Rehabilitation Guidelines for Osteochondritis Dissecans (OCD) Fixation - Knee

Osteochondritis is a condition in which the blood supply to an area of bone is disrupted. As a result, the area of bone and its overlying cartilage can separate from the rest of the bone. This piece of bone and cartilage can become loose and even break off into the joint. It can cause pain and swelling or even a feeling of “catching” or “giving out.” Osteochondritis dissecans (OCD) most often affects the knee, ankle and elbow.

The cause of OCD is not completely known. OCD can run in families, but often it does not. We think that it is at least partially caused by a change in the blood flow in the bone around a joint that makes the bone sick. Repetitive trauma (loading the joint) is also thought to play a role in causing OCD.

OCD usually causes pain in the involved joint. You may have swelling or stiffness in the joint too. You may have pain during or after activity. Sometimes, you might feel like your joint “gets stuck” in a position or it may even feel weak. You should see your doctor if you have any of these problems. Your doctor may order imaging studies to help evaluate the joint. OCD can often be seen on x-ray (fig 1), but sometimes an MRI is needed to see it. The MRI can also show if the piece could be loose or if it has broken off into the joint (figure 2).

Treatment for OCD depends on whether it is stable or unstable and on how much growing you have left to do. If the OCD is stable, you may not need surgery, particularly if you are young and have lots of growing left to do. If the OCD is loose, or if it doesn’t heal without surgery, you may need a surgery to fixate the loose piece and stimulate healing to the underlying bone. Surgery is more likely if you are done growing. Without treatment, the fragment of bone and cartilage can break off and float around in your joint. It can get stuck in the joint causing the joint not to move. It is possible to heal OCD completely.

Figure 1 Radiographic (x-ray) view of an OCD lesion of the knee.

Figure 2 MRI view of an OCD lesion of the knee.
The younger you are, the better chance you have of healing the OCD and getting back to the activities you enjoy. Sometimes, high impact activities, like basketball, can be difficult to play after OCD. Adults are less likely to be completely cured, even if they have surgery.

**Non-Operative treatment**
The goal of non-operative treatment is to decrease the load across your joint. This means that you will have to avoid activities like running and jumping (if it’s your knee or ankle) or gymnastics and throwing (if it is your elbow). You may use a brace and crutches too. This treatment can take several months, sometimes even a year or more. By taking the extra load off the joint, the blood flow can sometimes be restored. X-rays and/or MRI will be used to see if your OCD is healing.

**Surgical treatment**
If the OCD does not heal or if it is unstable, surgery will be recommended. The goal of surgery is to get the piece of bone to heal. In order to do that, the bone must be healthy and have enough blood supply.

An arthroscopic surgery may be done to make small drill holes in the healthier bone around the OCD to improve the blood supply to the OCD piece (fig 3). If the piece is loose, it may need to be held in place with a nail or screw (sometimes, a second surgery will be required to take out screws). Other bone from around your knee (bone graft) is sometimes used if the OCD is very large. After surgery, you will not be able to put all of your weight on the leg (or arm). You will wear a special brace and will do physical therapy. Adherence to your physical therapy program will significantly affect the long term health of your knee and your ability to return to sport and activity. X-rays and/or MRI will be used to see whether or not your OCD heals after surgery.

Figure 3
A – Depression of the articular cartilage shows the underlying defect
B – Holes drilled for fixation
### PHASE I (surgery to 8 weeks after surgery)

<table>
<thead>
<tr>
<th>Appointments</th>
<th>- Rehabilitation appointments begin within 7 to 10 days after surgery and continue 1 to 2 times per week</th>
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</table>
| Rehabilitation Goals | - Restore quadriceps function and leg control  
- Full knee extension and minimize the adverse effects of Immobilization  
- Adherence to home exercise program (HEP) |
| Precautions | - **Weightbearing:** Touch-down weight bearing (TDWB) with crutches.  
- **Brace:** Post-operative brace for 6-12 weeks. Sometimes a special unloader brace will be used after you are done with the larger postoperative brace. |
| Range of Motion (ROM) Exercises (3 times daily) | - Continuous passive motion (CPM): set at 30-70 at the slowest speed, increasing to 0-90 as tolerated  
OR  
- 500 passive ROM reps 30-70 degrees, increasing to 0-90 as tolerated |
| Suggested Therapeutic Exercise | - Non-weight bearing calf and hamstring stretches  
- Heel slides  
- Ankle pumps progressing to resisted ankle range of motion  
- Patellar mobilizations  
- Bike with little to no resistance can be initiated after 2 weeks  
- Deep water running with little to no resistance can be initiated after 2 weeks |
| Cardiovascular Exercise | - None at this time, aside from the gentle bike and deep water running. |
| Progression Criteria | - 8-12 weeks AND:  
1. Good quad set and open chain leg control  
2. Full ROM  
3. No active inflammation or reactive swelling |

### PHASE II (begin after meeting Phase I criteria, usually 8-12 weeks after surgery)

<table>
<thead>
<tr>
<th>Appointments</th>
<th>- Rehabilitation appointments are 1 time a week for 1 to 2 weeks</th>
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| Rehabilitation Goals | - Normalize gait  
- Avoid over-stressing the fixation site  
- Closed chain leg control for non-impact movement and positions  
- Adherence to HEP |
| Precautions | - Weight bearing as tolerated (WBAT)  
- Avoid over-loading the involved compartment through exercise and activity  
- Consider unloader brace if needed  
- No active inflammation or reactive swelling |
### ROM Exercises
- Stationary bike with low resistance
- Aquatic therapy - repeated knee motions such as march walking and bicycle walking

### Suggested Therapeutic Exercise
- Gait drills: forward and backward march walk, soldier walk, side step, step overs, hurdle walk
- Double leg balance drills - balance board, tandem balance
- Closed chain strengthening for quadriceps and glutes - double leg squat progressions and leg press (0-60 degrees ROM and respect weight bearing point of OCD as a component of the progression)
- Hip and core strengthening

### Cardiovascular Exercise
- Stationary bike with low resistance
- Deep water running
- Elliptical trainer

### Progression Criteria
1. Normal gait
2. Symmetric weight acceptance for squats to 45 degrees
3. No reactive swelling after exercise or activity

### PHASE III (begin after meeting Phase II criteria, usually 16-18 weeks after surgery)

#### Appointments
- Rehabilitation appointments as needed. Usually 1 time every 2-4 weeks

#### Rehabilitation Goals
- Normal running gait without side to side differences or compensations.
- Normal double leg landing control without side to side differences or compensations for sub-maximal squat jump.
- Adherence to HEP

#### Precautions
- No active reactive swelling or joint pain that lasts more than 12 hours.

#### Suggested Therapeutic Exercise
- Low amplitude low velocity agility drills: forward and backward skipping, side shuffle, skater’s quick stepping, carioca, cross overs, backward jog, forward jog
- Closed chain strengthening for quadriceps and glutes - lunge progressions and single leg squat progressions
- Single leg balance exercises and progressions
- At ~20 weeks initiate low amplitude landing mechanics: med ball squat catches, shallow jump landings, chop and drop stops, etc
- Core strength and stabilization

#### Cardiovascular Exercise
- Stationary bike with moderate resistance
- Deep water running and swimming
- Elliptical trainer
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| Progression Criteria | Normal jogging gait  
| Good single leg balance  
| Less than 25% deficit on Biodex strength test  
| No reactive swelling after exercise or activity |

PHASE IV (begin after meeting Phase III criteria, usually 24-26 weeks after surgery)

| Appointments | Rehabilitation appointments are once every 2 to 4 weeks |
| Precautions | No active reactive swelling or joint pain that lasts more than 12 hours |

| Suggested Therapeutic Exercise | Progressive agility drills: forward and backward skipping, side shuffle, skater’s quick stepping, carioca, cross overs, backward jog, forward jog  
| Landing mechanics - progressing from higher amplitude double leg to single leg landing drills. Start uni-planar and gradually progress to multi-planar.  
| Movement control exercise beginning with low velocity, single plane activities and progressing to higher velocity, multi-plane activities.  
| Strength and control drills related to sport specific movements.  
| Sport/work specific balance and proprioceptive drills  
| Hip and core strengthening  
| Stretching for patient specific muscle imbalances  
| Unanticipated movement control drills, including cutting and pivoting |

| Cardiovascular Exercise | Progressive running program. Design to use sport specific energy systems |

| Progression Criteria | Patient may return to sport after receiving clearance from the orthopedic surgeon and the physical therapist/athletic trainer. Progressive testing will be completed. Patient should have less than 15% difference in Biodex strength test, force plate jump and hop tests, and functional hop tests. |

These rehabilitation guidelines were developed collaboratively between UW Health Sports Rehabilitation and the UW Health Sports Medicine group.

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References:


