

Unicondylar Knee Arthroplasty

Intramedullary Technique

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KEYWORDS

- Unicondylar knee arthroplasty • Intramedullary technique • Intramedullary guide
- Partial knee replacement • Femur first technique • Unicompartmental arthritis
- Arthritis • Knee kinematics

KEY POINTS

- Use of an intramedullary femoral alignment guide for unicompartmental arthroplasty is a reliable, reproducible technique.
- Use of intramedullary alignment for partial knee replacements mimics the distal femoral preparation of total knee arthroplasty, familiar to many surgeons, improving the likelihood of successful outcomes.
- The distal femur cut provides increased working space for more accurate proximal tibial resection and also allows a flexion contracture or a non-passively correctable contracture of 15° or more to be treated successfully with a UKA in carefully selected patients.
- UKA with intramedullary instrumentation is amenable to minimally invasive surgical approaches.

INTRODUCTION

Unicondylar knee arthroplasty (UKA) has evolved substantially since its conceptual introduction by McKeever and MacIntosh in the late 1950s.^{1,2} Although early results with UKA were unpredictable, this procedure restores native knee kinematics and, according to some investigators, yields patient satisfaction superior to total knee arthroplasty (TKA).³⁻⁷ Advances in prosthetic design, bearing surface technology,⁸ and surgical instrumentation have rendered excellent results in recent literature. Long-term survivorship has been reported to be as high as 98% 10 years after surgery.⁹⁻¹³

There is a general consensus that implant positioning is key to long-term survival of unicondylar arthroplasties in addition to proper patient selection.¹⁴⁻¹⁶ In traditional extramedullary or spacer block techniques, the femoral cutting block is positioned

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freehand after the proximal tibial cut has been made. These methods have been associated with radiographic inaccuracies in prosthesis positioning in up to 30% of cases.¹⁷ With intramedullary (IM) femoral guide instrumentation, the femoral cut is made first. Cadaveric models have confirmed that the use of IM instrumentation yields superior radiographic results in coronal alignment of the femoral component, sagittal alignment of tibial component, and overall satisfaction with prosthesis positioning.¹⁸ We encourage use of the long IM rod for all procedures when possible. Insertion of the short IM rod in UKA per the manufacturer's guidelines may decrease the accuracy of the anatomic axis¹; however, newer techniques and instrumentation have the ability to restore knee kinematics matching that of the native knee when the short IM rod must be used.^{5,19} Furthermore, IM instrumentation for UKA mimics that of TKA, offering a more familiar operative experience for the orthopedic surgeon.²⁰

PREOPERATIVE EVALUATION AND MODERN SELECTION CRITERIA

Patient selection has been a topic of debate. Criteria described by Kozinn and Scott were rigorous leaving most potential surgical candidates no other option than TKA.^{21,22} Previous research has shown discrepancies in expected outcomes between patients and surgeons.²³ As a result, postoperative expectations must be discussed and managed preoperatively throughout the decision-making process to improve patient satisfaction.

Thoughts are evolving that there is no ideal candidate for UKA and an individualized approach must be taken by the surgeon. Recently expanded inclusion criteria have made this a viable option for the young, active patient seeking pain relief and return to activities without compromising the prosthesis or outcomes.^{24–26} A diagnosis of osteonecrosis or osteoarthritis (OA) (**Fig. 1**)²⁷ in the medial or lateral compartment of the knee is understood, but weight, age, and presence or absence of the anterior cruciate ligament (ACL) must all be critically assessed.

Patients must complain of isolated knee pain to a single side of the knee with the 1-finger test (eg, ask the patient to point with 1 finger to the area of pain) (**Fig. 2**). In the case of a dual-sided loss of joint space or magnetic resonance imaging (MRI) evidence of grade IV Outerbridge OA, pain or discomfort, if present, going up stairs must match the side of pain in order to be considered a candidate for UKA. Complaints of pain going downstairs with narrowing on the medial side with grade IV Outerbridge OA yields excellent medial-sided UKA results. Patients with controlled inflammatory arthropathies are also good candidates, in our experience.

A thorough physical examination should include a full radiographic examination (eg, weight-bearing anteroposterior, lateral, posteroanterior 45° Rosenberg, and patellar views, and long leg alignment films). Radiographic inspection includes noting antero-medial joint line changes on lateral plain film radiograph for a varus knee (Ahlback stage 3 or 4) (**Fig. 3**)²⁸ and anterolateral joint line changes for a valgus knee (**Fig. 4**). Radiographic evidence of mild degenerative changes in the contralateral compartment can be present and still result in a successful UKA if the MRI does not reveal grade IV Outerbridge changes. Patellofemoral joint disease should be ignored regardless of Outerbridge classification if it is addressed with a patelloplasty intraoperatively.^{29,30} Tibial pseudosubluxation should be a red flag to avoid failure.

Preoperative images allow visualization and measurement of angular deformities to determine the appropriate surgical plan and may even prove TKA to be the treatment of choice in some cases. Preoperative films are also used to template the prosthesis and to determine the mechanical axis for UKA to avoid overcorrecting alignment and risking failure.

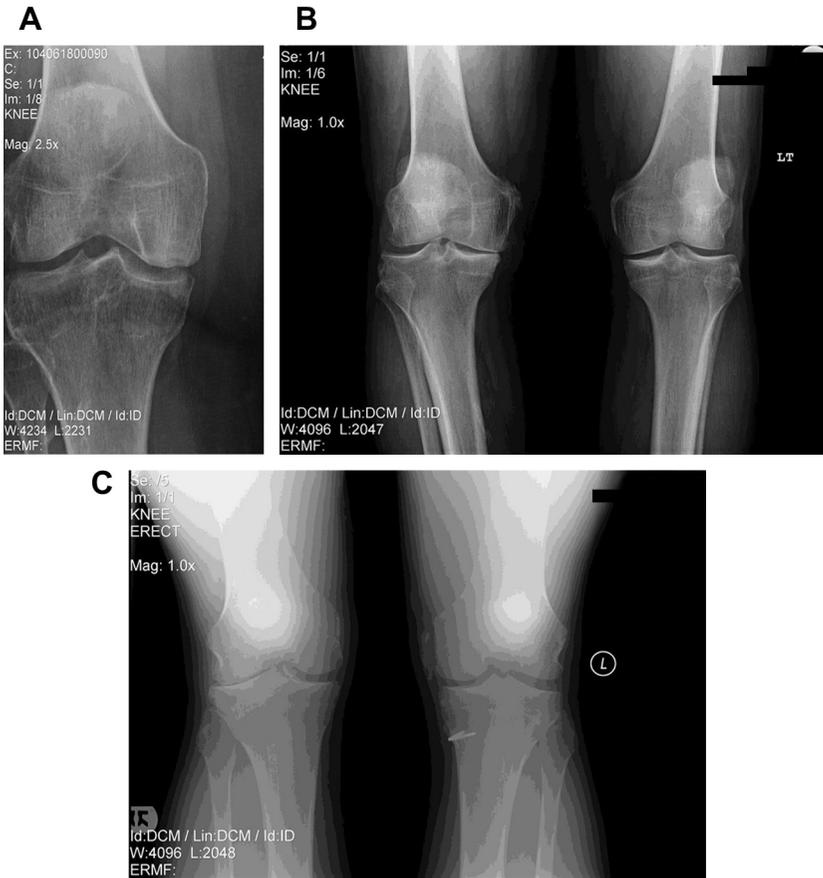


Fig. 1. (A) Osteonecrosis of the medial compartment. Preoperative posteroanterior notch view of avascular necrosis of the medial femoral condyle. (B) Medial compartment osteoarthritis. Preoperative anteroposterior view of medial compartment osteoarthritis. (C) Lateral compartment osteoarthritis. Preoperative posteroanterior view of lateral compartment osteoarthritis in a 58-year-old man.

A flexible, passively correctable, varus or valgus deformity of up to 15° on physical examination or stress view radiographs is acceptable, in our hands. In addition, a flexion contracture of up to 15° can be overcome in the operating room with an appropriate cut of the distal femur and tibia. A flexion range of motion (ROM) of 90° can even yield an outcome of 130° or more in many patients, with return to sport in rare circumstances.

SURGICAL TECHNIQUE

Operative setup, skin preparation, and draping for UKA using an IM technique are similar to TKA. We require all patients to wash their whole body with Hibiclens or Phisohex 1 week before surgery. The Zimmer Unicompartmental High-Flex Knee System (ZUK; Zimmer, Warsaw, IN) has yielded excellent results in the Australian registry, outperforming its predecessor, the M/G (M/G; Zimmer, Warsaw, IN) at 1, 3, and 5 years in terms of revision rates.³¹ Many other accomplished surgeons have reported excellent midterm and some long-term results with this prosthesis.



Fig. 2. The 1-finger test. On physical examination, the patient identifies the area of pain with 1 finger.



Fig. 3. Lateral plain radiographs of a varus knee requiring medial unicompartmental knee arthroplasty.



Fig. 4. Lateral plain radiographs of a valgus knee showing anterolateral joint line changes.

SURGICAL APPROACH

Minimally invasive surgical techniques are really a misnomer but have gained popularity with the general public. The size of implants restricts the ability to place the prosthesis with arthroscopic assistance. With the knee flexed to 45° , the skin incision, 9 cm long, should be made approximately 1.5 to 2 cm (approximately 1 fingerbreadth) medial to the superior pole of the patella, extending to the tibial crest (Fig. 5), for a medial UKA. For a lateral UKA, the incision is biased laterally, 8 to 10 cm over the lateral compartment. The patient's size should dictate the length of the incision to

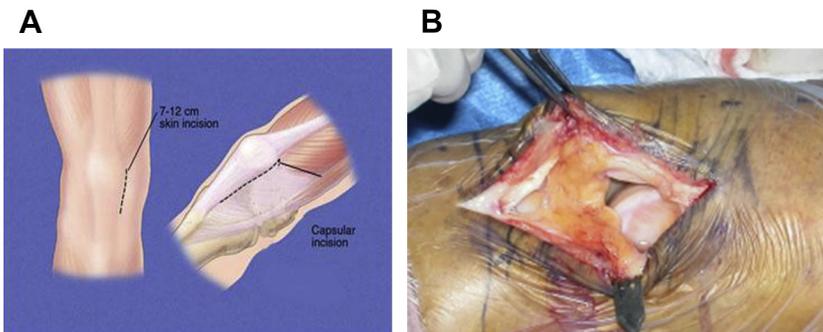


Fig. 5. (A, B) Laterally based skin incision approximately 9 cm, being cautious of thin tissue.

ensure accurate alignment of the prosthesis. The skin incision can be lengthened as needed for visualization if the superior aspect has a U shape, implying undue tension to the wound. The tension is relaxed at the superior or inferior apex of the incision to ensure good blood flow to the skin. Electrocautery should also be used as needed for hemostasis throughout the procedure. Hooded helmets with laminar flow can be helpful to ensure that the whole surgical team can attempt to limit any infections as well as protecting from blood being splashed inadvertently on the members of the surgical team. Dissection should occur in a single plane from the skin through subcutaneous fat and deep to Scarpa's fascia before creating a medial tissue flap. This step preserves blood supply to surrounding soft tissues and decreases the risk of postoperative wound complications.³²

Surgical approach does not seem to alter outcomes and should be dictated by surgeon preference.^{33,34} A quad-sparing parapatellar approach, a subvastus approach, or a midvastus approach can all be used for arthrotomy in a medial UKA, and a lateral parapatellar arthrotomy is used to enter the joint for a lateral UKA. We have found that by not violating the quadriceps tendon, our patients are out of bed the same day, with comfortable flexion in a continuous passive motion (CPM) device to 60°.

For a quad-sparing, midvastus approach, the arthrotomy should begin at the superior pole of the patella, dissecting in a single, full-thickness plane, and should extend proximally through the vastus medialis obliquus (VMO) or vastus lateralis obliquus (VLO) and repaired at the end of the case with an absorbable suture. We have not had any postoperative complications with denervation of the VMO or VLO and have therefore found no need for the subvastus approach.³⁵ Distally, the incision moves along the medial border of the patellar tendon, leaving a cuff of tissue, and over the tibial plateau, bisecting the medial or lateral meniscus in half, with the knee flexed to 45°. The knee is placed in extension when releasing the tibial tissue. From the capsular incision over the tibial plateau, the medial distal capsule is elevated subperiosteally in a single flap off of the medial aspect of the tibial plateau with a knife or key elevator in a full-thickness fashion to avoid stripping the medial collateral ligament (MCL) completely off of the bone. The distal capsular attachment to the tibial metaphysis should be maintained. Staying on bone, the dissection should be carried medially to the fibers of the deep MCL with a small Cobb or key elevator, as stated earlier. The fibers of the deep MCL are elevated off the proximal tibia, taking care to maintain the distal attachment. This procedure facilitates a Z retractor placed deep to the MCL to protect the superficial MCL and all vital structures during the operation.

When exposing the lateral side of the knee with a lateral midvastus incision, it is important to note this tissue is thin, unlike the medial side of the knee. The incision as described earlier is through the VLO, moving distally through the midsection bisecting the lateral meniscus and continuing to Gerdy's tubercle. We have found that it is important to release the IT band off of Gerdy's tubercle to help balance the knee when placing a lateral UKA. The same precautions for the neurovascular structures are carried out whether on the lateral or medial side of the knee. Unlike the medial side of the knee, where flexion and external rotation help the surgeon for visualization, the figure-of-four position is helpful for the surgeon when needing extra visualization for a lateral UKA.

FAT PAD AND OSTEOPHYTE EXCISION

When beginning the operation, the synovial fluid should be examined to ensure that it is yellow and clear, with no signs of infection. The knee should be thoroughly inspected using a systematic approach. Hoffa's fat pad is a potential source of

postoperative anterior knee pain, and therefore, a generous fat pad excision is recommended in the figure-of-four position for a medial UKA to decrease the risk of fat pad impingement postoperatively.^{36,37} Successful excision of Hoffa's fat pad allows for improved visualization of the patellofemoral and lateral joints. Care should always be taken not to violate the patellar tendon.

Osteophyte removal from the patella is routinely performed during patellar resurfacing, similar to TKA.³⁸ Osteophytes are circumferentially (360°) removed with a small hand rongeur. A small rongeur and nasal rasp are then used to ensure a smooth edge. No osteophytes are removed from the femur or the tibia unless full extension is blocked or a cutting jig does not sit flush on the patient's anatomy. Removal of osteophytes from the intercondylar notch is critical to avoid ACL impingement; however, this step is not completed until the end of the procedure, along with any overhanging osteophytes on the tibia or femur, to avoid a stress riser to either bone.³⁹

BONE CUTS

Bone cuts are initiated with the distal femoral cut first, followed by the proximal tibial cut, and then, the femoral posterior and chamfer cuts, with a gap-balancing technique, similar to TKA.⁴⁰ The advantages of this approach include (1) better access to the deepest portion of the tibial plateau, which is often more posterior than the tibial stylus can reach with the distal femur intact, (2) easier removal of the tibial cut bone fragment,⁴¹ and (3) the creation of a pilot hole, in which a self-retaining patellar retractor may be placed to improve visualization.

Distal Femoral Cut Using an IM Guide

When making the distal femoral cut with the IM guide, the knee is flexed to approximately 30° and held at the ankle (**Fig. 6**). The patella is laterally translated to expose the intercondylar notch, trochlear groove, and femoral insertion of the posterior cruciate ligament (PCL). A pilot hole is drilled approximately 1 cm superior to the femoral insertion of the PCL, 1 cm medial or lateral to the apex of the intercondylar notch, and in line with the central axis of the femoral shaft.⁴² If overgrowth has occurred, a rongeur is used for a better starting position. We always err with a starting hole on the side that has the disease. To avoid slipping off from the appropriate starting position, the catheter tip of the pilot drill is axially loaded through the articular cartilage until it is engaged in the subchondral bone before the drill is started. Suction is then placed



Fig. 6. Distal femur jig held in place with Z retractor.

into the drill hole to decrease IM pressures before inserting the IM guide rod.⁴³ The long IM rod guide with appropriate distal femoral cutting block is then inserted slowly. A short IM guide is available when a long-stem hip prosthesis is used, which is one of the reasons that we obtain 3 standing films preoperatively. A short guide is rarely used unless a bowing deformity of the femur necessitates its use.

The angulation of the cutting block should be adjusted according to preoperative templating, approximately 6° for a varus knee and 3° or 4° for a valgus knee. The cutting block should be flush with the distal femoral condyle, which is accomplished by soft tissue dissection. The posterior aspect of the cutting block is pinned in place with a long-headed, 48-mm pin, and the distal femoral cut is made down to the level of the posterior slotted pin. After the slotted pin is removed, the cut is completed (Fig. 7). The IM guide is removed in order to inspect the distal femoral cut. It is critical that the distal femoral cut is flat because the posterior and chamfer femoral cuts are dependent on this first cut. A large bone file from a TKA set is used. A self-retaining IM patellar retractor is placed into the IM pilot hole with the knee flexed to 90°. Alignment is exclusively obtained with this jig, and therefore, the importance of this step cannot be overemphasized. The posterior surface of the femoral jig must be perpendicular to the femur, ignoring the tibial surface. It is crucial to release the tibial surface for a medial UKA, to avoid a varus knee and a failed UKA. For a valgus knee, we advise a release of the IT band in all patients because the valgus knee heals back to bone within several weeks.

Proximal Tibial Cut with Extramedullary Guide

The extramedullary tibial guide is positioned in line with the long axis of the tibia using ankle clamps, similar to the same step in a TKA. Minimizing padding at the ankle allows for easier palpation of the distal tibia. The guide should be either medial or lateral to the tibial crest to ensure correct alignment depending on a varus or valgus knee. A lateral patellar incision is used for our valgus knees. The posterior slope should mirror the patient's native anatomy, as determined during preoperative planning. A posterior slope of approximately 5° to 7° is recommended, with a slope at a lesser degree for an ACL-deficient knee. In the presence of an extension lag, the cut should be more



Fig. 7. Completion of distal femoral cut. It is important to protect the soft tissues when completing the distal femoral cut.

anterior than posterior, despite fears of creating hyperextension. This strategy allows the contracted hamstrings a chance to be stretched out during the early postoperative period. When proceeding in this fashion, loss of extension, common in patients 70 years or older, is not a contraindication for a UKA, in our experience (Fig. 8).

The cutting block is centered over the medial or lateral tibial surface without overlapping the patellar tendon to avoid cutting it with the saw. A 4-mm slotted stylus is used to measure the appropriate amount of resection on the deepest portion of the tibial plateau, which is easily visible after the resection of the distal femur has been completed. The proximal tibial cutting block should be secured with 2 headless, threaded, long pins and the extramedullary guide left in place for added security with a long-headed, threaded pin. Three pins are used to secure the tibial cutting block; there have been no postoperative stress fractures.⁴⁴

The proximal tibial cut is made with the tibial cutting block and extramedullary guide with the knee positioned in 90°. Hyperflexion should always be avoided when completing this cut. Care is taken to protect the MCL with a Z retractor placed meticulously for a medial UKA and on the lateral side to protect vital structures for a lateral UKA. A sagittal saw with a triangular tip is used to avoid a small bone bridge on the anterolateral or medial aspect of the tibial plateau where the sagittal and proximal tibial cuts meet. The saw blade should be placed lateral or medial to the guide, hugging the medial or lateral aspect of the intercondylar notch. Extreme caution must be used when using this saw to avoid penetrating the posterior capsule. In addition, care must be taken to avoid undercutting the tibial spine when vertically pushing to avoid a fracture.

When the cut of bone is removed as 1 piece, it can be used as a guide to determine the proper tibial tray size. To successfully do this, a Cobb is placed on top with a 1.27-cm (0.5-inch) flat osteotome underneath. It is essential not to wedge the osteotome. The leg should be placed in external rotation and 90° flexion and the Cobb used on the medial side to remove the bone fragment. For a lateral UKA, a figure-of-four position can be used to successfully complete this step. When the fragment is difficult to remove, a knife can be used to remove the capsular meniscal attachments, which should have been removed at the beginning of the procedure.

It is important to verify the gaps at this point in the procedure in order to decrease the odds of a gap imbalance when trialing components. An 8-mm or 10-mm spacer guide is placed to ensure that full extension has been maintained as well as no flexion tightness.



Fig. 8. Extramedullary tibial guided positioned for a medial UKA. The angel wing verifies the level of cut with soft tissue protection.

Posterior Femoral and Chamfer Cuts

The final cuts are made with the knee flexed to 90°. The appropriate-sized femoral sizer/finishing guide is selected. When determining the appropriate size, 2 mm of cut bone should be exposed anteriorly from the previously made distal femoral cut. The posterior boot of the guide should contact the cartilage of the posterior femoral condyle. Oversizing this component leads to patellar impingement.⁴⁵ Once the guide is flush with the previously made distal femoral cut, the femoral finishing guide is pinned in place anteriorly (Fig. 9). It is important to line this jig up with the flat cut surface of the tibia to avoid edge loading. The jig is rotated to the posterior aspect of the finishing guide until it is collinear with the proximal tibial cut and headed, threaded long pins are placed to secure the cutting block. Both peg holes are now drilled to a positive stop on the drill. The chamfer and posterior femoral cuts should be made sequentially through the guide. The chamfer cut must be exact and often requires removal of 1 pin and placing it in a different hole. We recommend cutting the posterior femoral cuts before the chamfer cut. The appropriate femoral trial component is placed on the prepared femoral condyle (Fig. 10). A headed gold pin locks the jig in place and the posterior pins are also placed. We have found that in order to avoid edge loading, we bias the femoral sizer toward the notch. With all cuts complete, a smooth, laminar spreader is placed and 1.27-cm (0.5-inch) curved osteotome is used to remove all posterior osteophytes to gain high flexion. Any remaining meniscus is excised and the posterior joint is inspected for any loose bodies.

TRIALING COMPONENTS AND BALANCING GAPS

The key to a successful UKA is a well-aligned prosthesis, restoring the mechanical axis to neutral (or slight undercorrection), and having appropriate ligamentous tension in both flexion and extension without overstuffing the prosthesis. Overloading the contralateral compartment can accelerate degenerative changes.⁴⁶ The use of the spacer guide minimizes this risk by ensuring laxity in the operative compartment, as discussed earlier.

The fit of the tibial trials is best evaluated with the knee in 90° of flexion and slight external rotation. The use of the largest tibial tray possible without overhang, matching the implant size to the peripheral cortical bone, provides the most support for the implant (Fig. 11). Occasionally, the sagittal cut may need to be repeated, moving toward the notch to accommodate the larger tibial tray. Once the trial tibial tray is inserted, rotational alignment is confirmed when the insertion handle is 90° to the coronal axis of the proximal tibia and no overhang is noted.

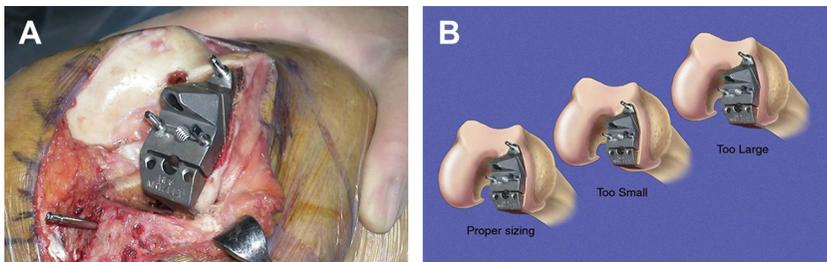


Fig. 9. (A) Femoral cutting block in place. It is important to appropriately size the femoral cutting block so there is no overhang. (B) Proper sizing of the femoral jig.

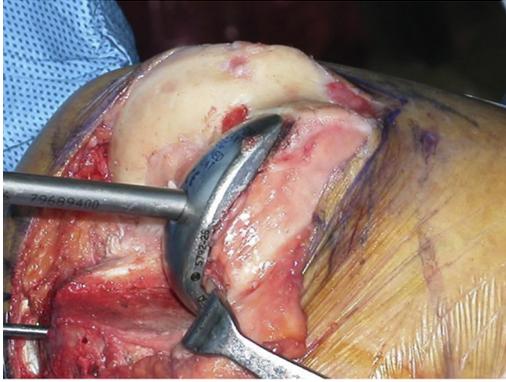


Fig. 10. Femoral trial sizing is completed before the trial component is placed on the prepared femoral surface.

A curved device is included in the set to feel around the back of the knee with the sizing guide to ensure that the correct tibial prosthesis is selected. The tibial keel is prepared with the provided keel punch and then inserted (**Fig. 12A**). It is important when creating this trough to first set it flush with the tibial cut surface, then send it posteriorly with good coverage, before drilling the 2, 20°-angled posterior tibial holes (see **Fig. 12B**). The trial femoral component and the trial polyethylene component are then inserted and the patellar retractor is removed.

After the trial components are inserted, the flexion extension gaps and tracking are evaluated. The knee is moved through its full ROM without the tension gauge to assess tracking between the femoral and tibial components. The tension gauge is then inserted, with the knee flexed to 90°. The tension gauge should slip in and out of the joint with 2 fingers and slight resistance without movement of the tibial trial on the 2-mm side. Movement of the tibial trial is an indication that the flexion gap may be too tight. This step should also be repeated with the knee in full extension. If the tibial trial moves when in extension, the extension gap may be too tight. At this point, necessary adjustments should be made to balance the gaps and properly align the components.



Fig. 11. Templates to find the largest tibial tray are completed.

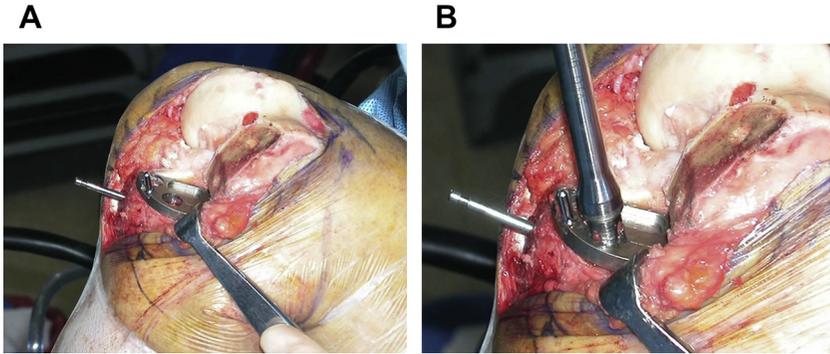


Fig. 12. (A) The tibial keel is placed with an appropriate tibial tray to finalize preparation of the tibial surface. (B) The cut tibial surface is completed, and the posterior tibial holes are prepared.

FINAL PREPARATION AND CEMENTING OF FINAL IMPLANTS

In final preparation for implant placement, the prepared bony surfaces are copiously irrigated with antibiotic solutions and the joint is reinspected for debris. The bony surfaces are dried and a 10.2-cm \times 20.3-cm (4-inch \times 8-inch) sponge held by a Z retractor is placed in the posterior aspect of the joint in addition to a thrombin spray. The cement should be compressed into the tibia with a finger or a ganglion knife, making sure not to place excessive cement posteriorly. Excess cement is difficult to remove after the implants are in place. We advise placing a small amount of cement only on the posterior aspect of the prosthesis and the anterior section of the tibia. The final tibial component is then inserted and impacted into place. A small, curved curette and a knife are used to remove excess cement from the posterior aspect of the joint. The process is then repeated with the femoral component, and the trial polyethylene component is placed ([Fig. 13](#)).

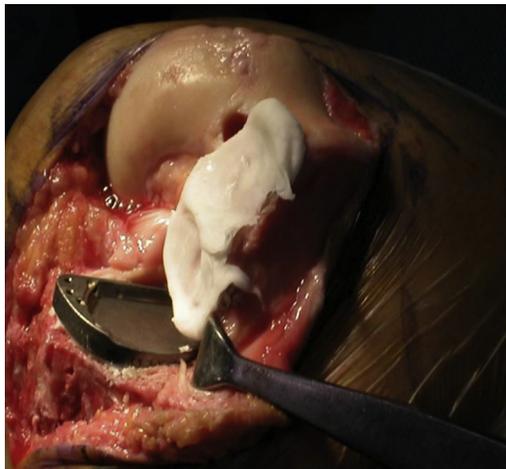


Fig. 13. The tibia is cemented in place, and the femoral surface is prepared with cement to accept the real prosthesis.

The leg is moved into extension to compress the components while the cement cures. The cement is monitored, and when appropriate, the previously packed sponge in the posterior aspect of joint is removed. Excess posterior cement should be brought into view for removal (Fig. 14). If the Z retractor is placed back in the joint, it should always be checked first to make sure that it does not have any excess cement. The trial polyethylene component is removed when the cement hardens, and the real polyethylene is inserted after checking the gaps (Fig. 15). We advise avoiding making the knee too tight. The MCL is checked in extension and flexion to ensure appropriate laxity. The wound should be copiously irrigated before closure of the incision in the surgeon's preferred standard fashion; our preference is a subcuticular monocryl (Fig. 16).

COMPLICATIONS AND OUTCOMES

Please see "Outcomes and Complications of Unicompartmental Arthroplasty" by Della Valle et al, elsewhere in this issue for detailed outcomes and complications.

Long-term outcomes of UKA performed with IM instrumentation are good. Berger and colleagues reported 98% survivorship at 10 years and 95.7% at 13 years when conversion to TKA was used as the end point in 62 consecutive patients. When aseptic loosening was used as an end point, survivorship increased to 100% at 13 years; 80% of patients reported excellent satisfaction, 12% reported good satisfaction, and 8% reported fair satisfaction. The 2 failures were because of progression of symptomatic arthritis in other compartments, albeit at a slow progression rate of 7 and 11 years.

Patients with UKA outperform their peers with TKA on reported symptoms, activities of daily living, and sport and recreation.^{47,48} Patients with UKA show greater knee ROM and report less difficulty with activities that involve bending their knee.^{48,49} Body mass index (BMI, calculated as weight in kilograms divided by the square of height in meters) does not adversely affect outcomes⁵⁰ and persons with BMI greater than 35 continue to show functional improvement for at least 2 years after surgery.⁵¹

In a recent review of our series, 52 of 56 patients (93%) who participated in sports preoperatively and underwent UKA returned to sports within 6 months after UKA. The 3 patients who did not resume sports postoperatively did not resume sports for reasons unrelated to their knee. All patients who participated in tennis (N = 14) and skiing (N = 23) preoperatively resumed after UKA without complication.

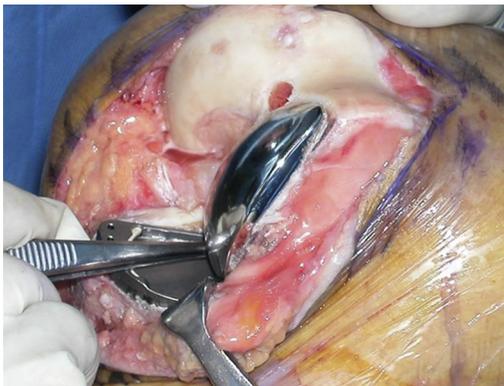


Fig. 14. The femoral and tibial components are cemented in place and any excessive cement outside the components or under the engaging locking mechanism is safely removed.

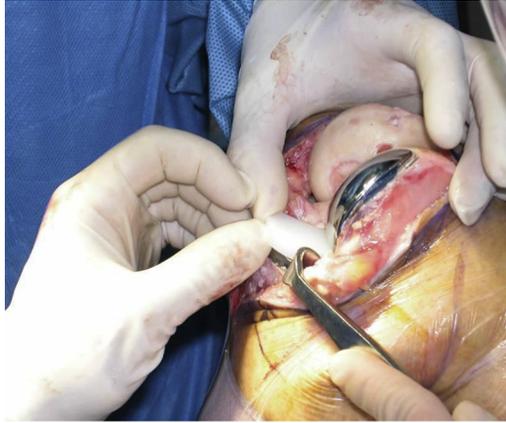


Fig. 15. The real polyethylene insert is snapped into place with an audible sound.

POSTOPERATIVE PROTOCOL AND REHABILITATION

ROM exercises are initiated immediately postoperatively in the postanesthesia care unit, and a multimodal pain control regimen is routinely used, including nonsteroidal antiinflammatory drugs and 1-time intravenous steroid intraoperatively to control swelling.⁵² A Hemovac drain is also used and sewn in the knee. We have found that the number 1 complication in our patients is too much activity too fast too soon with hematoma collection. For this reason, a drain is left in for several days, and we have had no infections. A CPM device and extensive icing are used to return our patients to activities in an accelerated fashion. The drain is taken out in the office and ambulation is partial weight bearing with crutches or a walker for the octogenarians. Deep vein thrombosis prophylaxis is based on risk stratification in accordance with the recommendations from the American Academy of Orthopaedic Surgeons.⁵³ We prefer Coumadin for 6 weeks with thigh-high compression stockings.

A formal outpatient rehabilitation program is prescribed including wall slides and stationary bike riding without tension and the seat placed high to avoid excessive flexion starting on day 1. Emphasis is placed on ROM, restoration of normal mechanics, and strengthening of the core, hip, and quadriceps, which has been shown to decrease rates of anterior knee pain and improve outcomes.^{54–56} Strength

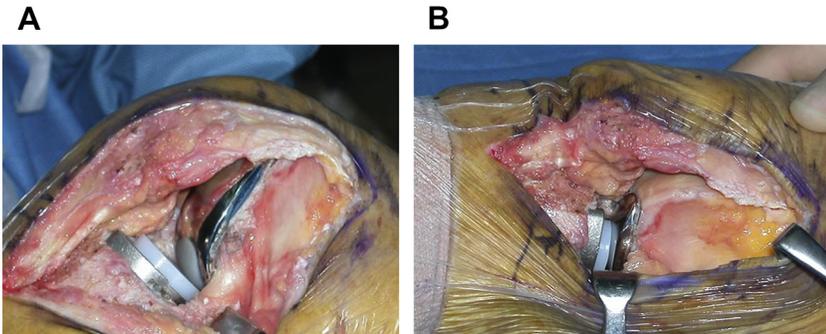


Fig. 16. Final UKA with real polyethylene liner. (A) Knee in full flexion. (B) Knee in full extension.

training is not initiated until 6 weeks postoperatively. Patients are permitted to return to their desired activities without restrictions after the completion of their physical therapy program. We allow patients to return to golf (riding in a cart) at 8 to 12 weeks, depending on swelling. Singles tennis and downhill skiing are permitted at 6 months.

SUMMARY

UKA is a reliable method of alleviating pain and restoring function in patients with knee arthritis with the appropriate indications and meticulous surgical technique. Use of IM instrumentation on the femur provides a similar operative experience to TKA, allowing most surgeons the comfort of a procedure known well to them. Preoperative goal setting and postoperative rehabilitation involving core, hip, and quadriceps strengthening are nonsurgical adjuncts, which enhance outcomes and patient satisfaction in this already successful procedure.

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