

Patient's Guide To Total Knee Replacement



prepared by:

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Foreword:

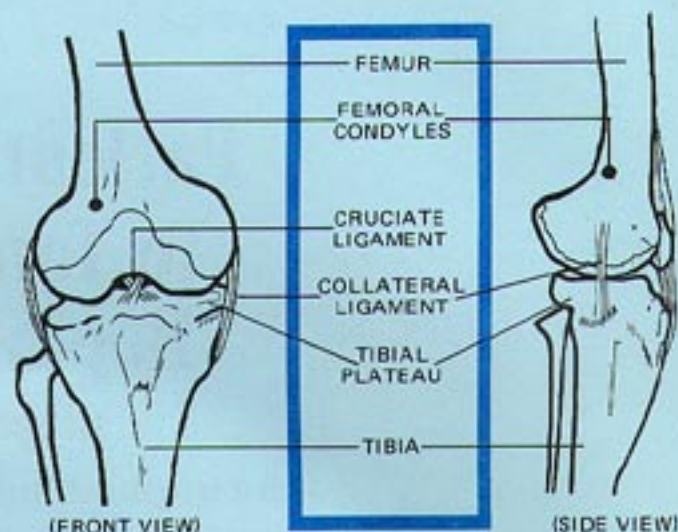
The concept of replacing all or part of knee joint surfaces damaged by disease or injury has become practical as the result of many years of careful research and important technological advances in materials and design. The development and use of total knee implants follows closely upon the successes experienced with the total hip replacement and early indications are that it carries the same potential for the restoration of motion and the relief of joint pain.

It must be recognized that total knee replacement is a major surgical procedure and that there are risks involved as with any comparable operation. The following material has been prepared to help you understand better how the total knee functions, to distinguish among the various types of total knees and to tell you what you may expect to encounter should you undergo such an operation.

The Natural Architecture of the Knee

The knee joint is formed by the meeting of the two major bones of the leg, the femur (thigh bone) and the tibia (shin bone). The ends of both the femur and tibia where they meet are covered with a smooth, slippery skin of cartilage which, in the normal joint, allows them to slide freely upon one another as motion occurs.

The femoral portion of the knee consists of two rounded condyles which fit into the slightly curved depressions called plateaus that make up the tibial portion of the joint. The two halves of the joint, femur and tibia, are held in position by a series of ligaments which give stability and control. A small, oval-shaped bone, the patella (kneecap), is suspended in a long sheath of muscle and tendon over the center of the knee, and helps to protect it against injury and control its motion.



When Total Knee Replacement is Needed

There are a large number of disease and injury conditions which can damage the knee to the point where it becomes painful or will not function properly. Generally, total knee replacement is considered only in those cases where more conventional treat-

ments have either failed or been deemed impractical. Three types of knee damage generally considered treatable by knee replacement surgery are shown below in the order of their severity.

Rough eroded cartilage causing pain and restricted motion



Severe destruction of cartilage and bone with possible leg deformity



Severe destruction complicated by missing or damaged ligaments

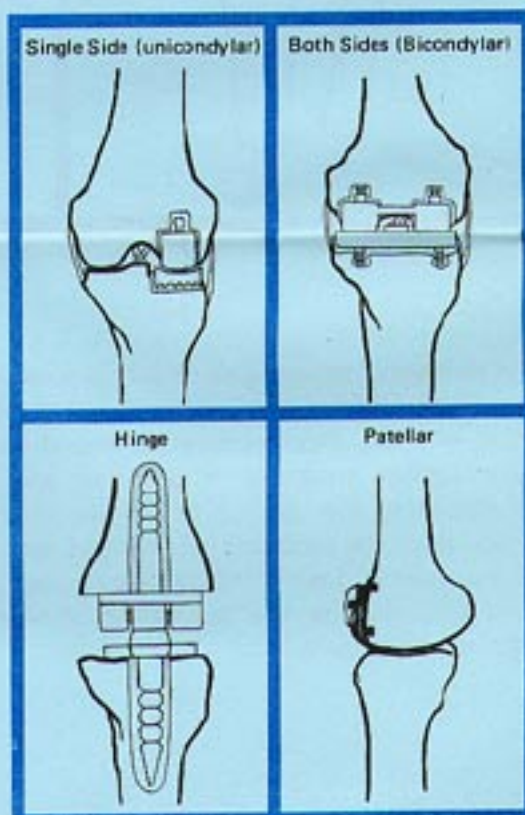


Total Knee Implants

There are three basic types of total knee implants in general use today. The implant selected for a particular patient is usually determined by the particular kind and severity of damage which the surgeon sees in the joint. The first two types of implants available are similar to each other in that their main purpose is to replace damaged bone and cartilage with new surfaces which slide freely upon each other to relieve pain and restore motion. Such implants have an upper component of metal and a lower component of plastic. Each part of the implant is installed separately with no mechanical connection to the other. For this reason, at least some of the natural ligaments of the knee must be present and intact in the presence of these devices in order to give the joint stability. The unicondylar and bicondylar knee implants as they are called are shown to the right. You can see that their main difference lies in the fact that one (the unicondylar) is designed to replace only one side of the knee joint at a time while the other (bicondylar) replaces both sides at once. It is not unusual for two unicondylar implants to be used in making up one complete joint replacement. Last of the three basic types of total knee implants is the hinged knee. This implant is generally reserved for those cases in which damage to the joint is particularly severe or in which there are no usable natural ligaments present. The hinged knee provides its own stability with the mechanical connection between its upper and lower parts. An example of this type of total knee implant is shown at the right.

THE PATELLA REPLACEMENT IMPLANT

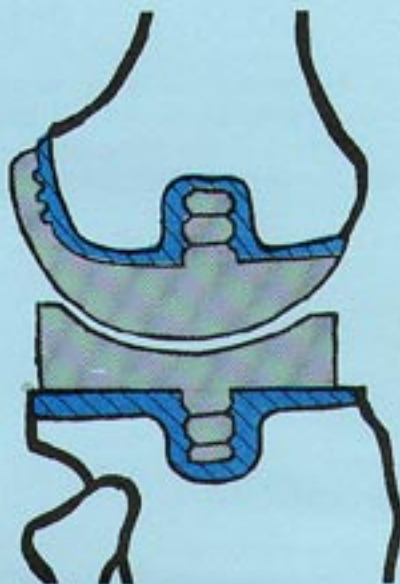
Damage to the knee joint sometimes extends to the kneecap (patella) and, for this reason, there is a fourth type of implant which replaces the underside of the kneecap and the surface of the groove between the condyles of the femur. The patellar implant, shown at the right next to the hinged knee, may be implanted at the same time that any of the total knee implants are installed, if the surgeon feels that its use is indicated.



Surgical Bone Cement

One of the most important components of any of the total knee replacements described here is a material known as surgical bone cement. The bone cement, in use for many years as a dental filling material, found its first major orthopedic application in the total hip replacement operation.

Without some means to securely fasten them in place, the parts of a total hip or knee implant could loosen in time; no matter how carefully or precisely they were fitted to the patient at surgery. When implant parts become loose, they often erode away the surrounding bone. This can bring the return of pain and may cause the implant to break down. Bone cement solves the problem by filling any gaps between bone and the implant parts. Because it is resilient, the cement gives instead of eroding under the normal stresses applied to it in walking. It is inserted around the total joint implants as a soft, doughy substance which hardens within a few minutes to lock them securely into place in the bone.



Before the Operation

Some of the things that your doctor may ask you to do prior to surgery are listed below. All of these are designed to have you as ready as possible to receive your new knee. Some of these steps may not be required in your case or your doctor may want to do some additional things but, generally, these may be expected.



BLOOD STORAGE

Often your surgeon will want to store a pint of your blood at the hospital prior to your operation. This will then be available for use in the event it is needed to replace normal blood loss during the surgery.

CRUTCH PRACTICE



If you are not already using crutches, you may be advised to obtain a properly fitted pair and to begin practicing for an hour each day. Crutch walking should be done by placing a minimum amount of weight on the painful knee. In addition to familiarizing you with the use of crutches so that you can begin walking shortly after surgery, this may provide some temporary relief of pain before the operation.



TESTS

In most cases, your surgeon will want to have your family doctor prepare a complete report on your general health and any specific problems which might complicate your surgery. If you are, for instance, anemic and exhibit a low hemoglobin, the family physician may wish to institute appropriate therapy prior to your operation. Your family physician or internist may wish also to administer tests to evaluate the effects which any long term medications, such as diuretics, blood pressure regulators, and steroids, may have on you.

When You Go To the Hospital

1. It will usually be advisable for you to be admitted to the hospital a day or two prior to the operation. This will allow the hospital ample time to run a complete series of appropriate laboratory tests and x-rays so that your surgeon and anesthesiologist will have an up-to-the-minute picture of your overall physical condition. This will also help them to determine which medications and what type of anesthesia are best for you.

2. The Operation . . . Most people want to know how long they will be in surgery. The time that is actually spent operating will vary from a little over an hour to two or more hours, depending upon the particular set of circumstances encountered by the surgeon. If, for instance, there is a great deal of erosion in the joint; the surgeon will have to work longer to correct it. Generally,

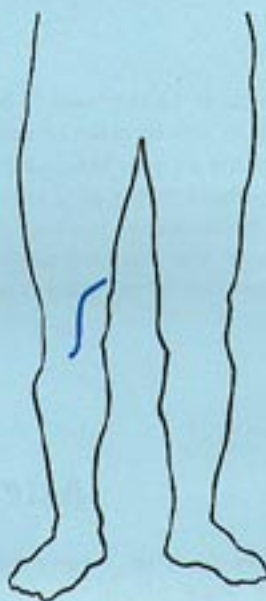
the time spent in surgery with this operation, even if it runs two or more hours, should not cause alarm to friends and family as some knees are just naturally more complicated to work on than others.



The Surgical Procedure

The following description of the total knee operation presents a good idea of the basic steps followed in the surgery. There may be variations depending upon the specific conditions present and the type of knee implant the surgeon decides is best for a particular patient. Generally, however, this is what is done.

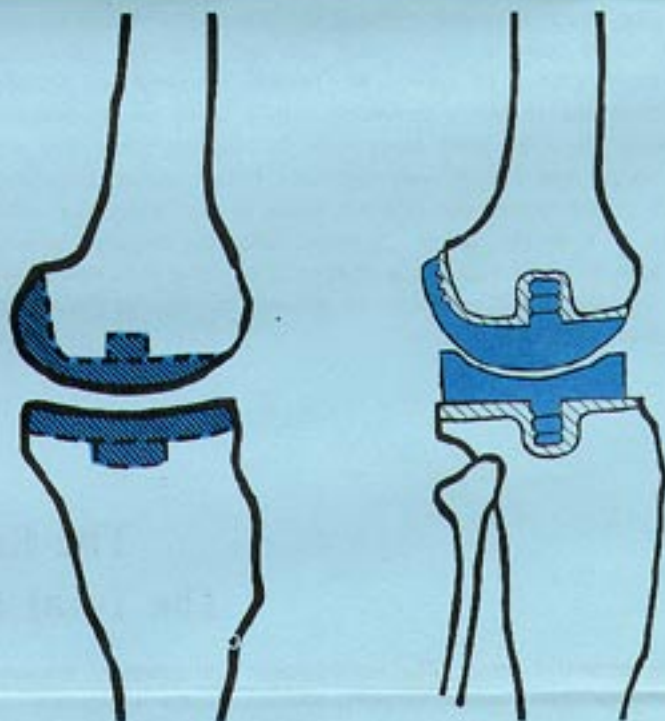
THE SURGICAL APPROACH: The incision is generally made for several inches above and below the knee along the inside of the patella. The length of the incision may vary somewhat depending upon the amount of fatty tissue present and on how much working space is required to prepare the bone and install the implant. Sometimes it will be necessary for the surgeon to make a second incision along the outside of the patella so that he can reach the outer portion of the joint. In most cases, the knee can be entered by these or similar standard surgical approaches without disturbing the function of any important muscular or skeletal systems.



FITTING THE IMPLANT:

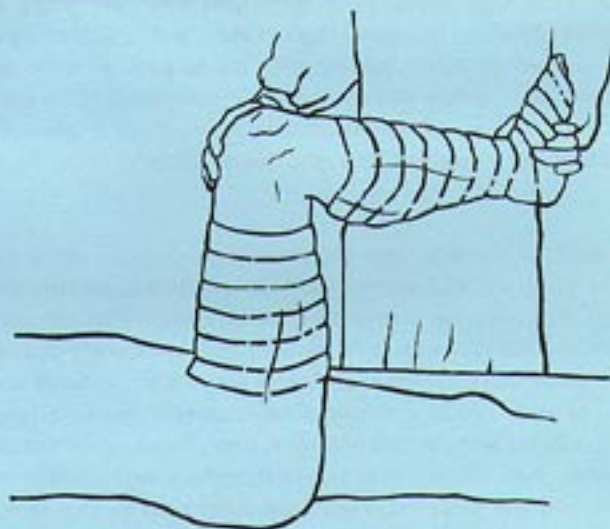
After he has made the incision, the surgeon moves the patella to one side and, with the aid of specially designed instruments, he aligns and marks the position of the implant parts in the joint. Following this, he carefully shapes the bone in both the tibial and femoral portions of the joint to receive the bone cement and the implant parts. To be certain that everything has been correctly prepared, the implant parts are placed into the joint and tested prior to being cemented into final position.

When the joint has been prepared and aligned so that as much of the original damage as possible has been corrected, the final implant components are cemented into place. A final test of their position is made before the incision is closed.



REPLACING THE PATELLA:

If after implanting the total knee components the surgeon feels that the joint's function might be significantly improved or knee pain reduced through the use of a patellar prosthesis, he may decide to proceed directly with that operation. Since patellar replacement takes place through the same incision as knee replacement, there is generally little added time or surgical trauma involved. The groove between the femoral condyles is measured and shaped to receive the metal portion of the patellar implant and the undersurface of the kneecap itself is contoured to accept the plastic implant part. These preparations are carried out in the same way as in the knee replacement. When the implant parts have been tested and aligned, they are cemented into place, given a final test, and the incision is closed.



After the Operation

You can generally expect to be confined to bed for several days after surgery. Medication will be given to relieve the usual post-operative discomfort as the incision heals. Often a plastic drainage tube will have been inserted into the joint at the end of the operation to help prevent postoperative swelling. This tube is usually removed within a day or two after the surgery during a routine change of dressings. Removal of the tube is painless.

During this initial period also, many patients retain a urinary catheter which has been put in place in the operating room. If this is done, it is in the interest of protecting you against unnecessary movement during the first few days of healing.

Passive exercise may be started soon after surgery with the nurse or the therapist flexing your knee for you.

After You Leave the Hospital

During the first six weeks after surgery the crutches should be used to assist and protect your new knee as much as possible. Use of two crutches during the period ordered by your surgeon must be strictly adhered to. During the approximately two weeks spent in the hospital, you will have been permitted to sit in a chair of appropriate heights for increasing periods of time and to use a commode with a raised seat to prevent flexing the knee joint more than 90 degrees. Once you are at home, you should very carefully follow the routines and instructions carried out in the hospital so that when you make your visit to the doctor six weeks after the surgery, he will be able to move you to the next stage of using your new knee. A few very good guidelines to observe during this important six week period as follows:

1. Do not let yourself become over-fatigued.
2. Do not strain the new implants by stooping or excess knee bending.
3. Do use two crutches or a walker for as long as your doctor orders.

After about six weeks your surgeon will make x-rays and take a good look at the progress of your new knee. Based upon the results of the x-rays and your general condition, he will then advise you as to when crutches may be discarded and will recommend an expanding program of normal activities. Depending upon the condition of the bone, a longer period on crutches may be indicated.

The Results of The Total Knee Surgery

The successful total knee replacement will generally provide nearly complete relief of pain. Motion in the affected limb will generally be significantly improved as will any bowing or knock knee that might have developed over the years as a result of erosion. In most cases, canes and crutches can be discarded within a few months after the surgery. In some situations, however, where there are other disabilities and the patient may not become completely mobile again, there is generally a significant improvement brought about by the relief of pain alone.

It should be realized that the total knee replacement is not a normal joint and that certain cautions will have to be observed in its use. For instance, a total knee patient, even with the best of results, should not expect to participate in extremely strenuous activities or sports which might cause the implant to break down. Many patients notice a certain amount of stiffness on arising or sitting still for an extended period of time. This is to be expected. Although these devices have been successfully implanted in many people and the same materials have been used in thousands of

total hips, their ultimate durability, particularly in an active younger person, remains to be confirmed over the next several years. Simulated laboratory testing of the implants has shown them to be quite durable under repeated stress, but only actual patient use over many years can confirm their actual life expectancy to the point where the replacement of one or more implant parts may be required.

At approximately one week postoperatively, you will begin walking with crutches under the supervision of a nurse or physical therapist. You will be encouraged to put your leg through the normal motions of walking but with minimal weight bearing. The absence of pain at this period may lead you to place more weight than recommended on the new knee or, in short, to become over-zealous about walking normally again. It should be carefully noted that the healing process is still taking place at this point. You must be careful not to try to do too much too soon. It is easy during this period to become over-fatigued. The surgeon, the nurses, and the physical therapist will bring you along as quickly as is advisable without endangering your new joint.



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