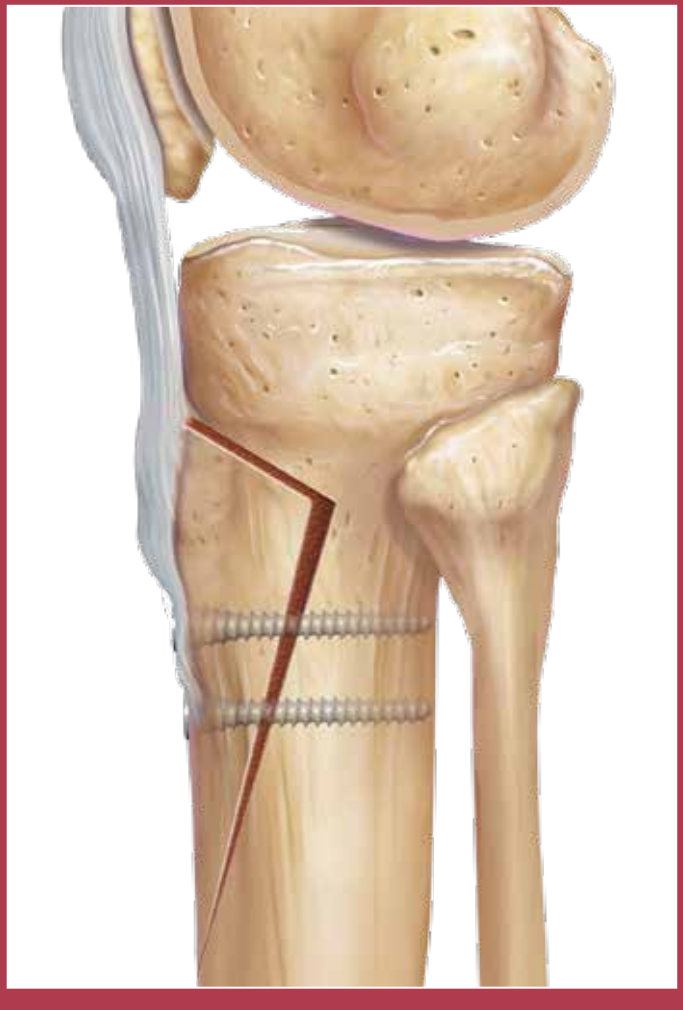
Arthrex®

Tibial Tuberosity Osteotomy with Anteromedialization (AMZ) for Realignment of the Extensor Mechanism using the T3 AMZ System

Surgical Technique



Tibial Tuberosity Osteotomy

Arthrex T3 AMZ System

The T3 AMZ system is a comprehensive set of instruments designed to achieve precise cutting angles during tibial tuberosity anteromedialization (AMZ) osteotomy procedures to accurately realign the extensor mechanism and unload the patellofemoral joint. The correct amount of anterior and medial tuberosity shift is achieved by determining the slope and selecting the corresponding T3 AMZ Horizontal Cutting Guide based upon the desired amount of correction.

Patient Selection

Anteromedialization is largely indicated for two types of patients:

1. Not a candidate for cartilage restoration or patellofemoral arthroplasty but has the classical isolated (distal) lateral patellar chondrosis with subluxation and/or tilt.
2. Undergoing patellofemoral cartilage restoration and the goals are to optimize the biomechanical environment of the patellofemoral compartment by improving the contact area and decreasing patellofemoral forces.

Preoperative Imaging:

1. A true lateral radiograph allows measurement of patellar height, patellar tilt and assesses trochlear morphology. Additionally, the position of the foot can be documented as another check to use intraoperatively that the posterior knee is parallel to the table.
2. AP and PA (skier or Rosenberg view) both assist in assessing any tibiofemoral joint narrowing.
3. Merchant or low axial patellofemoral view allows further assessment of trochlear morphology, patellar position and patellofemoral joint space.
4. CT (arthrogram) or MRI with tuberosity in the image allows measurement of the true Caton-Deschamps ratio, TT-TG (tibial tuberosity-trochlear groove) distance to determine how much medialization is necessary, as well as cartilage mapping and assessment of morphology.
5. Optional hip-ankle film will assess for abnormal alignment (for example, a valgus knee can contribute to lateral position of the patella and should be corrected first).

Pre-op Radiograph

Post-op Radiograph

Preoperative Planning

The amount of medialization and/or anteriorization necessary is based upon the medial/lateral position of the tuberosity and the proximal/distal position of the patella. This is calculated based on the patient's TT-TG (tibial tuberosity-trochlear groove) distance and patellar height. The tuberosity can be simultaneously moved proximally or distally to address (normalize) patellar alta or infra. Normal TT-TG distance is approximately 15 mm based upon multiple studies. The slope of the osteotomy allows medialization to vary depending on the amount of optimal anteriorization. As shown in the table 1 below, all standard amounts of needed medialization can be typically achieved by using slopes of 45˚ or 60˚ and various amounts of anteriorization.

Table 1. Medialization Achieved by Varying Slope and Anteriorization

SLOPE							
45°	Anterior Shift (mm)	10.0	11.0	12.0	13.0	14.0	15.0
	Medial Shift (mm)	10.0	11.0	12.0	13.0	14.0	15.0
60°	Anterior Shift (mm)	10.0	11.0	12.0	13.0	14.0	15.0
	Medial Shift (mm)	5.8	6.4	6.9	7.5	8.1	8.7

Pre and Postoperative Rehab Protocol

Preoperatively, the patient should have been in a thorough low back to foot rehabilitation program with emphasis on core proximal muscle strengthening. These will be modified according to concomitant procedures.

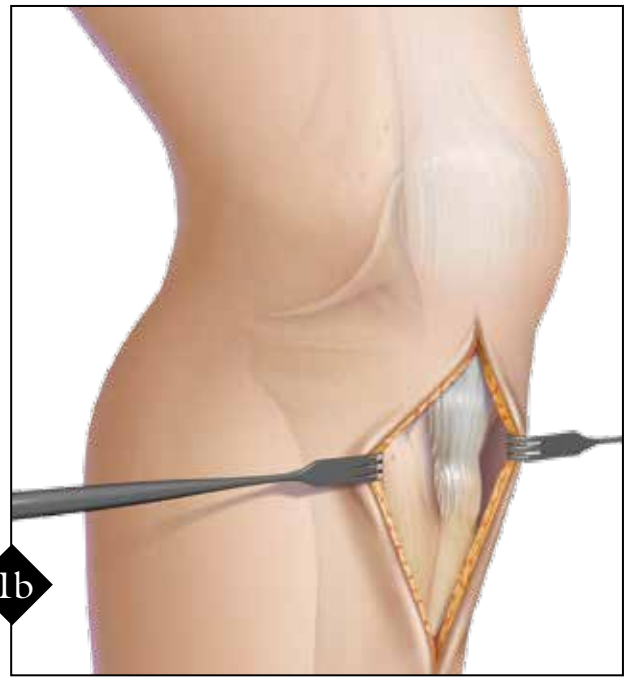
Postoperatively, weight-bearing is limited to the weight of the foot using two crutches or a walker for six weeks. At six weeks post-op, radiographs are obtained and a decision is made to allow progression to full weight-bearing based on the radiographic results and clinical examination. Nicotine use is contraindicated at all times, as it can interfere with healing.

Range of motion is encouraged early through CPM, active heel slides or nonloaded biking. The goal is near full motion within the first four weeks. After six weeks, the rehabilitation is determined by the limitations of the concomitant procedures. If there are no such limitations, the core proximal and limb strengthening programs are gradually advanced.

Tibial Tuberosity Osteotomy with Anteromedialization (AMZ) for Realignment of the Extensor Mechanism using the T3 AMZ System

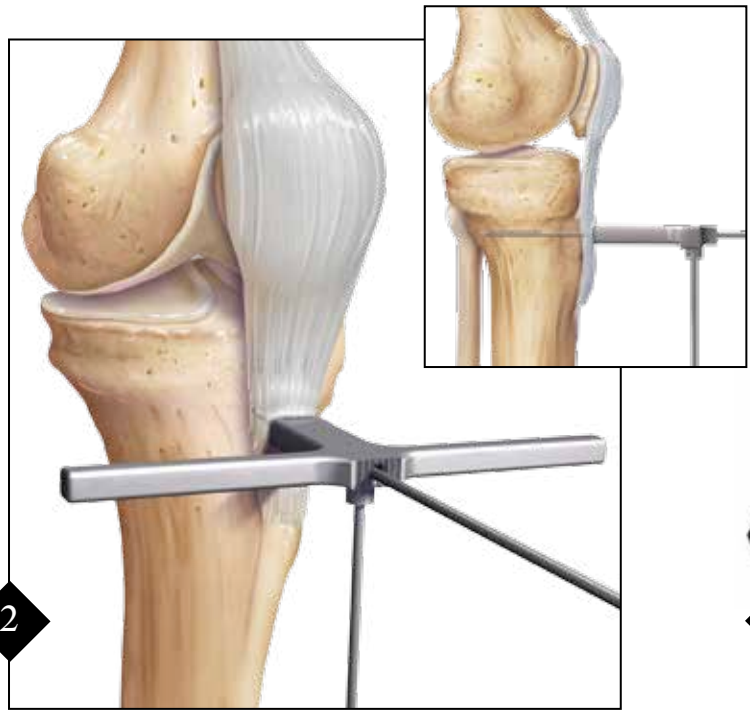
1a

A longitudinal incision is made over the midline of the tibial tuberosity extending approximately 5 cm from the distal extent of the patellar tendon. The subcutaneous tissues are dissected from the underlying superficial fascia of the knee, exposing the distal insertion of the patellar tendon, the attachment to the tibial tuberosity and distally enough to allow for the Cutting Block.



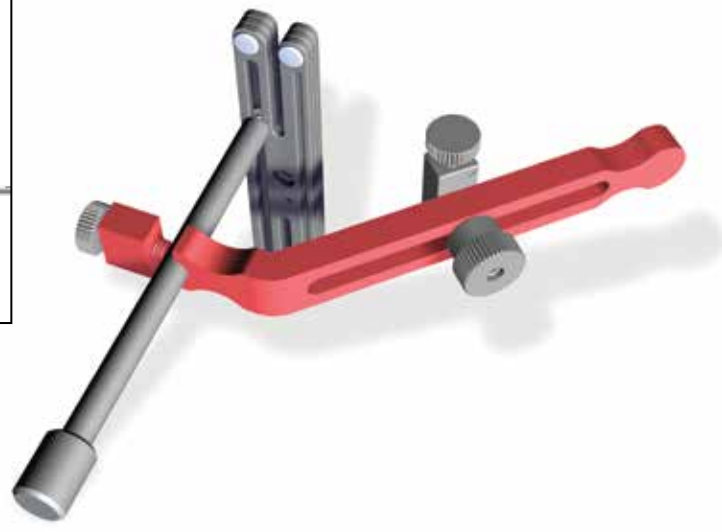
1b

Incisions are made longitudinally medial and lateral to the patellar tendon to allow for anteriorization. The patellar tendon is protected with a retractor. The anterior compartment musculature is elevated from the lateral wall of the tibia, beginning distal to Gerdy's tubercle, to gain access to the posterolateral tibia.



2

Position the Tuberosity Pin Guide, using the femoral condyles and ankle as reference points, on to the tuberosity below the level of Gerdy's tubercle. Insert the Tuberosity Pin into the tuberosity so it is oriented perpendicular to the posterior wall of the tibia. Note that in most patients under anesthesia, the natural position of the limb is in external rotation, so an assistant will need to aid in the positioning of the limb.

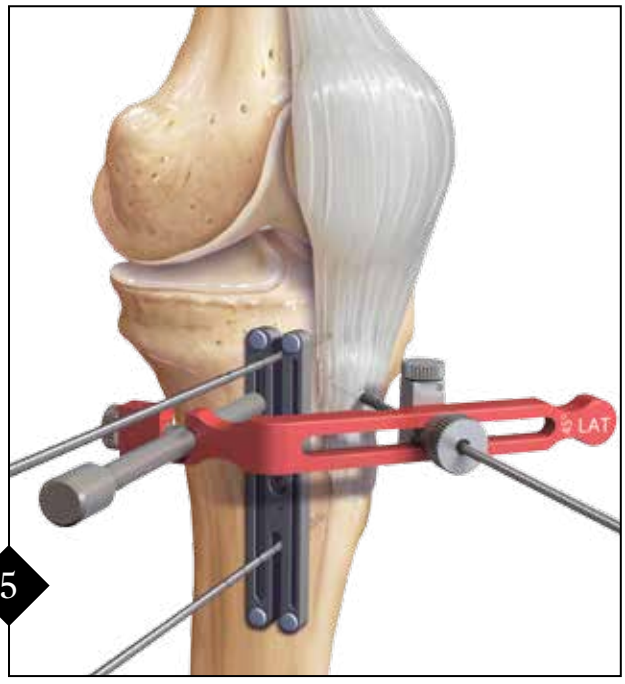


3

Assemble the cutting guide by first attaching the T3 AMZ Cutting Block Post into the Cutting Block. Secure the Cutting Block Post into the post slot of the appropriate T3 AMZ Horizontal Guide. Loosely tighten the screw to hold the Cutting Block Post in place.

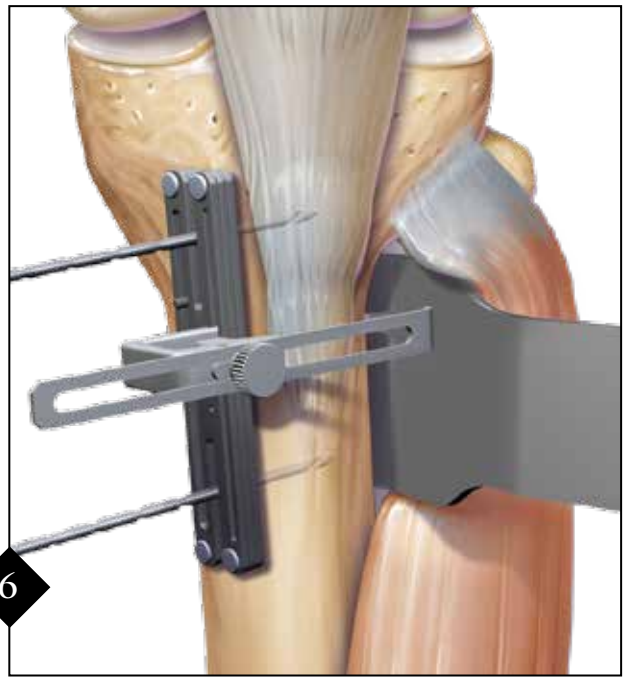
4

Slide the Horizontal Guide over the Tuberosity Pin and temporarily tighten its locking nut and screw to hold the Cutting Block in place on the medial aspect of the tuberosity.



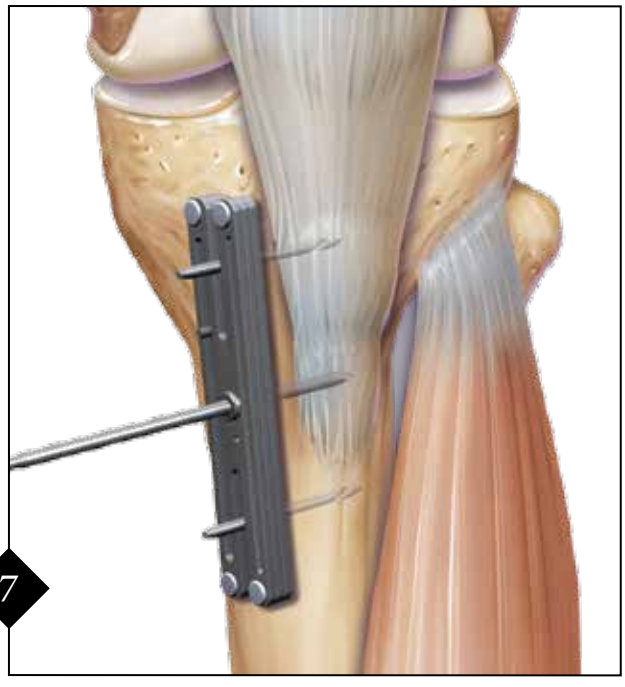
5

Adjust the position of the Cutting Block so it is positioned medial to the tuberosity in a posteromedial to anteromedial orientation as it travels distally. Tighten the Cutting Block Post and all three locking screws on the Horizontal Guide to hold the Cutting Block securely in place. Insert two T3 AMZ Breakaway Pins into the middle slots of the Cutting Block, taking care not to penetrate the posterolateral cortex of the tibia.



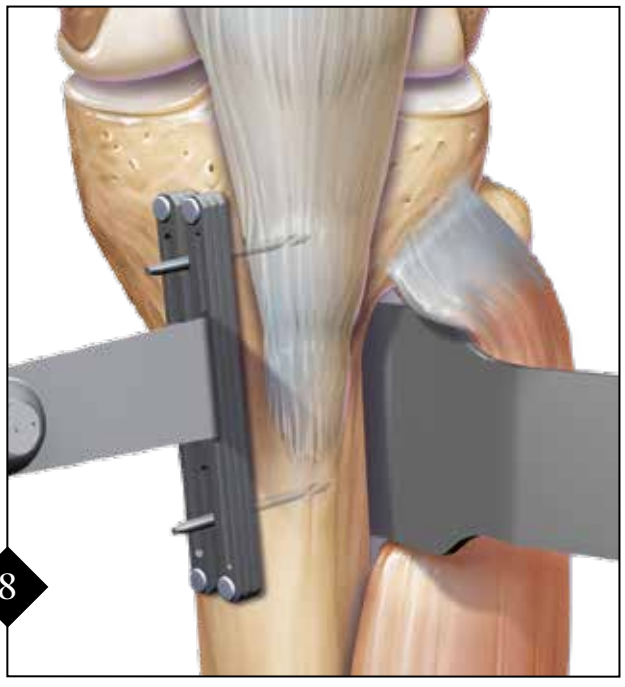
6

Release the Horizontal Guide from the Cutting Block Post and remove the Post from the Cutting Block, leaving the Cutting Block in place. Remove the Horizontal Guide and the Tuberosity Pin. Use the T3 AMZ Saw Blade Exit Indicator in the cutting slot of the Cutting Block to visualize on the posterolateral tibial cortex where the saw blade will exit. Readjust the Cutting Block position either superiorly or inferiorly.



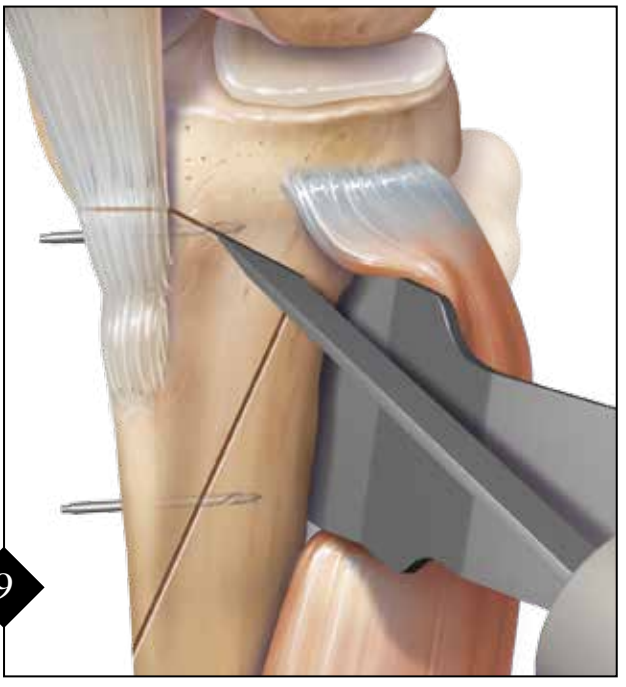
7

Snap off the excess Breakaway Pins, leaving approximately 1 cm above the Cutting Block and insert the Collared Breakaway Pin into the center hole of the Cutting Block. Snap off any excess Collared Breakaway Pin so it will not get in the way of the sagittal saw.



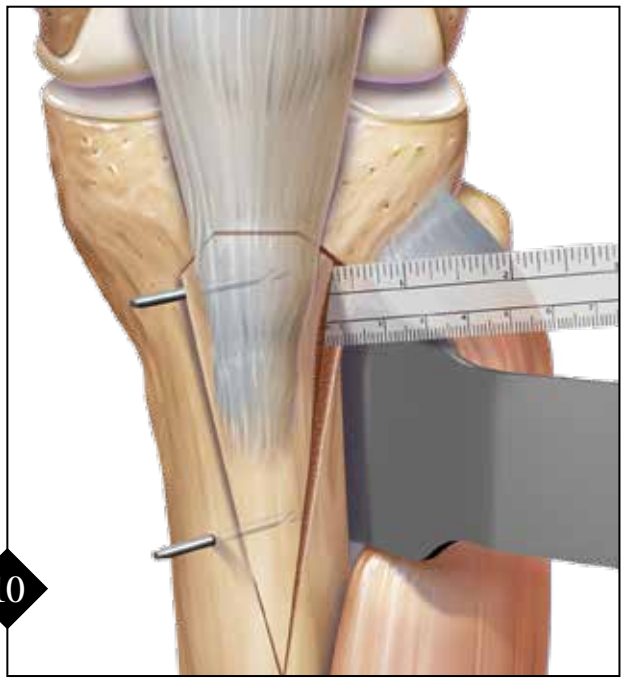
8

With the Soft Tissue Retractor in place, cut through the tuberosity using a sagittal saw along the top slot of the Cutting Block. Sweep the saw blade superior and inferior. Avoid completely detaching the tuberosity distally and leave a small bridge of periosteum.



9

Remove the Collared Breakaway Pin and the Cutting Block, leaving the Breakaway Pin remnants in place. Finish the proximal osteotomy medially and laterally at the level of the insertion of the patellar tendon using a small osteotome and a mallet.



10

Using a ruler, measure the amount of anterior and medial shift necessary to correct the patellar malalignment from preoperative planning.

11

Fix the tuberosity osteotomy by inserting two 4.5 mm cortical screws in a lateral to medial angulation as they course posteriorly.

Ordering Information

T3 AMZ Instrument System (AR-13216S) includes:

45˚ Horizontal Guide, T3 AMZ	AR-13216-01
60˚ Horizontal Guide, T3 AMZ	AR-13216-02
90˚ Horizontal Guide, T3 AMZ	AR-13216-03
Saw Blade Exit Indicator, T3 AMZ	AR-13216-04
Tuberosity Pin Guide, T3 AMZ	AR-13216-05
Soft Tissue Retractor, T3 AMZ	AR-13216-06
Cutting Block Post, T3 AMZ	AR-13216-07
Pin Extractor	AR-14016PE
T3 AMZ Instrument Case	AR-13216C

T3 AMZ Disposables Kit (AR-13217) includes:

Collared Breakaway Pin, T3
Tuberosity Pin, T3 AMZ
Cutting Block, T3 AMZ
Breakaway Pin, T3 AMZ, qty. 2

This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience and should conduct a thorough review of pertinent medical literature and the product's Directions For Use.

Designed in conjunction with Jack Farr, M.D., Indianapolis, IN; Brian Cole, M.D., Chicago, IL; and Akbar Nawab, M.D., Louisville, KY

Arthrex®
www.arthrex.com
. . . up-to-date technology just a click away