

TOTAL KNEE REPLACEMENT

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Since you have progressed to the point of serious consideration of total knee replacement, there is a great deal of information that is important for you to understand. Prior to making your final decision and ultimately having your total knee replacement, it is important that you understand everything about the procedure and have realistic expectations about the results. You should understand why you are having problems with your knee and when you should make the decision to have knee replacement surgery. These expectations, along with the possible complications of the procedure, will allow you to decide when to proceed with the operation. I also want you to understand clearly what is expected of you prior to your admission to the hospital, during your hospitalization, and in the rehabilitation period after your discharge. I will try to summarize all of this information for you. Certainly if you have any questions, please feel free to contact me.

RATIONALE AND INDICATION

Total knee replacement for disorders of the knee joint has been performed for 50 years. There has been a rapid evolution in prosthetic design and to a lesser degree, the surgical technique. The great majority of the operations are done for arthritic conditions of the knee. There are many different causes of arthritis, all of which cause a deterioration of the knee joint. The knee joint is a hinged joint which moves on a smooth surface called the articular cartilage. The articular cartilage is worn away by the arthritis process to the point that the knee joint becomes painful. The process is usually gradual and may progress for months or even years before becoming severe. As it becomes more severe, there will be more pain and limitation of function. There are many types of arthritis that can cause deterioration of the knee joint. The forms of arthritis include

osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, traumatic arthritis (related to injury) and avascular necrosis or loss of blood supply to the knee joint.

A secondary category of causes requiring total knee replacement are those of failed previous knee surgeries. The most common is a previous knee replacement that now has failed either through loosening of the components or wear of the polyethylene liner. This is called a revision total knee replacement while the initial knee replacement is called a primary total knee replacement.

In the early stages of knee disease, the pain and loss of function may be improved by conservative means of treatment including non-steroidal anti-inflammatory agents, intra-articular injection of steroids, or viscosupplementation (a series of gel type injections into the knee joint). Patients may also use a cane or crutches, and restrict their activities. Weight loss, if possible, can also significantly reduce the level of pain. For many medical reasons, it is best to reach and maintain your optimal weight. This weight loss is difficult and sometimes impossible as you cannot exercise or walk very far with severe disease.

At some point, however, if the arthritic process increases in severity, patients will have increasing pain and decreasing function which is no longer managed by conservative measures. At this point it is time to seriously consider a total knee replacement. The decision to perform the total knee replacement is usually based entirely on the patient's complaints. It is rare when knee replacement is done on an urgent basis. The only potential cause for this necessity is when the arthritic process is so severe it actually wears away or erodes the bone. Once this erosion occurs, the operation must be done within a reasonable period of time as progressive loss of bone will compromise the potential for surgical success.

SURGERY

The knee is a hinged joint that connects the lower end of the femur or thigh bone and the upper end of the tibia or shin bone. The surfaces of each of the bones are covered by articular cartilage. The hinged joint has an additional component in that the knee cap or patella rubs on the anterior end of the femur. This serves as a fulcrum for the quadriceps muscle which straightens the knee. The end cap of the femur is removed and replaced by a metal shell that is made of either titanium or combination of chromium and cobalt. The upper end cap of the tibia is replaced by a surface made of high density polyethylene or plastic that is attached to the bone by a metal plate. The hinged joint of the knee, therefore, is replaced by a metal on plastic total knee replacement. The portion of the patella that slides on the femur is replaced also by a high grade polyethylene surface.

The greatest controversy that currently exists in total knee replacement is the method of fixation of the prosthesis to the patient. Two options are available. One is the use of commercially pure acrylic bone cement called methyl-methacrylate. This has been used for over 50 years. Early use was quite crude and the cement fixation was actually quite weak. It has been improved dramatically to the point that it now provides very strong fixation. It is best used in patients who are older or have very weak or osteoporotic bone. In younger patients with stronger bone structure, typically those under the age of 70 years, we prefer the use of a trabecular metal tibial implant. This type of implant does not require the use of cement for fixation but rather allows your bone to grow into the implant. In this patient population, cement is used for fixation only on the femoral and patellar components.

The type of fixation you will have for your knee replacement will be determined based on your age, your activity levels, your bone quality and your pre-surgery x-rays .

EXPECTATIONS

The operation is very successful in terms of its main goal which is pain relief. Approximately 90 percent of people have complete pain relief. The additional 10 percent of patients may have mild and intermittent discomfort if they overuse the knee or become too active. The same high percentage of people, no longer have a limp after the surgical procedure. A limp may occur or persist even though pain relief occurs. This occurs in situations where the muscles around the knee are very weak or in cases where the postoperative exercises are not performed. Most patients do not require any assistive devices to walk, although in some cases, patients choose to use a single prong cane for safety or balance reasons.

You are usually able to increase your activity level dramatically after surgery. Patients are encouraged to walk, hike, ride a bicycle or exercycle, swim and even play golf. Sports that cause significant impact or twisting such as running, singles tennis or downhill skiing are not ideal. Getting up from a low chair without arms and going up and down stairs places significant stress on your knee replacement. These activities can be accomplished but you should not do them excessively. Finally, kneeling with direct pressure on the knee replacement is uncomfortable for many patients but is not considered restricted activity.

A frequent complaint of patients in addition to pain is the development of an angular deformity such as becoming knock-kneed or bowlegged. This occurs because the arthritic process is wearing more on one side of the knee joint than the other. Either process may occur in any given patient. Normally a patient should be slightly knock-kneed. An advantage of the operation is that the knee is realigned so it has a normal appearance with the patient being slightly knock-kneed.

Some patients complain that one leg is shorter than the other. After the knee replacement surgery, the leg may be straighter but the leg can rarely be made longer. The ligaments of the knee limit any intentional lengthening of the leg. In patients who are undergoing hip replacement one is usually able to correct leg length discrepancies. That is a distinct difference between hip replacement and knee replacement surgeries.

The final critical issue is how long the knee replacement will last. At this point we have very good information that suggests a cemented knee

replacement will last approximately twenty to twenty-five years. After many years of use and walking, the knee prosthesis can loosen from the bone or the plastic can wear out. If this occurs, and pain is present, it may be necessary to revise, or re-do the knee replacement. This technically can be accomplished successfully but obviously it is best to have the initial knee replacement last as long as possible.

Bone in growth knee replacement is a newer technique. It is my belief that if it is done in the patients with very strong bone, it may actually last as long as, or longer than cemented knee replacements. But, the results of bone in growth total knee replacements are not good in patients with weak bone.

COMPLICATIONS

The results of total knee replacements are excellent. Therefore, there must be some reason that prevents us from performing knee replacements except in patients with significant arthritis. Potential complications are rare but nonetheless exist. These complications include infection, blood clot formation or thrombophlebitis, stiffness, slippage or dislocation of the kneecap from its groove at the end of the femur, nerve injury, fracture and other general complications. The issues especially important to address are the potentials for infection, blood clot formation, and stiffness.

The chance of infection in a total knee replacement is 1 out of 200 or 0.5%. This is a very low number but, nevertheless, can occur. If this occurs, it can be a very difficult problem as it is often necessary to have other surgeries to remove the infection and, in some cases, actually remove the implant for a temporary period of time. Obviously, the best way to treat the infection is to prevent it. The surgical team also uses air exhaust systems which are operating room apparel often called spacesuits. This prevents the operating room staff from breathing on the area of your knee operation. In addition, all patients receive preventative or prophylactic antibiotics for 24 hours. Our hospital infection rate for all primary joint replacements last year was 0.2%

Blood clot formation/thrombophlebitis or deep venous thrombosis is the formation of a blood clot in one of the deep veins of the lower leg. This is a common complication that occurs despite all methods of prevention. There are multiple ways to try to prevent this. Early mobilization decreases blood pooling your lower extremities. We put all patients on some type of blood thinner throughout the hospitalization, dependent upon your past medical history and the medications you take. The types of blood thinners we use include aspirin (taken twice a day), Coumadin or warfarin, lovenox (injectable) and/or xarelto. Finally, all patients also wear sequential compression TEDS which are devices placed on both feet that increase blood flow to minimize the chance of clot formation. The best result, of course, is that you do not form a blood clot. If you did form a blood clot, and it is not treated, there is a chance the blood clot could break loose and embolize/or move to your heart or to your lung. This could potentially be fatal. Therefore, the safest approach is: 1) attempt to prevent DVT and 2) diagnose deep vein thrombosis prior to leaving the hospital. With this protocol the incidence of blood clots following knee replacement is minimized.

After total knee replacement, it is very important for you to faithfully follow your exercise and physical therapy program. Nevertheless, it is still possible for the knee to gain less than the expected flexibility. For you to have a well functioning knee implant the goal is to gain 90 degrees or more of bend or flexion. This must be gained in the first three months after surgery. If excessive scarring occurs or you do not perform your exercises, stiffness may prevent you from gaining the knee flexion necessary for daily activities. If this occurs, manipulation under anesthesia must be performed to break the adhesions or scar tissue. The chance of requiring manipulation should be less than 1 to 2 %.

Total knee replacement rarely requires blood transfusion. Because it is rare that our patients require blood transfusion we do not suggest pre-surgery blood donation by our patients. We do not routinely use a wound drain after surgery because we routinely use a medication during surgery that significantly decreases blood loss. In some situations, and for patients undergoing revision or repeat total knee surgery, blood transfusion is a possibility. If necessary, all blood products are extensively tested for hepatitis and HIV. The chance of this occurring is exceedingly small with

the estimated incidence of hepatitis transmission being 1 in 4,000 blood transfusions and AIDS being 1 in 1,000,000 transfusions. In the rare occasion that blood transfusion becomes necessary, be certain the blood is very carefully screened and tested for these two problems.

Other complications that might occur are rare. They are potentially associated with any major surgery and anesthesia. The potential complications include death, heart attack, heart failure, stroke, pneumonia, lung congestion, gastrointestinal problems such as nausea, vomiting, diarrhea, constipation, urinary tract infections and decubitus or bedsores, etc.

The long-term complication is that the total knee replacement may fail by either loss of fixation or mechanical loosening of one or all of the implants or by wear of the plastic polyethylene surface. Since a patient with painless knee replacement may walk one to two million steps per year, it is reasonable to expect that eventually it may fail. Most total knee replacements last more than twenty years.

It is advisable to stay in good physical health, avoid excessive weight gain, avoid excessive impact activities as previously noted, and exercise frequently. Although revision surgery is usually very successful, hopefully it will never be required for most patients.

PREPARATION FOR SURGERY

Once you have made your decision to have a total knee replacement, you should contact our Surgery Coordinator, Renee Wood at 910-295-0224. She will help you choose a surgery date and will also schedule you for a pre-surgery appointment with my Physician's Assistant: Michelle (Shelley) Moore. This pre-surgery appointment with Michelle is mandatory for surgery. The time you must wait for your surgery is variable depending on the surgery schedule and your other medical conditions. We will make every attempt to schedule the surgery at your convenience. Renee can answer many questions about preparation for surgery, the pre-operative sequence of events, and insurance matters.

It is important to have a physical examination by your primary care physician/internist and/or cardiologist (if you have any cardiac history at all) prior to your total knee replacement surgery. Since this is a serious operation, you should be in your best medical health with all medical problems under good control. If you have had a recent physical examination it may not be necessary to have a new examination.

Once you have discussed your upcoming knee replacement with your primary care physician and/or cardiologist they will then mail or fax the results of your examination and tests results to our office. It is preferable that these documents are received by our office prior to your pre-surgery appointment with Michelle. Additionally, we request that your dental health be at its optimum. We must ensure that you do not have any active oral/dental infection prior to joint replacement surgery, and therefore require that you see your dentist and undergo evaluation. Your dentist may also mail or fax results of your examination to our office prior to your admission to the hospital.

We will provide you with a letter to give to your primary care provider/other medical providers detailing our plans to proceed with surgery. **It is your responsibility to make certain your pre-operative primary care physician, cardiology, and dental appointments are completed prior to surgery.**

As mentioned above, at the time our surgery coordinator schedules your knee replacement she will also be scheduled an in depth preoperative history and physical examination with my Physician's Assistant, Michelle Moore (Shelley). This appointment typically occurs 3-4 weeks prior to your surgery date, and we do encourage you to bring a spouse, family member or friend with you to this appointment if you would like to involve them in your care. Michelle will be involved in your whole surgical experience as she is my operative assistant during surgery. She will also be involved in your post-operative care and will also be seeing you during various clinic follow up visits.

At your pre-surgery appointment Michelle will ensure that you are medically and surgically prepared for surgery, and that all of your questions have been answered. You will understand what will happen just prior to

surgery, during surgery, during your stay in the hospital, and after your discharge from the hospital. **You should bring copies of your medical and/or cardiac preoperative evaluation and dental evaluation to this appointment if they have not already been faxed to our office.**

Upon arrival and check in at Pinehurst Surgical Clinic for your appointment with Michelle, one of our nurses will accompany you to one of our examination rooms for an anticipated 45-60 minute appointment. During this appointment, please be prepared to complete specialized x-ray examination needed specifically for surgery purposes. Additionally, you will be accompanied to our Pinehurst Surgical Clinic laboratory for routine laboratory tests of your blood. It is not necessary that you fast prior to your appointment with Michelle as the laboratory testing that will be completed does not require so. You will also undergo an electrocardiogram at this time (please inform us if you have undergone EKG testing by any other provider within the past six months and bring a copy of this study with you to your appointment if you have). **It is important that you come to your history and physical examination with the actual bottles of medications you are taking on a regular basis, including those used on an as needed basis, both prescription and over the counter. We will be carefully documenting the dosages of the medications you take including the time of day your medications are taken. Please do not bring a list of your medications, as we prefer the medications in their original bottles instead insuring accuracy.**

I would also like for you to compile a comprehensive list of all the medical providers you see including their name, and contact information. This will allow us to keep all of your medical providers updated with your progress before your knee replacement surgery, during your hospitalization and also during your recovery. Michelle will request this list at your pre-surgery appointment with her.

Michelle will also provide you with individualized pre-surgery written instructions detailing any medications that need to be discontinued prior to surgery, medications that must be taken the morning of surgery and any other necessary instructions. She will also provide you with an application for a temporary handicapped license tag, which you might use for three to six months after your knee surgery.

As part of our preoperative education program, we do encourage all patients scheduled for knee replacement to participate in a preoperative patient education class which is held at Moore Regional Hospital. ***Patients with MEDICARE A and B are required by our government to attend one preoperative class (effective 2014).*** Although the class is voluntary for all other patients, we feel strongly that this is a very important part of preparing for your surgery. The class will discuss in great detail what to bring to the hospital, what to expect during your hospitalization, what to expect during physical therapy, what to expect from discharge planning and what to expect after you are discharged from the hospital. This is a very helpful time to bring members of your family as well so that everyone can understand what is required to get the best possible result from your surgery. At this time, you will also discuss the nursing plan and philosophy for your care at First Health Moore Regional Hospital. These classes are typically held on Wednesday and Thursday afternoons from 1:00-3:30 pm. Our preference is that you attend one class before your surgery date, if you are able. Michelle will provide you with a flyer detailing additional class information, she will also facilitate your class enrollment and even pre-register you for class should you have a date in mind.

For those of you who are internet savvy, and have difficulty with travel distance, time and date constraints, the hospital does offer an online option/replacement for the onsite preoperative preparation class. Step by step website instruction will be provided to you at your pre-surgery appointment with Michelle, should you choose the online class option.

HOSPITALIZATION

Most insurance plans do not approve hospital admittance prior to the surgery day, therefore, you will be admitted to the hospital the same day of surgery in most cases. At admission, if necessary, additional blood testing might be required.

Renee Wood, our surgical coordinator, will call you one business day prior to your surgery date and inform you of your arrival time to Moore Regional Hospital Outpatient Registration located on Page Road. We do not

not assign surgery times for our patients as there are instances where certain surgical procedures take longer than others. It is likely that you will wait a period of time between your arrival to the hospital and the start of your surgery. We advise that you bring a family member or friend to keep you company during this waiting period as well as some reading materials to help in passing the time. It is important that we have current, accurate contact information for you in order to facilitate the provision of information in a timely manner. Michelle will confirm your current phone number at the time of your pre-surgery appointment and also discuss the best methods of providing your arrival time to you (i.e. telephone vs. email).

You will find that the pre-medication process begins immediately upon hospital admission. We will be administering medications to prevent post-surgical nausea and pain. You will then be taken to the preoperative holding area in the operating room. This will allow for consultation with the anesthesiologist and starting of the intravenous line. At this point a preoperative sedative will be given to you by your anesthesiologist.

In almost all cases, a spinal anesthetic is administered. You will be numb from the waist down. Although you may choose to be wide awake or we can sedate you as heavily as you would like so that you are completely relaxed and will not remember anything about the operation. This is safer than a general anesthetic and your recovery is more rapid. A general anesthetic is used in rare cases. As an adjunct to the spinal anesthetic the anesthesiologist will be also utilizing a femoral nerve block when helps with post-operative pain management. Once you are sedated, medication is placed in the groin area of the body causing numbness and tingling in your anterior thigh after surgery.

Once the spinal anesthetic has taken effect, our nurse will be placing a urinary catheter into your bladder. Because the spinal anesthetic makes you numb from the waist down, you will not feel this catheter being inserted. The catheter will remain in only until the morning after your surgery. At that point you will be able to urinate independently.

Primary total knee replacement requires approximately one hour of surgery time, while a revision total knee replacement requires between two and four hours of surgery time. While you are in the operating room, your family will wait in the surgical waiting area or at home. As soon as surgery is completed, I will contact them in person or by telephone.

You will be in the recovery room for one to three hours until the effect of the spinal anesthesia is worn off. Once that occurs and your vital signs are stable, you will be returned to your room on the orthopedic floor.

Patients with severe cardiac problems may be monitored in the Intensive Care Unit overnight. After surgery, you will be able to move about the bed. You will not need to remain rigidly immobilized in one position. With the bed controls you may elevate the head of the bed or remain perfectly flat.

With the assistance of our physical therapists, you will begin your bed exercises, standing, and walking either the day of surgery or on the first postoperative day (depending on the hour of your surgeries completion).

We will also begin the use of a continuous passive motion machine on the first day after your surgery. You will gradually increase your walking distance and frequency as tolerated. You are usually in the hospital for three days until you reach a level of independence following the surgery.

When you are independent, you should be able to get in and out of bed by yourself and walk between 150 and 300 feet. If you meet these guidelines you will be able to return home. You should strive to go home. This will encourage independence. Home physical therapy will be arranged by a hospital discharge planner prior to discharge from the hospital. You should expect that once home a physical therapist will come to your home for the first several weeks after surgery. Both your insurance company and your medical team will help determine the amount of home physical therapy that is best for you. Transition to a skilled nursing facility is rarely planned for, regardless of whether you had one or both knees (bilateral) replaced on your day of surgery. We will assess your discharge disposition based on many factors, health status, social factors, age and daily functionality.

It is also an option to forgo home physical therapy and replace home therapy with outpatient therapy instead. You would need to have someone to drive you to and from these outpatient therapy appointments.

The continuous passive motion machine is used throughout the hospitalization, which is typically two days. You will be on the machine a minimum of four hours per day. Because some patients become tired of being in the machine continuously, it is satisfactory to have the nurses take you out of the machine approximately two hours every shift. If you do not require that, I would suggest you stay in the machine throughout the day if possible.

Your therapy will be tailored to the type of operation that you received. Regardless of the use of cemented components vs. bone in growth components, patients can be weight bearing as tolerated, which means you can put as much weight on the leg as you desire. While you are walking in the hospital, you will initially be using a walker but you can advance to the use of crutches if you can master the technique. It is your personal preference whether you go home on a walker or on crutches. Prior to the discharge from the hospital, the physical therapy and occupational therapy departments will be certain that you understand very clearly your discharge exercise program and have all the assistive devices that will help you cope in the immediate postoperative period.

You will be required to go home with the use of a walker for ambulation, regardless of whether you have one or both knees replaced. Studies are very clear that patients who go home have better results than those who go to a skilled nursing facility or inpatient rehabilitation facility.

In fact, most patients do not qualify for skilled nursing facility placement or inpatient rehabilitation placement.

In order to prevent blood clot formation you will be placed on a blood thinner and compression foot pumps. We will also have you continue on a blood thinner at home for a period of time.

By two days after surgery, which will be your time of hospital discharge, your incision should be healing well. You will not have staples placed for knee closure after surgery as we opt, rather, to close your wound with absorbable sutures.

When you go home you may still have some clear, yellow drainage (serous drainage). This is not an indication of any type of infection but just a part of the healing process in the tissue below the skin level. This may continue from one to five days. You will be able to take a shower at home with the airstrip in place.

When you are discharged you will have a prescription for a narcotic pain medication but you should be requiring less of the medication each day. You should moderate your activities to reduce the amount of stress that is put on the incision and muscles about the knee. This is the appropriate way to manage your pain after your discharge.

It is common to have swelling in the leg, especially, if you are becoming more active in your activities at home. The one type of swelling that can be worrisome is swelling in the entire leg starting at the ankle or foot level. This is common when you sit for prolonged periods of time. If this occurs you need to spend less time sitting and more time lying down on the bed or couch with the leg elevated. If the swelling does not resolve significantly with this rest and elevation, you should contact me so that we might further evaluate this.

You should stay on your crutches or walker for the entire first six weeks after the surgical procedure unless otherwise informed. I will only advance you to a single crutch or cane after you return to see me at your second postoperative visit six weeks following the surgery.

FOLLOW-UP

Since you have had a total knee replacement, it is important to monitor closely the healing process in the first three to six months following the surgical procedure. It is also important to monitor the long-term fixation of the implant over a period of many years to be certain there is no adverse effect on the bone or any sign of loosening of the prosthesis.

Therefore, the usual follow-up schedule involves your return to the office for examination and x-rays at the following times after the surgical procedure: two weeks, six weeks, six months, and one year. After the first year, you are seen on an annual basis. In some situations because of difficulty of travel, I can make arrangements for you to be seen by your local family physician who can obtain x-rays and send those to me for evaluation. Unfortunately, this is not the ideal situation. I will try to be as flexible as possible because I know travel is often quite difficult and expensive.

PROPHYLACTIC ANTIBIOTICS

Patients with knee replacements can develop infections of the joint in special circumstances. Any infection you might acquire in any other part of your body could potentially spread to your replaced knee. As a result, antibiotics should be taken before certain types of colonoscopy, urologic, and dental procedures. An instruction sheet has been prepared and will be given to you in your educational packet.

PROBLEMS OR QUESTIONS

If you have any concerns or questions about the scheduling or preoperative sequence of events, you should contact Renee Wood at 910-295-0224. She can answer questions about the surgical scheduling, any insurance concerns or preparation for surgery. She can also help you after your discharge from the hospital with questions about your recovery and will forward any other specific questions to me or my Physician's assistant, Michelle. If we are not in the office at the time of your call, they will make certain that we receive the message as soon as possible. Either myself or Michelle will return your phone call as soon as we are able.

I want you to understand completely your arthritis and the proposed surgery. It is best that you clearly understand all information about total knee replacement surgery. If you have any additional questions, please ask me when I see you prior to your admission to the hospital or at the time of your preoperative history and physical examination with Michelle. You may also contact Michelle via the intranet at mmoore@pinehurstsurgical.com.

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SUGGESTED ADDITIONAL INTERNET RESOURCES

- www.aahnks.org
- www.nih.gov/medlineplus
- www.aaos.org
- www.edheads.org
- www.zimmer.com