defect with the same type of cartilage that was lost or **hyaline cartilage**. There are two different ways to do this. The first method is to take plugs of bone and cartilage from another part of the body and transfer them to the elbow, filling in the hole. It then takes several months for the plugs to adapt to their new home (Figure 7). Another option is to use an artificial bone plug made of calcium crystals. This bone plug provides a scaffold for the bone cells to create healthy bone over time.

Figure 7: Bone plugs are removed from anotherpart of the body and insert them in the osteochondritis dissecans defect

Another option is to replace the lost cartilage with new cartilage cells that are grown from the patient's own cartilage. A small sample of healthy cartilage is taken from the patient and converted into millions of cells in the lab. In a separate surgery the cells are placed into the crater and covered with a flap to hold them in place. The transplanted cartilage cells will promote healing and creation of a new cartilage layer (Figure 8).

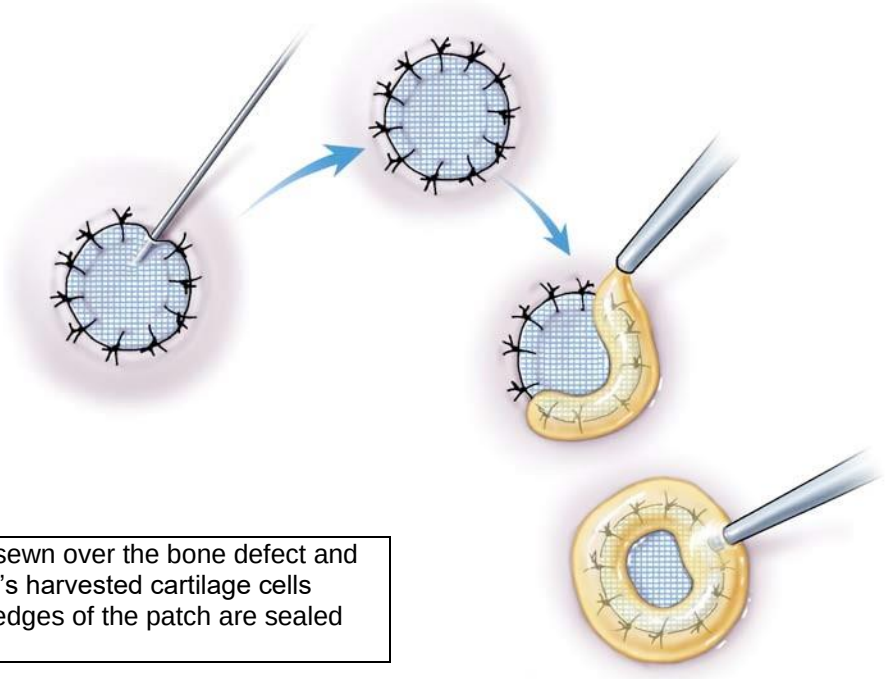


Figure 8: A patch is sewn over the bone defect and filled with the patient's harvested cartilage cells grown in a lab. The edges of the patch are sealed with fibrin glue

The pediatric orthopedist and physical therapist are keenly aware of the need to educate parents, coaches and the athlete regarding osteochondritis dissecans of the capitellum. Certain high risk and repetitive activities such as pitching and gymnastics increase the susceptibility to this condition at this age. For most patients with open growth plates, non-operative management is successful in alleviating most of the symptoms associated with osteochondritis dissecans of the elbow. If this area heals, the likelihood that an active and healthy lifestyle can continue into adulthood is excellent.