

Total Knee Replacement

A **total knee replacement (TKR)**, also known as **knee arthroplasty**, is a surgical procedure in which a damaged or worn-out knee joint is replaced with an artificial joint (prosthesis). This surgery is typically recommended for individuals with severe knee pain or disability due to conditions like osteoarthritis, rheumatoid arthritis, or knee injuries that cannot be managed with nonsurgical treatments.

Typical Surgery Process:

1. Preparation:

- **Anesthesia:** You will either receive **general anesthesia** (where you are fully asleep with a breathing tube) or **spinal/epidural anesthesia** (where only your lower body is numbed and you are given sedation). The choice depends on your health, surgeon's preference, and your condition.
- **Sterilization:** The surgeon will clean and sterilize the knee area to reduce the risk of infection.
- **Positioning:** You will be positioned on the operating table in a way that gives the surgeon good access to the knee. The leg is typically placed straight, and your affected knee will be exposed for surgery. A **tourniquet** may be used on your thigh. This can cause discomfort in the thigh after surgery.

2. Incision and Removal of Damaged Tissue:

- The surgeon will make an incision on the front of your knee, usually around 6-10 inches long.
- The damaged cartilage and bone are removed from the knee joint. The femur (thigh bone), tibia (shin bone), and the patella (kneecap) may be reshaped to accommodate the artificial joint.
- **Femoral component:** The end of the femur is reshaped to fit the metal femoral component.
- **Tibial component:** The top surface of the tibia is cut and replaced with a metal platform and plastic spacer.
- **Patellar component:** If necessary, the kneecap is resurfaced with a plastic piece.

3. Implantation of Prosthesis:

- The artificial knee components (usually made of metal, plastic, or a combination) are then inserted into the joint. These components are designed to mimic the natural motion of the knee.
- The surgeon will test the knee's range of motion and stability to ensure the components fit properly and move smoothly.

4. Closing the Incision:

- Once the prosthesis is in place, the incision is closed with stitches or staples, and a sterile dressing is applied.
 - A waterproof dressing is applied. You may shower right away and leave the dressing in place.

5. Post-Surgery:

- After surgery, you will be taken to a recovery room where your vital signs are monitored as you wake up from anesthesia.

Recovery Course:

Immediate Post-Op (Day 1-3):

1. **Pain Management:**

- You will experience pain and swelling after surgery, but this is managed with pain medications prescribed by your surgeon.
- A **nerve block** may also be administered to help manage pain immediately after surgery.

2. **Mobilization:**

- You will be encouraged to start moving your knee as soon as possible. Most patients begin gentle range-of-motion exercises on the same day or the day after surgery.
- **Physical therapy (PT)** will begin immediately after surgery to help improve knee movement and strengthen muscles.

3. **Hospital Stay:**

- A lot of patients are able to go home the same day as the surgery. If a hospital stay is needed, the hospital stay lasts about **1 to 2 days**. During this time, you'll be monitored for any complications and begin your recovery process.

4. **Swelling and Bruising:**

- Swelling and bruising around the knee are common, and you may be instructed to elevate the leg and apply ice to reduce this.

Short-Term Recovery (Week 1-6):

1. **Physical Therapy:**

- **Physical therapy** will be important throughout the recovery process. Therapy will focus on regaining the knee's range of motion, strength, and function.
- Initially, exercises will focus on gently bending and straightening the knee, and gradually increasing the strength of the quadriceps and hamstring muscles.
- **Use of walking aids** (crutches or a walker) is common during this phase, and you will slowly begin putting weight on the knee as tolerated.

2. **Swelling Control:**

- Continue using ice, elevating your leg, and possibly using compression stockings to reduce swelling.

3. **Pain and Medication:**

- Pain should gradually decrease as healing progresses. You will be weaned off stronger pain medications and may only need over-the-counter pain relievers.

4. **Wound Care:**

- Your surgeon will advise when you can remove the dressing or change it.

Mid-Term Recovery (6 weeks - 3 months):

1. **Increased Activity:**

- By **6-8 weeks**, you should be able to walk without crutches or a walker, though you may still need a cane for support.
- The knee's strength will continue to improve as you progress with physical therapy.

2. Return to Daily Activities:

- By **3 months**, you may be able to return to light daily activities such as walking longer distances, driving (if you are no longer taking narcotic pain medication), and performing simple household tasks.
- High-impact activities such as running or jumping should still be avoided at this stage.

*Long-Term Recovery (3-12 months):***1. Return to Normal Function:**

- Full recovery from a total knee replacement can take up to **12 months**, but many people experience significant improvement within the first 6 months.
- You may be able to resume low-impact activities, such as walking, swimming, or cycling, with your surgeon's approval.

2. Ongoing Physical Therapy:

- Continued physical therapy will focus on strengthening the muscles around the knee, improving balance and stability, and enhancing mobility.
- Exercises to improve flexibility, strength, and endurance will be emphasized to maximize the knee's function.

3. Pain and Swelling:

- Most patients experience a reduction in pain after the first few months, with continuing improvements in swelling and stiffness.

Possible Complications:

- **Infection:** Though rare, infections can occur and may require treatment with antibiotics or, in some cases, additional surgery.
- **Blood clots:** Post-surgical blood clots (deep vein thrombosis, DVT) are a concern after any major surgery. You will be monitored for signs of clots, and measures like blood thinners, early mobilization, and leg exercises are used to reduce this risk.
- **Knee stiffness:** Some people experience stiffness or limited range of motion even after surgery. Physical therapy is crucial to prevent this.
- **Implant Loosening or Wear:** Over time, the artificial joint can wear down, particularly if the knee is subjected to high-impact activities. In some cases, revision surgery may be needed in the future.

Conclusion:

A total knee replacement is an effective procedure for relieving pain and improving function in patients with knee arthritis or other severe knee joint conditions. The recovery course involves a combination of rest, physical therapy, pain management, and gradual return to normal activities. It can take several months for the knee to fully heal, but many patients experience significant improvements in mobility and quality of life. Close follow-up with your surgeon and adherence to post-surgical guidelines are key to a successful recovery.

**Exercise Program After Total Knee Replacement (TKR)**

A structured rehabilitation program is crucial for **regaining strength, flexibility, and mobility** after a **total knee replacement (TKR)**. Below is a **phase-based** exercise plan to help restore knee function safely.


Rehab Timeline & Goals


Phase	Timeframe	Primary Goals
Phase 1 (Early Recovery)	Weeks 1–2	Reduce pain/swelling, restore knee extension, begin mobility.
Phase 2 (Strength & ROM)	Weeks 3–6	Improve knee bending, build strength, walk without assistive devices.
Phase 3 (Advanced Strength)	Weeks 7–12	Increase endurance, balance, and return to daily activities.
Phase 4 (Full Activity)	3–6 Months	Restore full strength, return to low-impact sports & normal function.


Phase 1: Weeks 1–2 (Early Recovery & Mobility)


 **Goals:** Reduce swelling, prevent stiffness, activate muscles.


 **Restrictions:** No high-impact activities, deep squatting, or twisting movements.

 **Exercises (3–5x/day, 10 reps each):**

 **Ankle Pumps** – Move feet up & down to improve circulation.

 **Quadriceps Sets (Quad Squeeze)** – Tighten thigh muscle, hold for 5 seconds.

 **Straight Leg Raises** – Lift leg while keeping knee straight.


 **Heel Slides** – Bend knee as much as tolerated, then straighten.


 **Seated Knee Extension Stretch** – Place foot on a chair to keep the knee straight.


 **Walking:** Use a walker or cane **as needed** and walk short distances every hour.

Phase 2: Weeks 3–6 (Strength & Range of Motion)


 **Goals:** Improve knee bending (**90°–120° flexion**), strengthen leg muscles, improve walking.

 **Exercises (2–3x/day, 10–15 reps each):**

 **Mini Squats (Chair-Assisted)** – Slowly lower into a shallow squat.

 **Seated Knee Flexion Stretch** – Let knee bend naturally while sitting.

 **Step-Ups (Low Step)** – Step up slowly, one leg at a time.


 **Calf Raises** – Rise onto toes to strengthen lower legs.

 **Stationary Bike (No Resistance)** – Helps with knee mobility.


 **Walking Progression:**


- **Week 3-4:** Transition from walker to cane.
- **Week 5-6:** Walk longer distances without assistance (as tolerated).

Phase 3: Weeks 7–12 (Advanced Strength & Balance)


 **Goals:** Improve stability, endurance, and leg strength.

 **Exercises (3–4x/week, 15 reps each):**

 **Leg Press (Light Resistance)** – Strengthens quads & hamstrings.

 **Wall Slides** – Perform controlled squats against a wall.

 **Side Leg Raises** – Strengthens hip muscles.


 **Standing Hip Extensions** – Improves balance & knee control.

 **Balance Training (Single-Leg Stands)** – Improves stability.


 **Swimming or Elliptical** – Low-impact cardio for endurance.

 **Walking & Stairs:** Work towards **climbing stairs with alternating legs**.


Phase 4: 3–6 Months (Full Activity & Return to Low-Impact Sports)

 **Goals:** Restore full function, return to activities like **golf, cycling, swimming, light hiking**.


 **Exercises (3–5x/week, 15–20 reps each):**

 **Lunges (Assisted)** – Strengthens leg muscles.

 **Squats (Bodyweight or Light Resistance)** – Builds knee strength.

 **Resistance Band Work (Leg Press, Hamstring Curls, Hip Abduction).**

 **Treadmill Walking or Outdoor Walking** – Improve endurance.

 **Stationary Cycling (Increased Resistance).**

 **Avoid:** High-impact activities like running, deep squats, and jumping.

Long-Term Maintenance (6+ Months)

- Continue **low-impact exercises** (cycling, swimming, light hiking).
- Strengthen muscles around the knee to **prevent stiffness & instability**.
- Avoid **high-impact sports (basketball, running, skiing)** unless cleared by your surgeon.