OUTPATIENT 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 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 the 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 viscosupplimentation (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 kneecap 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 bones. In younger patients with stronger bone structures, 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/or 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 radiographs.

EXPECTATIONS

The operation is very successful in terms of its main goal which is pain relief. Approximately 90 percent of people have near complete pain relief. An 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 the leg. In patients who are undergoing total 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 modern knee replacement will last approximately twenty-five to thirty years. The use of Robotics in knee replacement surgery has provided new data that suggest robotics assisted knee replacements may last longer than their typical 25 years. Studies are ongoing as the use of robotics is increasing rapidly around the world. Although it is thought by many that robotics is very new technology, I have actually been using ROSA Robotic for outpatient total knee replacement since 2019.

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 patients with very strong bones, it may actually last as long as, or longer than cemented knee replacements. But the results of bone on/in-growth total knee replacements are not good in patients with weak bone/osteoporosis/osteopenia.

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 grove at the end of the femur, nerve injury, fracture and other general complications. The issues especially important to address are the potential 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, it 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, remove the implant for a temporary period. 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 to prevent blood clots include aspirin (taken twice a day), Xarelto, Eliquis or lovenox injection. 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 toohave 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 physical therapy 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 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.

PREPARATATION FOR SURGERY

Once you have made your decision to have a total knee replacement, you should contact our Surgery Coordinator at 910-295-0275. She will help you choose a surgery date and will also schedule you for a pre-surgery appointment with either of my advanced practice professionals, Michelle Moore, physician assistant and Steve Balos, Nurse practitioner. This pre-surgery appointment with one of my APP's 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. Our Surgery scheduler 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 or Steve. 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 send or fax results of your examination to our office prior to your outpatient 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 either Michelle or Steve. 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. One of my advanced practice professionals (Michelle or Steve) will be involved in your whole surgical experience as they are also my operative assistants during surgery. Michelle and Steve 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 or Steve, they 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. If any testing (EKG/stress testing/echocardiograms/blood work/ultrasounds) were completed by your providers, please also bring copies to the preoperative evaluation.**

Upon arrival and check in at Pinehurst Surgical Clinic for your appointment with Michelle or Steve, 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 a specialized x-ray examination needed specifically for surgery planning purposes. Additionally, you will be accompanied to our on-site lab for routine laboratory tests of your blood. It is not necessary that you fast prior to your appointment with Steve or 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 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 your medical providers updated with your progress before your knee replacement surgery, during your hospitalization and during your recovery. Michelle or Steve will request this list at your pre-surgery appointment with her.

Michelle and Steve 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 information. Steve or Michelle 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 consider participating in our preoperative patient education class which is held at Pinehurst Surgical Renaissance Room-Clinic every other Thursday at 10:00am (please call Melinda Nance at (910) 215-2514 to register for total joint class).

Although the class is voluntary for all other patients, we feel strongly that this is a very helpful part of preparing for your surgery. Our preference is that you attend one class before your surgery date, if you are able. Michelle or Steve will provide you with multiple flyers detailing additional class information, they will also facilitate your class enrollment and even pre-register you for class should you have a date in mind.

HOSPITALIZATION

Healthy and well supported patients are ablet to undergo total knee replacement at our surgery center with same day or day of surgery discharge. Having knee replacement as an outpatient at a surgery center is very common and very safe. We have been performing same day discharge total knee replacement surgery at our surgery center successfully for over since 2019. Patients who have same day discharge total knee replacement benefit from decreased risk such as decreased risk of infection, decreased risk of deep vein thrombosis and improved outcome and satisfaction overall.

Our surgical coordinator will call you one business day prior to your surgery date and inform you of your arrival time to our surgery center. We do not assign surgery times for our patients as there are instances where certain surgical procedures take longer than others. You instead will be provided with an arrival time to the surgery center. It is likely that you will wait 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 to facilitate the provision of information in a timely manner.

You will find that the pre-medication process begins immediately upon surgery center arrival. We will be administering oral medications to prevent post-surgical nausea and pain once you arrive at our preoperative surgical assessment unit in the hospital. This will allow for consultation with the anesthesiologist/Nurse anesthetist and starting of an intravenous line. At this point a preoperative sedative will be given to you by your nurse anesthetist/anesthesiologist.

In almost all cases, both an adductor block (for pain relief after surgery) and a spinal anesthetic is administered for your surgery. You will be numb from the waist down. Although you may choose to be somewhat awake, we will sedate you during surgery and you will be completely relaxed and will not remember anything about the operation. This is safer than a general anesthetic and your recovery is more rapid. General anesthetics are used in rare cases.

Primary total knee replacement requires approximately one hour of surgery time. We will be using robotic assistance for your procedure (Zimmer Biomet ROSA robot). Robotics assistance means that the robot will help Dr Moore to better evaluate your anatomy and deformity, which in turn helps Dr Moore to better formulate a surgical plan tailored to your specific anatomy. Dr Moore is your surgeon and Dr Moore does your total knee replacement while ROSA provides Dr Moore with 4D anatomical information using a haptic arm and cutting-edge technology.

While you are in the operating room, your family will wait in the surgical waiting area or at home. As soon as the 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 effect is worn off. Our post anesthesia care unit has two phases of recovery. Your family member will be able to join you in phase II.

With the assistance of our physical therapist, you will begin your bed exercises, standing, and walking on the day of surgery.

You should strive to go home with either home physical therapy, outpatient physical therapy or self-physical therapy. Whichever type of therapy is chosen best for you-arrangements are started at the time of your pre-operative appointment with Michelle or Steve, and plans finalized while in the hospital prior to your discharge by our discharge planners.

Regardless of the mode of therapy chosen, after surgery physical therapy usually ends after two-three weeks at which time you would continue the exercises you learned independently.

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 will be putting full weight on your operative leg after surgery.

While you are walking in the surgery center, you will be using a walker, but you can advance to the use of crutches or cane 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 surgery center, the physical therapist 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.

To prevent blood clot formation, you will be placed on a blood thinner and compression foot pumps will be used during your time at the surgery center. We will also have you continue a blood thinner at home for a period of time, usually 6 weeks.

By one to two days after surgery, 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 for one to five days. You will be able to take a shower at home with the airstrip in place.

When you are discharged from the surgery center, we will be sending prescriptions for pain medications and anti-nausea medication to your pharmacy of choice. 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. Ice and elevation are also imperative to managing your pain.

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 cane or walker for the entire first four 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: one week, six weeks, six months and one year. After the first year, you are seen on a biennial basis (every two years). 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 colonoscopies, urologic, and dental procedures.

COMMUNICATION WITH OUR OFFICE

I think it critically important to have excellent communication with each other, especially after surgery. My staff and I try to make every effort to be available for issues that may occur and to answer questions that need attention. We have been using a communication tool called GetWell Loop (App and/or Email communication) that is specifically related to your knee replacement surgery. I find GetWell Loop to be a very important link between my patients, my physician's assistant, and our administrative assistants. Use of Getwell loop allows my patients to communicate with myself and my team 24 hours per day/7 days per week without needing to

speak with one of our on-call medical providers who may not have ever met you.

I strongly encourage you or any family member who is interested in helping in your care to sign up for Get Well loop at any point in your journey toward total knee replacement surgery. Get Well loop delivers real time communication to you daily once you're signed up and allows multi-directional communication that is delivered to our cell phones and email on an ongoing basis beginning the day you are signed up through 4 weeks after your knee replacement surgery is completed.

PROBLEMS OR QUESTIONS

If you have any concerns or questions about the scheduling or preoperative sequence of events, you should contact our surgery scheduler at 910-295-0224. My surgery scheduler can answer questions about surgical scheduling, 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 advanced practice professionals. If we are not in the office at the time of your call, they will make certain that one of our providers will receive the message as soon as possible. Either myself, Michelle or Steve 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 the 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 or Steve. You may also contact Michelle or Steve via email at mmoore@pinehurstsurgical.com and sbalos@pinehurstsurgical.com.

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SUGGESTED ADDITIONAL INTERNET RESOURCES

- www.aahks.org
- https://www.nlm.nih.gov/medlineplus/
- www.aaos.org
- www.zimmerbiomet.com