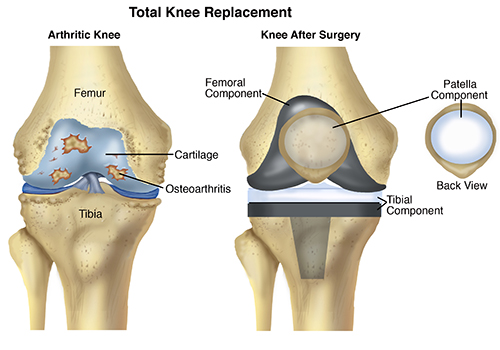
**Total Knee Replacement**

**Patient Handout**

**TOTAL KNEE REPLACEMENT OVERVIEW**

It has been estimated that knee osteoarthritis affects 37.4% of adults > 60 years of age. Osteoarthritis (OA) is described as a “wear and tear” arthritis, usually occurring in adults > 50 years old, although it can occur in younger populations as well. It results in the damage, softening, and thinning of the cartilage that covers the bones of the knee. Eventually these bones rub together, causing pain and inflammation (1). There is no radiological consensus indicating the need for a total knee arthroplasty (TKA) but the general agreement is that it is indicated when a patient can no longer tolerate the pain of OA.

A total knee replacement consists of replacing specific parts of the knee with artificial parts. A femoral component covers the end of the femur or thigh bone, a tibial component cover the top of the tibia or shin bone and the patellar component covers the underside of the patella or knee cap.



**MOST COMMON POST OP COMPLICATIONS**

**DVT (Deep vein thrombosis)** – occurs at a rate of 41% and greatest risk is 1 week after surgery; signs and symptoms include pain in leg or calf unrelated to incision, tenderness or redness above or below knee and increasing swelling in calf, ankle, or foot but often is asymptomatic. Prevention includes pharmacological agents, mechanical compression device and support stockings. Screening can be done by your physical therapist utilizing the Wells Score System.

In very rare cases, a blood clot may travel to your lungs and become life threatening. Signs of this include shortness of breath, sudden onset of chest pain and localized chest pain with coughing. Your doctor should be notified if any of the above develop (2).

**Infection** – occurs at a rate of 1.5%; signs and symptoms include low grade fever, night sweats, high skin temperature of the knee, redness or drainage from the incision, hardening of the incision, swelling, severe pain, malaise or delayed healing (2).

**Arthrofibrosis or “stiff knee”** – incident estimated between 1% and 15% - prevention includes prioritizing ROM gains early in rehab (2).Slight post-operative stiffness is to be expected after surgery which may persist for months to years and is usually more apparent after exercise or increased activity. Arthrofibrosis is different in that it presents as a disproportionate amount of pain and stiffness that worsens as opposed to improves as time progresses, persistent swelling different from typical fluid build-up and persistent “hotness” around the knee > 2-3 weeks.

1. [www.cdc.gov](http://www.cdc.gov)
2. www.apta.org

PRE-OPERATIVE HOME EXERCISES/INFORMATION

**Ankle Pumps:** Lie on your back or elbows with your operated leg elevated on pillows and pump your ankle (i.e. point your toes then pull toes up).

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_

**Heel Slides:** Lie on your back or propped up on your elbows and begin with your knee straight. Slide your heel towards your buttock until a stretch is felt in your knee. Hold 10 seconds and return to starting position.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Quad Sets:** Tighten the front thigh muscles (quadriceps) by pressing your knee into the table keeping your knee as straight as possible. Concentrate on contracting your inner quad muscle (VMO). Hold as tight as possible for 5 seconds, and then completely relax the muscle.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Supine Hip Abduction/Adduction:** Lying on your back, begin with your legs together. Tighten the muscle on top of your thigh and slide your operated leg away from the other.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_

**Straight Leg Raises:** Lie on your back or propped up on your elbows. Bend your non-operated leg. Tighten the quadriceps muscle (top of thigh) and lift your operated leg 12 inches from the table keeping your knee as straight as possible.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Calf Raises:** Stand with weight equally distributed on both feet. Push through toes to lift heels off floor and then slowly lower to the resting position.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Chair Push-ups:**  Begin seated in a chair

with your hands on the armrests. Push down through your hands/arms to get your hips to come up off the chair.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_

Prepare your home prior to surgery – rearrange furniture so that you can maneuver with walker, crutches or cane. Consider temporarily changing rooms to avoid using stairs such as making the living room your bedroom. Remove any throw rugs or electrical cords from walking areas. Get a good chair that is firm and higher-than-average seat height with a footstool for leg elevation. Install a shower chair, gripping bar and raised toilet seat in bathroom. Utilize assistive devices such as a long-handled shoehorn, long-handled sponge and grabbing tool.

**TIMELINE OF APPOINTMENTS**

One pre-operative physical therapy appointment should be made prior to surgery to review your home exercise program, review gait training with an assistive device, and to discuss your timeline moving forward. If you are having surgery in the surgery center, a physical therapist will see you

1st post-op MD visit with PA at 2 weeks

2nd post-op MD visit at 6 weeks

3rd post-op MD visit at 12 weeks

4th post-op MD visit at 6 months

5th post-op MD visit at 1 year

Yearly visits with MD will continue

**SECTION 4**

**POST-OPERATIVE TOTAL KNEE REPLACEMENT INFORMATION**

**Activity Guidelines**

* Change your position at least every hour while you are awake. This helps prevent your knee from getting stiff and promotes blood circulation in your legs, which can help prevent blood clots.
* You will be sent home with a cryocuff icing system – this is to be utilized at a minimum of 3-4 times/day for 15-20 minutes to control swelling and reduce pain. During icing sessions, you should also elevate your entire leg so that it is higher than your heart. Elevation should be done with 2-3 pillows under your ankle; no pillows should be placed under your knee to allow for improved extension.
* Use cold therapy after every session of exercises for 15-20 minutes to decrease swelling in your knee and for pain relief.
* You can “Weight Bear as Tolerated” (WBAT) on your operated leg following surgery unless otherwise instructed by your physician or physical therapist.
* Use your walker or crutches for walking until discontinued by your doctor or physical therapist. Practice walking with a “heel to toe” gait pattern, trying to bend your knee as you normally would when you walk.
* You will receive proper gait training by a physical therapist and the goal is to advance to a cane by 2-3 weeks.
* You are clear to shower 1 week after surgery.
* You are clear to fly 6 weeks after surgery.
* TED stockings should be worn on both legs for approximately 14 days as determined by your physician. These can help decrease swelling, which makes knee motion easier.
* Massage your scar/incision 2 times per day once your staples are removed and your incision is well healed.
* You can safely sleep on your back, either side or your stomach.
* You will usually be cleared to drive in 4-6 weeks as determined by your Physician, provided they are off narcotics and can safely operate a vehicle.
* The goal for range of motion of your operated knee is 0 to 90 degrees by two weeks after surgery and 120 degrees by the 3 month visit.
* “Clicking” sensations in your operated knee are normal.
* Kneeling on your operated knee is acceptable when it is not too uncomfortable for you and when this activity can be tolerated.
* You will be instructed in a home exercise program by your physical therapist. It should be performed at least 3 times per day.
* Upstairs – the non-operated leg goes first, then the operated leg, followed by the crutches or cane. Downstairs – the crutches or cane go first, followed by the operated leg, followed by the non-operated leg.
* Return to work varies based on job requirements but, generally, you can return to more sedentary work by 3 weeks and higher level work by 2 months.
* Return to high impact physical activity is not recommended. This includes jogging, basketball, football, soccer, volleyball and downhill skiing
* It is generally safe to return to lower impact physical activities. Some examples of these include bowling, stationary cycling, ballroom dancing, golf, shuffleboard, swimming, normal and speed walking, road cycling, hiking. The timeline for returning to leisure or sports activities varies from person-to-person, your physical therapist will be able to estimate your unique timeline based on your specific condition.

**SECTION 5**

**TOTAL KNEE REPLACEMENT PROTOCOL**

**You will have a pre-operative visit with a Physical Therapist to:**

1. Introduce you to the rehabilitation department who will help guide you through your post-operative rehabilitation.
2. Instruct you on specific pre-operative and post-operative home exercises.
3. Familiarize you with the Total Knee Arthroplasty rehabilitation protocol and specific goals.
4. Gait training--learning how to walk using an assistive device and to negotiate stairs properly.
5. Educate you on home modification and assistive device recommendations

**General Post-operative Considerations:**

* Please keep in mind that the time frames listed below are approximate and may not be met by all patients as specified due to differences in healing, patient tolerance, and differences in the surgical procedure. Actual progression will be based upon clinical presentation.
* Use your assistive device, i.e. walker, crutches, or single point cane (SPC) until discontinued by your Physician or Physical Therapist. Patients are **WBAT** (weight bearing as tolerated) on the operated limb unless otherwise specified.
* Change your knee position at least once per hour when awake to avoid stiffness and help prevent blood clots.
* Perform your home exercise program at least 3 times daily.
* The elastic/compression stockings will be worn for approximately 2 weeks post-operatively in order to help reduce knee swelling and promote circulation.
* Use your icing system a minimum of 3-4 times/day for 15-20 minutes to reduce swelling and control pain.
* You will be released to drive by your physician when appropriate, usually by 4-6 weeks post-operatively.
* Stairs/Curbs:



**UP**

**DOWN**

**Upstairs** – the non-operated leg goes first, then the operated leg, followed lastly by the crutches or cane.

**Downstairs** – the crutches or cane go first, followed by the operated leg, followed lastly by the non-operated leg.

**Post-operative rehabilitation:**

**0-2 weeks:**

Goals:

1. Safe ambulation with walker, crutches, or cane (level surfaces and stairs). May begin weaning as able with goal of SPC by 2 weeks.
2. Range of motion 0-90 degrees.
3. Pain management and edema control through exercise, modalities, and manual therapy.
4. Normal quad activation

* PROM/AAROM/AROM exercises (i.e. supine heel slides, seated knee flexion, PT assisted knee flex, heel propped knee extension - weighted as tolerated).
* Early emphasis for full knee extension equal to the opposite side with active VMO recruitment. Patient education on post-op surgical positioning (no pillows under knee, heel prop)
* Isometrics—Quad Sets, Gluteal sets, abdominal isometrics.
* NMES for quad activation
* Isotonics—Ankle pumps, Short arc quads, Straight leg raises (standing and on plinth), Calf raises and Supine hip abd/add.
* Gait training for instruction in proper mechanics, progression of weight bearing as tolerated, and to minimize compensation.
* Manual therapy and soft tissue treatments to the quads, surgical incision, posterior musculature, and patellofemoral joint to improve ROM and decrease fibrosis.
* TENS use for pain control as needed
* Monitor for signs of DVT/PE – utilize Wells Score system if signs present.

Progression Criteria:

1. Normal gait pattern with assistive device on level surfaces.
2. No extension lag.
3. Active knee range of motion 0-90 degrees
4. Double leg squat to 45o knee flexion.

**2-6 weeks:**

Goals:

1. Continue to progress ambulation with walker, crutches, or cane with goal of walking with no assistive device by 6 weeks.
2. Active knee ROM 0-100 degrees.
3. Progression of exercise program, CKC (closed kinetic chain) and functional exercises, balance/proprioceptive activities
4. Tolerate bilateral stationary cycling for knee ROM and aerobic conditioning.

* Continue with home program.
* AAROM/AROM exercises (i.e. heel slides with overpressure, wall slides, sit to stand training for knee flexion).
* Straight leg raises (4 planes—flexion, abduction, adduction, extension) – standing (B) and on plinth – and long arc quads
* Standing exercises: Terminal Knee Extensions, hamstring curls, mini-squats, step ups, wall squats to 45 degrees and calf raises.
* Core stabilization exercises (bridging, clamshells)
* Stationary bicycle—Begin with forward and backward to tolerance to improve knee flexion ROM.
* Single leg balance/proprioceptive exercises & activities.
* Wean from single point cane if patient demonstrates proper gait pattern with minimal to no compensation.
* Continue with manual therapy to the patella, soft tissues, and incision to improve ROM, prevent fibrosis, and decrease pain/edema.
* Can begin aquatics once incision is healed (4-6 weeks)

Progression Criteria:

1. Regain muscular strength, focusing on quadriceps and glut med.
2. Active ROM 0-100 degrees
3. Progress to no assistive device by 6th week with minimal to no compensation.
4. Double leg sit to stand with no upper extremity compensation.

**6-12 weeks:**

Goals:

1. Ambulation without assistive device with a normal gait pattern.
2. Active Range of motion 0-120 degrees.
3. Increase intensity of exercise program (i.e. add resistance, use of ankle weights, increase height of step exercises).
4. Ascend/descend stairs with reciprocal pattern.
5. Independent with all ADL’s

* Continue with ROM focus until patient can actively flex knee to 120 degrees.
* Continue patellofemoral joint mobilizations as indicated.
* Progression of single leg balance activities, use of foam pad, balance challenges, etc.
* Lateral training exercises: lateral steps, lateral step-ups, step overs, progressing in height
* Incorporate single leg exercises: single leg RDLs, single leg squats, step-ups, step-downs, swiss ball hamstring curls, etc.
* Neuromuscular re-education to minimize substitution patterns.
* Continue stationary bicycle with goal of achieving complete revolutions (backward/forward) without compensation
* Work specific training for those with higher level work activities with goal of return to work by 2 months.

Progression Criteria:

1. Active ROM 0-120 degrees
2. Normal gait without assistive device
3. Elimination of substitution patterns/balance safety with basic functional activities

**12 + weeks:**

Goals:

1. Independent with all ADL’s (activities of daily living).
2. Independent with advanced home exercise plan.
3. Return to appropriate recreational sports/activities.

* ROM exercises if patient cannot actively flex involved knee to 120 degrees.
* Continue with CKC exercises: Step-ups, step-downs, lateral step-ups, wall sits, squats & lunges as able and within comfort ranges.
* Single leg strengthening exercise progression
* Functional exercises: retro walking, side🡨🡪side shuffles, chair squats, dynamic single leg balance activities.
* Stationary bicycle: complete forward revolutions with minimal to no compensation. May add resistance when appropriate (i.e. complete forward revolutions without compensation).

Criteria for return to non-impact sport/work activities:

1. Normal gait on all surfaces, including distances > 1 mile.
2. Dynamic neuromuscular control without an increase in pain or swelling.
3. Return to impact sports such as tennis will be discussed with your surgeon and physical therapist.

**SECTION 6**

TOTAL KNEE REPLACEMENT HOME EXERCISE PROGRAM

Weeks 0 – 2 post-op



**Heel Props:** Lie on your back or elbows and prop your ankle on a pillow or towel roll. Be sure the entire leg is off the floor, especially the back of the knee. Relax the entire leg and hip and allow gravity to pull the knee straight.

Hold\_\_\_\_\_\_\_\_ Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_\_

**Heel Slides:** Lie on your back or propped on your elbows and begin with your knee straight. Slide your heel towards your buttock until a stretch is felt in your knee. Hold 10 seconds and return to starting position.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_

**Ankle Pumps:** Lie on your back or elbows with your operated leg elevated on pillows and pump your ankle (i.e. point your toes then pull toes up).

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_

**Quad Sets:** Tighten the front thigh muscles (quadriceps) by pressing your knee into the table keeping the knee as straight as possible. Concentrate on contracting the inner quad muscle (VMO). Hold as tight as possible for 5 seconds, and then completely relax the muscle.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Supine Hip Abduction/Adduction:** Lying on your back, begin with your legs together. Tighten the muscle on top of your thigh and slide your operated leg away from the other.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_\_

**Short Arc Quad:** Begin by lying on your back with a pillow or bolster placed under your operated leg. Straighten your knee by tightening your thigh muscle.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_

**Straight Leg Raises:** Lie on your back or propped up on your elbows. Bend your non-operated leg. Tighten the quadriceps muscle (top of thigh) and lift your operated leg 12 inches from the table keeping your knee as straight as possible.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Seated Heel Slides:** Sitting in a chair, begin with your operated knee straight and then slide your foot back towards the chair until a stretch is felt in your knee. Hold 10 seconds.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Calf Raises:** Stand with weight equally distributed on both feet. Push through toes to lift heels off floor and then slowly lower to the resting position.

Repetitions\_\_\_\_\_\_\_\_ Sets\_\_\_\_\_\_\_\_



**Scar massage:** Once your staples have been removed and your incision is healed, massage your scar 2 times per day for 3-5 minutes each time. Massage along the length of the scar as demonstrated in the 1st picture on the far left. Also massage across your scar with your fingers crossed as demonstrated in the 2nd picture.