

PATIENT GUIDE TO ARTICULAR CARTILAGE INJURIES

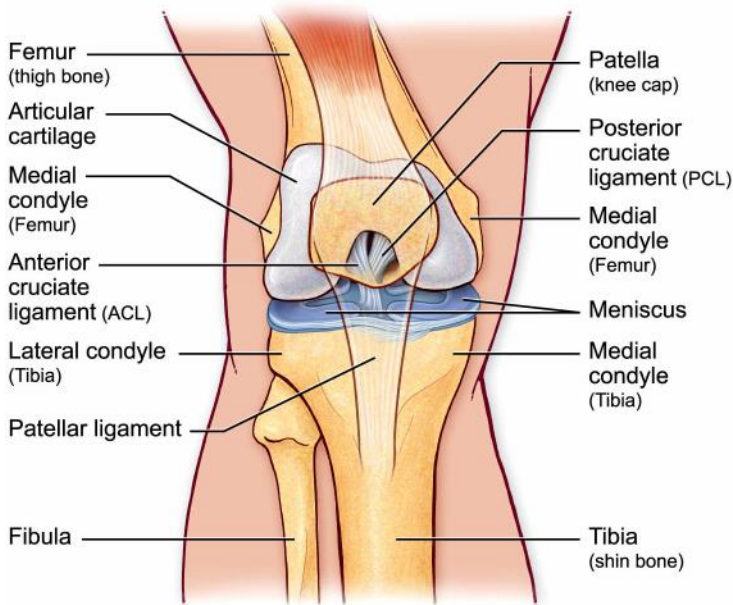


FIGURE 1: Anterior (front) view of the knee.

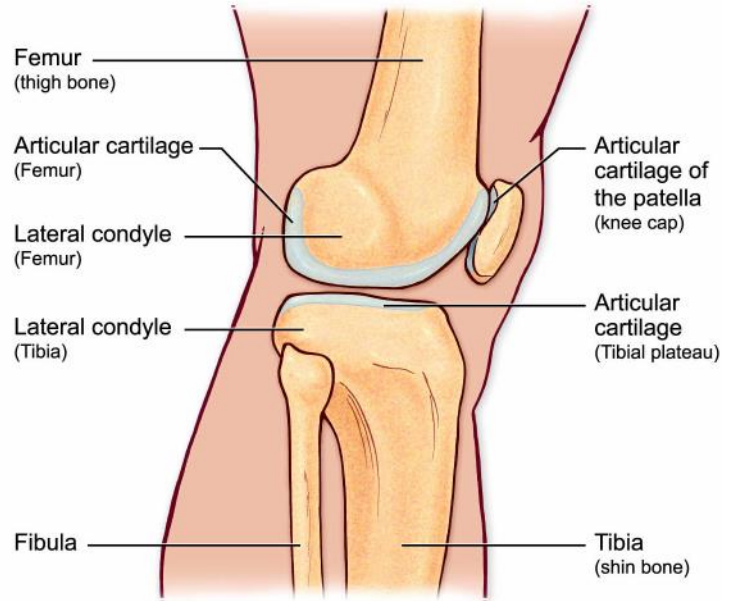


FIGURE 2: Lateral (side) view of the knee.

What is the articular cartilage?

The articular cartilage is the cartilage that lines your joint surface. This cartilage allows the joints to move smoothly through the normal range of motion. In the knee, there is cartilage on the underside of the kneecap (patella) and where the kneecap rides on the femur (trochlea), on the ends of the femur (medial and lateral femoral condyle), and on the tibia (tibial plateau) (**Figures 1&2**). This cartilage is different than the other cartilage in the knee, the meniscus, which are the cartilage rings inside the knee joint.

What is an articular cartilage injury?

An articular cartilage injury occurs when there is damage to the joint surface. Injuries to the cartilage can be partial thickness (part of the way down to bone) or full-thickness (all the way down to bone) (**Figure 3**). The problem with articular cartilage injuries is that they have very limited ability to heal.

How is the articular cartilage injured?

Cartilage injuries can occur from trauma, such as a football tackle or twisting injury, or gradually over time. In addition, there are certain diseases, such as osteochondritis dessicans, which causes damage to an area of cartilage and bone in the knee without a definite cause.

When there is significant loss of the articular cartilage, the knee is considered to have “arthritis”.

How do I know my articular cartilage is injured?

Injuries to the articular cartilage most typically cause pain in the knee in the area of the damage. In addition, patients can get swelling, locking, or buckling of the knee. Damage to the cartilage to the underside of the patella can commonly cause pain with stairs or squatting. It can also lead to weakness of the knee.

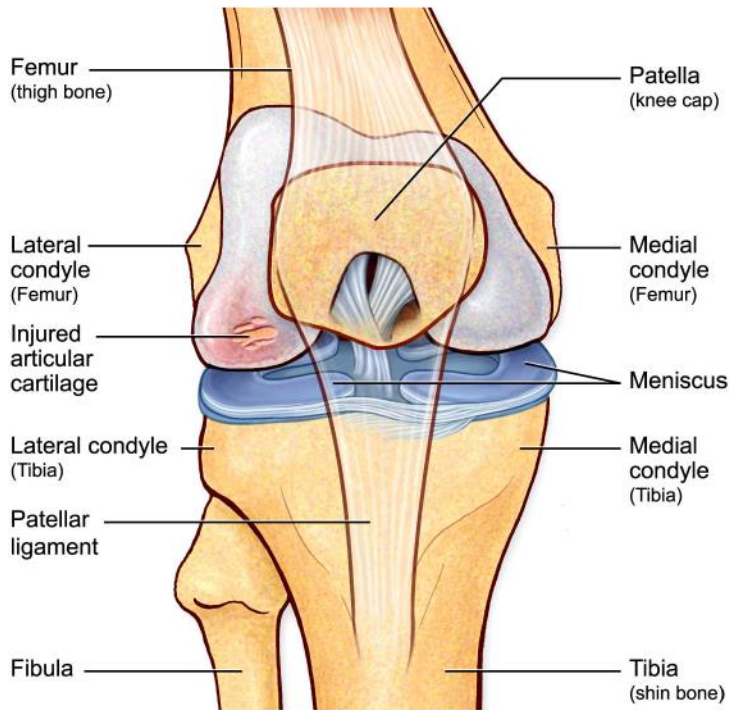


FIGURE 3: Worn articular cartilage.

Do I need x-rays, MRI's or any other test?

A set of x-rays is usually ordered to evaluate the bones and cartilage around the knee. The x-rays are primarily used to evaluate for arthritis and severity of the articular cartilage injury of the knee joint. If the damage is small, the x-rays may appear normal. A MRI may be ordered to look for damage to the articular cartilage and rule out any other injuries to the knee. In some cases, the damage cannot be seen on the MRI, even though it is present.

Is there other damage to the knee when the articular cartilage is injured?

There is frequently other damage to the knee in cases of articular cartilage damage, which occur at the time of the injury. These include ligament tears or tears of the meniscus (**Figure 4**). In addition, there can be malalignment of the knee that can lead to further injury. If surgery is needed, all of the injuries will be addressed at the time of surgery.

What are the treatment options for articular cartilage injuries?

Some patients with an articular cartilage injury improve with conservative treatment. The treatment includes exercises, use of anti-inflammatory medications (NSAIDs), and possibly an injection of steroid. The exercise may include a program you can do at home or formal physical therapy. Depending on the extent of the damage, some patients get better with these treatments and do not require surgery.

If patients do not get better with conservative therapy, or have a large articular cartilage lesion, surgery may be necessary.

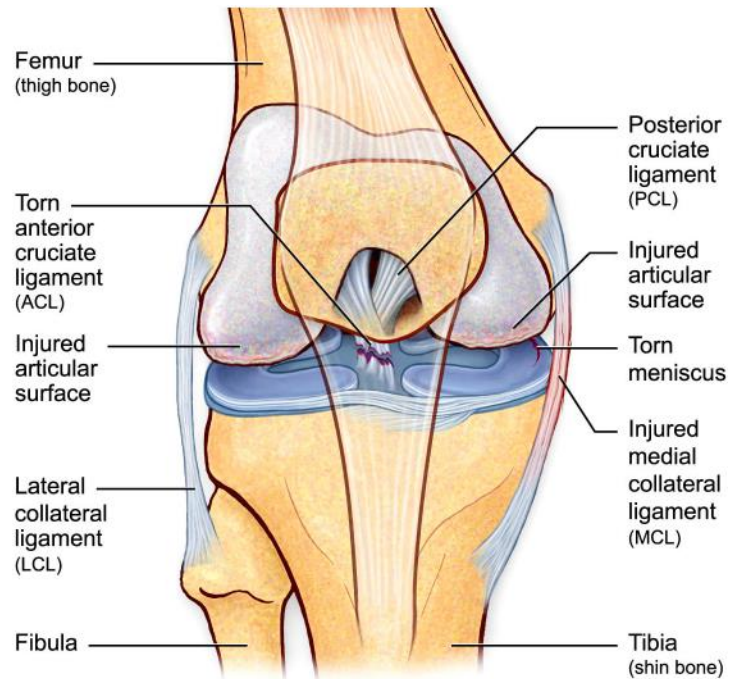


FIGURE 4: Ligament and meniscus tears.

How are articular cartilage injuries treated with surgery?

The surgery for articular cartilage injuries depends on the extent of the problem. There are several surgical options, and which procedure is best depends on several factors. These factors include the patient's age and activity level, the size of the lesion, and the chronicity (age) of the lesion.

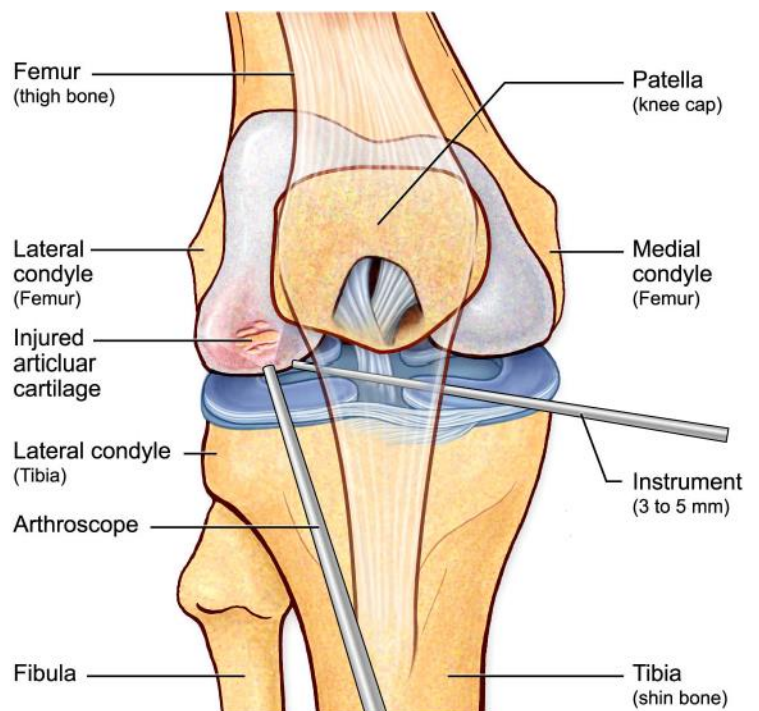


FIGURE 5: Arthroscopic treatment.

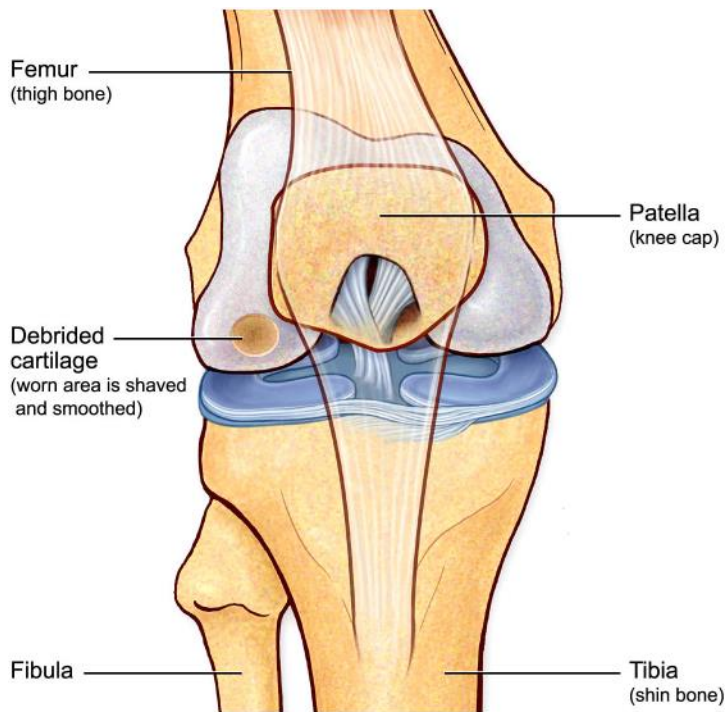


FIGURE 6: Debridement of articular cartilage.

The first step in evaluating the lesion is usually arthroscopy (**Figure 5**). The arthroscope is a fiber optic instrument (narrower than a pen) which is put into the knee joint through small incisions. A camera is attached to the arthroscope and the image is viewed on a TV monitor. The arthroscope allows me to fully evaluate the entire knee joint, including the knee cap (patella), the cartilage surfaces, the meniscus, the ligaments (ACL & PCL), and the joint lining. Small instruments ranging from 3-5 millimeters in size are inserted through additional incisions so that I can feel the joint structures for any damage, diagnose the injury, and then repair, reconstruct, or remove the damaged tissue.

Once the lesion is evaluated, there are several options for treatment. These include:

- Smoothing of the lesion and removing loose edges only (debridement)
- Techniques to stimulate scar cartilage to grow into the lesion (microfracture)
- Techniques to replace the lesion with new cartilage (osteochondral autografts, osteochondral allografts, or autologous chondrocyte implantation).

Each of these techniques is briefly described below.

What is debridement of the articular cartilage?

Debridement (**Figure 6**) is performed by using small arthroscopic instruments, such as a mechanical shaver, to smooth the cartilage edges. This is performed so that there are no loose edges to irritate the joint, and to prevent the

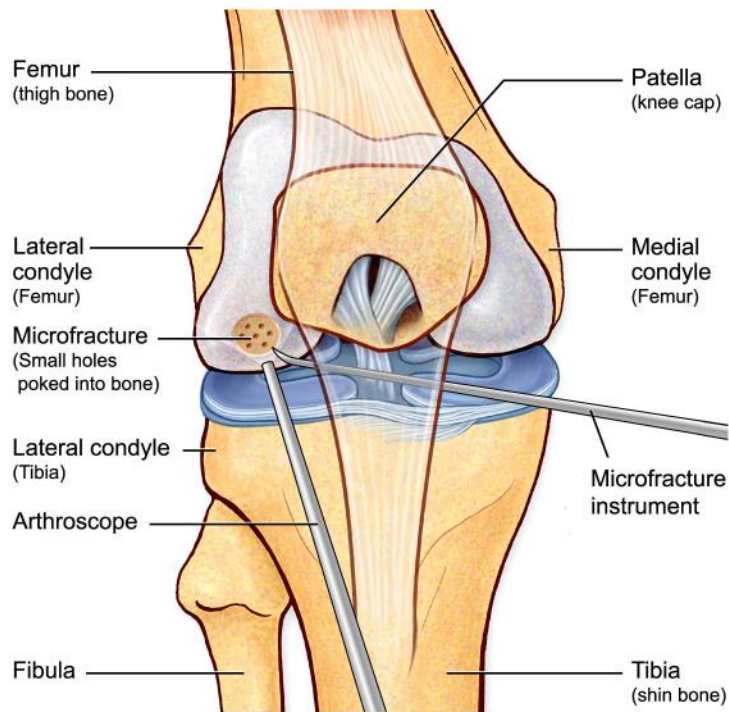


FIGURE 7: Microfracture technique.

area of damage from expanding. Debridement is primarily used for small lesions, or when severe arthritis is found that involves the entire knee joint. Many patients can do well with debridement.

What is the microfracture technique?

Microfracture (**Figure 7**) is a technique to attempt to repair damaged articular cartilage. Small holes are poked into the bone in order to allow blood and marrow healing elements into the area of missing cartilage. This technique allows scar cartilage (fibrocartilage) to fill the area where the cartilage is missing. This technique is easy to perform and can create good results in a lot of patients. However, since the cartilage is scar cartilage, it may not be as durable as other techniques to restore cartilage defects. If the damage is to the cartilage underneath the kneecap (patella), microfracture may be less effective. Microfracture can be performed during an arthroscopy, and no other incision or surgery is needed.

What is an osteochondral AUTOGRAFT?

An osteochondral autograft (**Figure 8**) is a technique to take a small piece of cartilage and bone from one area of the knee and put it in the area that the cartilage is missing. The cartilage is taken from an area in the knee that feels minimal stress, so it is thought that patients do not notice that the piece of cartilage is missing. This technique can be very effective for small areas of missing cartilage. It is typically only performed for areas of damage on the condyle. An osteochondral autograft can often be performed by arthroscopic techniques, but sometimes requires an open incision on the knee.

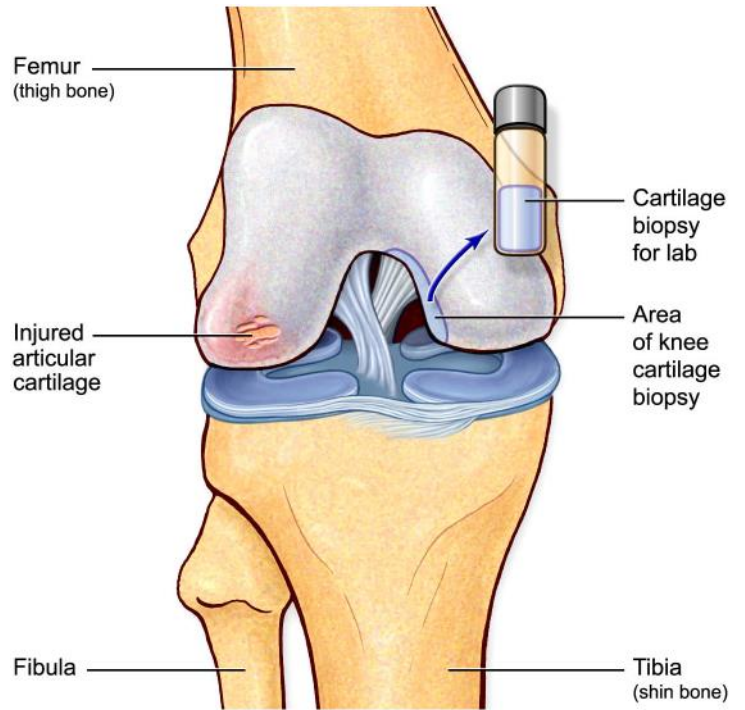
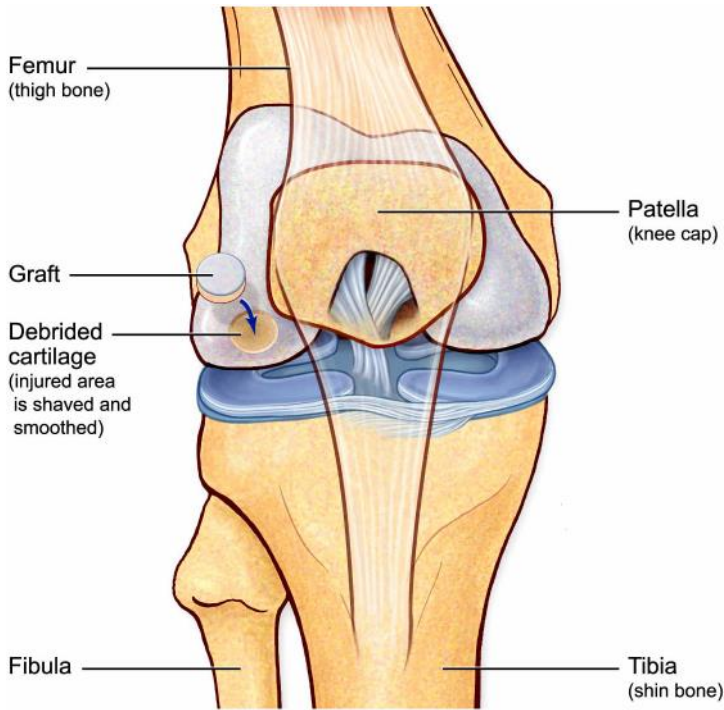
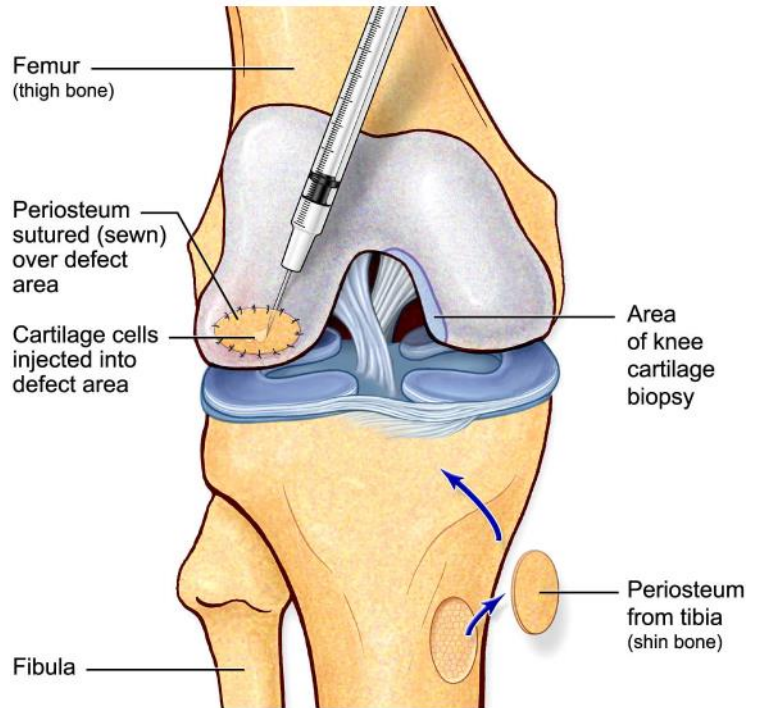


FIGURE 8: Osteochondral autograft (bone & cartilage from your knee) or osteochondral allograft (bone & cartilage from a cadaver).

What is an osteochondral ALLOGRAFT?

An osteochondral allograft (**Figure 8**) is a technique to take a piece of cartilage and bone from a cadaver (as opposed to your own knee) and place it in the area that the cartilage is missing. This technique is good when there is a large area of cartilage that is missing, or if there is both bone and cartilage missing (such as cases of osteochondritis dessicans). The donor allograft is testing for bacteria, hepatitis, and HIV. However, there is always a small chance of disease transmission from an allograft. An osteochondral allograft usually requires an open incision on the knee.



FIGURES 9A&B: Autologous chondrocyte implantation

What is autologous chondrocyte implantation (ACI, Genzyme, MACI)?

Autologous chondrocyte implantation (**Figure 9**) is a technique to restore cartilage from your own knee in the area of the cartilage injury. The technique first involves performing an arthroscopy and taking a small piece of cartilage from your knee (biopsy), which is then sent to a lab in Boston. The lab then grows more cartilage cells from the cells given in the biopsy. A second surgery is then performed (about 4 to 12 weeks later) to implant the cartilage cells. This involves an open incision on the front of the knee. A patch of tissue, either a small layer of the bone called periosteum, or a collagen membrane is sewn in place in the area of the cartilage defect. The cartilage cells are then injected in the area of the defect, and the patch is sealed. A newer technique called MACI where the cells are adhered to a collagen membrane may also be used. In many cases, this cartilage then grows into nearly normal articular cartilage.

What if I need realignment surgery (High tibial osteotomy, Tibial tubercle osteotomy)?

There are cases where malalignment of the knee or kneecap are contributing to the cartilage problem. In these cases, a realignment of the knee or kneecap may need to be performed. In most cases, this is performed at the same time of the cartilage surgery. This realignment typically requires the placement of screws or a plate to secure the bone.

What are some of the possible complications of surgery?

The possible complications depend on which of the procedures above is performed. Possible complications include stiffness of the knee after surgery or continued pain. The use of arthroscopic techniques attempts to limit these complications. Other complications include an infection, bleeding, nerve damage, blood clots, or problems with the anesthesia.

What kind of anesthesia is used?

Knee arthroscopy can be performed with general anesthesia (going to sleep), regional anesthesia (spinal or epidural block) or local anesthesia with sedation. The type of anesthesia will depend on your choice, as well as the type of procedure you are having. Since many of the procedures to restore cartilage defects are bigger surgeries, general anesthesia is performed.

What do I need to do to prepare for surgery?

Our staff will help to set up the surgery through your insurance company and will instruct you on any paperwork that may be necessary. Many of the procedures above require several letters to the insurance company to explain the need for the surgery, since the surgery can be expensive for the insurance company.

Prior to your surgery, you may be asked to get several medical tests, done on an outpatient basis. Most patients need some minor blood tests and a urinalysis. If you are over age 50, you may require an EKG and chest x-ray. Some patients need to see an internist or their family doctor to obtain clearance for surgery.

The night before the surgery, a member of our staff will contact you about what time to arrive for surgery. You may not eat or drink anything after midnight the night before your surgery.

Can I continue to take my medications?

You should STOP taking any aspirin or anti-inflammatory medication (Motrin, Advil, Relafen, Naprosyn, etc.) at least seven days prior to your surgery. However, you may CONTINUE to take Celebrex or Bextra if you are on these medications. You may also take Tylenol as needed.

Continue to take any other prescribed medications, such as blood pressure pills, up until the day of surgery. You may also take these medications the morning of surgery with a sip of water.

How long will I be in the hospital?

Almost all patients are able to have surgery and go home the same day. For the bigger procedures that require open surgery, patients may be admitted for an overnight stay.

What happens the day of surgery?

The day before surgery you will be told what time to report to the hospital. You will be admitted and taken to a pre-operative holding area where you are prepared for surgery.

You will be asked several times which extremity is being

operated on, and the surgical site will be initialed by the surgeon. Please note that you are asked this question many times on purpose.

After the operation, you will be taken to the recovery room to be monitored. Once the effects of anesthesia have worn off and your pain is under good control, you will be taken to another area where you can see your family and finish recovering. You will be given all of your post-operative instructions and pain medication before leaving.

Please be aware that the process of getting checked in, prepared for surgery, undergoing the operation, and recovering from anesthesia takes the majority of the day. I would recommend that you and your family members bring along some reading material to make the process easier for all.

How should I care for my knee after surgery?

Prior to your discharge, you will be given specific instructions on how to care for your knee. In general, you can expect the following:

Diet:

Resume your regular diet as soon as tolerated. It is best to start with clear liquids before advancing to solid food.

Medication:

You will be given a prescription for pain medication.

Bandage:

You will have a thick dressing on the knee. You will be instructed on when it can be removed, usually in 3 days. After your dressing is removed, you should cover your sutures with a Band-Aid to protect the area from irritation.

Showering:

You may shower after your dressing is removed, after 2 – 3 days. You cannot take a bath until the wounds are completely sealed, usually 2 – 3 weeks after surgery.

Crutches:

You will have crutches after surgery, and will be instructed on how to use them. How long you use crutches will depend on the type of surgery performed, and can vary from one to two days to 6 weeks.

Brace:

Depending on your surgery, you may receive a brace for your knee. You will be instructed on the amount of motion allowed in the brace, and how long it is needed.

CPM:

You may be given a machine, called a continuous passive motion (CPM) machine, to help move the knee after surgery. Whether or not you receive a machine will depend on your type of surgery and your insurance company.

Ice:

You may receive an ice machine that continually surrounds your knee with cold water. If not, you may apply ice over the dressings for 30 minutes every hour for several days. Do not use heat.

Suture removal:

Your stitches will be removed at your office visit 7-10 days after surgery. Occasionally, sutures are used which resorb and do not need to be removed.

Follow-up office visit:

You will be instructed on when to follow-up in the office. This is usually 7-10 days after surgery.

Exercise:

You will be instructed on exercises you can do immediately after surgery. Typically, you will start physical therapy within 1 to 2 weeks after surgery.

Return to work or school:

You can return to school or work within 3 – 5 days using the crutches. If your job involves more extended walking or heavy activity, you may be out of work or school for a longer period of time.

What will rehabilitation involve?

The rehabilitation is based on several goals: 1) allowing the tissue to heal; 2) regaining motion; 3) regaining strength; and 4) return to sports. The specific rehabilitation protocol for the physical therapist will depend on the procedure performed, and will be reviewed after surgery. Many of the procedures require you to restrict weight bearing for 6 to 8 weeks, in order to allow the area of cartilage repair to heal.

When can I return to sports?

Your return to sports will depend on the extent of damage and the procedure performed on your knee. In general, you will be allowed to return to sports in six to nine months after surgery. You must have good motion, strength, and control of your knee. How quickly you return to sports depends on several factors, including: 1) your own rate of healing; 2) the damage found at surgery; 3) if you have any complications; 4) how well you follow the post-operative instructions; 5) how hard you work in rehabilitation.

How successful is the surgery?

The success of each surgery depends on a number of factors, including the size of your cartilage injury, your age, your activity level, and the site of the injury. Many of these surgeries have a success rate up to 90% in the appropriate patient. The correct surgery for you is a decision to be discussed with your surgeon.

Questions?

If you have questions about your injury or possible need for

surgery, please don't hesitate to contact our staff.

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