The Standard Anterior Medial Parapatellar Approach to TKA

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Introduction

The standard surgical approach used in total knee arthroplasty (anterior medial parapatellar) was first described in 1945 by Abbott and Carpenter. It has since been modified to become the standard approach for total knee arthroplasty (TKA). Simple and extremely utilitarian, the standard approach offers excellent visualization, extensibility, and reproducibility. As is the origin of many surgical exposures in orthopedics, the anterior medial parapatellar approach was first utilized in treating infection, namely septic arthritis. The advent and success of TKA, however, brought its effectiveness to the forefront of adult reconstructive knee surgery.

The manner in which the approach is prepared for and carried out at our institution reflects our goals of patient safety, surgical precision and speed; maximizing surgical exposure while minimizing surgical time.

Positioning and Preparation

The patient is placed supine on the operating room table. If a Foley catheter is used (as is done at our institution after induction of spinal/epidural anesthesia), care is taken to route the catheter posterior to the non-operative leg in order to reduce the risk of catheter kinking and obstruction during surgery. A non-sterile tourniquet is placed as proximally as possible on the thigh to maximize area for surgical exposure if needed. The tourniquet is set at between 250 and 350 mmHg as is necessary given the patient’s mean blood pressure and body habitus. A non-sterile clear plastic drape is placed just distal to the cuff to prevent betadine prep from saturating and soiling the tourniquet. The foot is wrapped in a non-sterile clear drape to define the surgical field and area to be prepped.

A foot-stop bump is attached to the table maintaining approximately 90–100° of knee flexion when the foot is resting on it. After standard prep and draping has been performed, landmarks are outlined on the skin. The superior, inferior, medial and lateral borders of the patella are marked, as well as the tibial tubercle. With the knee flexed to 90°, a 13–17 cm line is marked for incision centered over the femoral shaft, patella, and medial aspect of the tibial tubercle (Fig. 8.1). A betadine impregnated
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plastic drape is then placed over all exposed skin. The leg is exsanguinated with the use of an esmarche, and the tourniquet is inflated.

**Superficial Dissection**

The skin incision is carried out using a scalpel through skin and subcutaneous tissues down to the level of the patellar retinaculum (Fig. 8.2). Using bovie electrocautery and tissue forceps, meticulous hemostasis is maintained so as to prevent post-operative deep or superficial hematoma formation. The medial skin and subcutaneous tissues are dissected sharply away from the underlying fascia in order to expose the medial edge of the patella and its adjoining retinaculum. If the patient is obese, a lateral flap is created by subcutaneous dissection. This facilitates patellar eversion by creating a “pocket” under the skin where the patella can be stably placed.

**Deep Dissection**

A large Richardson-type retractor is placed proximally exposing the proximal edge of the quadriceps tendon (Fig. 8.3). Taking care to maintain a 3 mm medial cuff of tendon, the medial parapatellar arthrotomy is carried out from proximal to distal, beginning with the quadriceps tendon (Fig. 8.4). The arthrotomy is done with the entire depth of the scalpel blade, in line with the tendon fibers in order to prevent the creation of multiple tissue planes that would hamper good repair at closure. As the arthrotomy approaches the patella, it is curved sharply medially along its border, again taking care to maintain a 3 mm cuff of patellar retinaculum laterally for repair. The arthrotomy is continued distally along the medial edge of the patellar tendon and tibial tubercle (Fig. 8.5). The knee is then extended, and the patella gently everted 180°, exposing the anterior aspect of the knee-joint surface. The knee is then returned to 90° of flexion with the patella everted, taking care to protect the patellar tendon insertion into the tibial tubercle (Fig. 8.6). The surgeon resects the patellar fat pad using scalpel dissection, leaving a thin layer of adipose tissue on the undersurface of the tendon to minimize scarring and tendon contracture (Fig. 8.7).
Fig. 8.4a,b. The medial arthrotomy is carried out from proximal to distal taking care to maintain a 3 mm cuff of tendon for later repair.

Fig. 8.5. The arthrotomy is completed distally along the medial edge of the tibial tubercle.

Fig. 8.6. The knee is flexed, patella everted laterally, and the knee returned to 90 degrees of flexion taking care to protect the patellar tendon insertion into the tibial tubercle.
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Medial Release, Cruciate Resection and Knee Dislocation

In order to allow surgical dislocation of the knee without the risk of tearing the medial collateral ligament, a medial release is performed. Using a Cobb periosteal elevator and scalpel, sub-periosteal dissection is performed. A medial release is carried out at a 45° angle to the shaft of the tibia to the level of the meniscal rim. A Cobb elevator is then used to continue this dissection around the medial side of the tibial plateau, elevating and protecting the MCL (Fig. 8.8). The release is carried posteriorly back to the insertion of semimembranosus and distally about 1-1.5 cm (the approximate width of a large Cobb periosteal elevator). Minimal medial release is performed if the patient has a pre-operative valgus deformity. The anterior and posterior cruciate ligaments are then resected using a scalpel or...
bovie (assuming a posterior stabilized knee system is to be used as is the case for all TKAs at our institution) (Fig. 8.9). Using a large posterior reverse (Hohmann) retractor, the knee is gently dislocated anteriorly with applied external rotation to the tibia (Fig. 8.10). The menisci are resected (medial first, then lateral) using a large Leahy and scalpel (Fig. 8.11). The lateral patellofemoral ligament is incised with a scalpel or bovie (Fig. 8.12). The superior lateral geniculate artery is cauterized after it is exposed during resection of the lateral meniscus (Fig. 8.13). Any cruciate remnants are resected from the posterior tibia. Care is taken to completely expose the posterior tibia. Care is taken to completely expose the tibial plateau to help facilitate the tibial cut (Fig. 8.14).

Fig. 8.9a-c. The cruciate ligaments (ACL, then PCL) are resected using bovie electrocautery dissection

Fig. 8.10a,b. Using a large reverse (Hohmann) retractor and anterior translation with external rotation, the knee is dislocated
Fig. 8.11a–c. The menisci are resected at the menisco-synovial junction (medial meniscus, then lateral) using a scalpel.

Fig. 8.12a–c. The lateral patellofemoral ligament is incised taking care to protect the underlying UCL.
Part III. The Knee

Fig. 8.13a,b. The superior lateral geniculate artery is cauterized

Fig. 8.14. The entire tibial plateau is completely exposed prior to proceeding with the tibial bone cut

References