Osteochondritis dissecans (OCD) describes an injury to the area of bone just under the cartilage surface, an area called the subchondral bone. OCD affects the knee most often and develops in active teens between the ages of 10 and 15 years old. Repetitive trauma (such as skateboarding, snowboarding, or skiing) is the primary risk factor and leads to damage to the blood vessels of the bone. Without blood flow, the area of damaged bone actually dies. This area of dead bone can be seen on an X-ray and is sometimes referred to as an osteochondritis lesion.

The problem occurs most often where the cartilage of the knee attaches to the bone underneath. The end of the femur (thigh bone) is the most common location, but the patella (knee cap) or top of the tibia (lower leg bone as it meets the femur to form the knee joint) can also be affected. It is possible to develop OCD in other joints such as the elbow, wrist, ankle, and top of the femur.

Anyone who has ever had OCD as a teenager is also at increased risk for a return of this condition called adult osteochondritis dissecans or AOCD. The juvenile form in teens is called juvenile osteochondritis dissecans (JOCD). The adult form really is just a failure to heal from the juvenile form. The adults most likely to develop AOCD are those who never knew they had the juvenile form. There were no symptoms.

When symptoms do develop, the patient reports knee pain and swelling that comes on with activity. If a piece of cartilage has broken off and is present inside the joint, there can be mechanical symptoms such as locking or catching of the joint. Many patients have tenderness along the front/middle portion of the joint line. To take pressure off this area, they limp or turn the lower leg outward.

Diagnosis begins with the patient's history and a physical exam followed up by imaging studies. X-rays show the location of the problem. MRIs show the extent or severity of the condition. For example, the amount of swelling or edema can be seen on MRIs as well as the condition of the cartilage and whether or not the cartilage has separated from the bone.

Once the diagnosis has been made, the decision about treatment is next. Treatment depends on the grade of the subchondral bone. Grade 1 is normal cartilage but early changes observed in the subchondral bone. Grade 2 means the cartilage has fragmented but it hasn't detached or moved, and grade 3 refers to a partial detachment of the damaged cartilage. Grade 4 is the most severe form of OCD with bone damage and complete detachment of the overlying cartilage, which is now loose inside the joint.

For grades 3 and 4, osteoarthritis will occur without surgical treatment to repair or reconstruct the cartilage. The larger the area of the bone that gets compressed and there's no friction from the two bones rubbing against each other. Young patients have the best chance for full recovery.

Conservative care has evolved over time with evidence from studies to suggest optimal ways of supporting natural healing. At first, the approach was to prescribe immobilization and non-weightbearing of the leg. But it was quickly realized that this method left the patient with a stiff and weak knee that starts to lose bone mass from disuse. Today, the leg is still placed in an immobilizer, but partial weight-bearing is allowed until the patient no longer has any pain. That usually takes about six weeks.

The next phase of rehab involves increasing the weight put on the foot and leg and adding low-impact strengthening exercises. No one is allowed to participate in sports activities until X-rays show the bone is healed, there are no symptoms, and the patient has completed the full course of rehabilitation under the supervision of a Physical Therapist.

If conservative care fails, then surgery is still an option. In all cases, the surgeon tries to preserve the natural cartilage.
rather than removing and replacing the torn cartilage. Studies have shown that removing the torn fragment may give the patient relief from pain and symptoms, but it doesn't last. Only one in four patients treated this way go on to heal completely. But sometimes repair is not possible and the damaged cartilage must be removed and replaced.

In those cases, the surgeon has quite a few options to choose from. Procedures to repair the damage include drilling holes in the subchondral bone to open up channels for blood to get to the area and get the healing process going. Or the surgeon may think reattaching the fragmented cartilage, a procedure called internal fixation is what the patient needs. Teens are more likely to respond well to the drilling technique, but rarely experience spontaneous healing this way and must rely on internal fixation for a successful outcome.

If the least invasive surgery fails to restore the cartilage, then bone grafting might be considered as the next step. The surgeon uses plugs of cartilage and subchondral bone from a non-weight-bearing area of the patient's knee as the graft. This is still an attempt to salvage the damaged area without removing tissue. This approach is more likely to be successful when the lesion is small or in areas with less pressure and friction.

Larger lesions in less active patients may respond to a technique called microfracture. The surgeon places tiny holes around the damaged area and then in toward the center of the damaged area. This technique works best for high-demand individuals with small lesions, low-demand patients with slightly larger lesions, and when the subchondral bone is not damaged. Microfracture resurfaces the defect but does not restore subchondral bone.

Autologous chondrocyte implantation (ACI) is the final treatment option discussed. The surgeon removes healthy cartilage cells from a non-weight-bearing area of the joint and sends them to a lab where they are multiplied in number. When there are enough cells, the surgeon performs the second part of this two-part operation and places the new cells in the damaged area. The goal is to produce a graft that is close to natural cartilage cells in form and function. If the defect is really deep, the surgeon may have to inject cells into the area in stages over time. Fortunately, the healthy cells created in the lab last up to five years when kept very cold.

The authors conclude by saying that treatment for OCD of the knee is most successful when the condition is caught early and long-lasting damage can be done. The surgeon makes the treatment decision with the patient's interests in mind but by taking into consideration the size and depth of the lesion. The presence of loose fragments complicates the decision, making surgery almost inevitable. Most people do not heal on their own and require some kind of intervention. The patient should expect a long recovery of several years.