Arthroscopically assisted Knee Resurfacing (AKR)
The First Meniscal Sparing Knee Resurfacing

A New Algorithm for Early Knee Arthritis Treatment

- Preserves meniscus & articular cartilage
- Maintains soft tissue envelope
- Inlay components match patient anatomy
- Bone sparing for future UKA or TKA
- Technique similar to ligament (ACL/PCL) reconstruction

Between failed conservative treatments (allograft, microfracture) and the more aggressive techniques (TKA and UKA) sits the “Millennium Patient™”.

This middle-aged “boomer” is looking for a surgical solution that relieves pain and provides increased ROM but does not “burn a bridge” for future surgery.

The Arthrosurface AKR knee is your answer for this challenging patient.
The Unicompartmental Knee Resurfacing Prosthesis (UniCAP™) incorporates a low-profile femoral articular component that mates to a taper post via a taper interlock. The femoral component articulates against an all-polyethylene tibial component. The UniCAP™ implants allow resurfacing of the compartment utilizing the undisturbed compartmental structures and soft-tissues.

**Materials:**

### Femoral Components
- **Articular Component:** Cobalt-Chromium-Molybdenum alloy (Co-Cr-Mo)
- **Undersurface Coating:** Titanium (CP Ti)
- **Taper Post:** Titanium alloy (Ti-6Al-4V)

### Tibial Components
- **Ultra-High Molecular Weight Polyethylene (UHMWPE)**

**Indications for Use:**
Partial replacement of the articulating surfaces of the knee when only one side of the joint is affected due to the compartmental primary degenerative or post-traumatic degenerative disease, previous tibial condyle or plateau fractures, deformity or revision of previous arthroplasty. This device is intended to be used with bone cement.

**UniCAP™ Femoral Component**
- Cobalt Chrome articular surface
- Titanium plasma spray undercoating
- Bead-blasted Titanium taper post
- Morse taper interlock

**UniCAP™ Tibial Component**
- Inlay cemented UHMWPE
- Meniscus preserving
- Implantation technique similar to ACL reconstruction
1. The tibial component may be placed under arthroscopic visualization to ease preparation of the tibial defect. With the knee at 90 degrees of flexion, and working through an anteromedial portal, place a *Tibial Template* central to the damaged area of the tibial plateau surface. The underside of the *Tibial Template* should be in contact with the surface of the tibia. Select the *Tibial Template* that best matches the A/P and M/L surface curvatures of the tibia. Attach the *Tibial Template* to the *Tibial Drill Guide* and *Bullet*. Place the guide so the arm of the *Tibial Template* is parallel to the tibial plateau.

2. Drill the *2.0mm Drill Tipped Pin* through the central axis of the *Tibial Drill Guide* until it reaches the center of the *Tibial Template*. Use a small closed curette to “catch” the tip of the *Pin* to prevent drilling into the femur. Care must be taken so that excessive torque is not applied to the *Drill Guide* which may cause the pin to miss the target. Confirm that there is a minimum of 5mm of bone from the edge of the *Template* to front of the tibia to avoid breaking through the anterior tibia during reaming. Bring the knee into extension and probe the underside of the meniscus to ensure complete visualization and proper placement of the *Template*. Remove the *Tibial Drill Guide* and *Bullet*.

3. Drive the *Tibial Pilot Drill* over the *2.0mm Drill Tipped Pin* until it reaches the center of the templated area. Drilling should stop before the larger diameter tip of the *Pilot Drill* breaches the tibial plateau. Remove the *Tibial Pilot Drill* and *2.0mm Pin*.
4. Advance the **Introducer** into the prepared tibial tunnel. The proximal tip of the **Introducer** should be flush with the tibial plateau. Begin to advance the threaded **Blade Stop** over the **Introducer** until it begins to screw into the bone. Remove **Introducer** and continue to advance **Blade Stop** until it is 2/3\(^{rd}\) into the tunnel.

   a. Remove **Driver** handle and reinsert **Introducer** and **Driver** and continue to advance as one unit. Stop when the tip of the **Introducer** is flush with the tibial plateau. Confirm that the laser mark on the **Introducer** is in-line with the laser mark in the slotted window of the **Blade Stop Driver**.

   b. **Blade Stop** is at the correct depth when the tip of the **Introducer** is flush with the tibial plateau and the laser mark lines on the **Driver** and **Introducer** are aligned in the slotted window. Remove the **Blade Stop Driver** and **Introducer**.
5. Place the Cutting Blade into the Blade Holder with the long slot facing posteriorly to the joint. Introduce the Cutting Blade into the portal. Advance the Blade Drive Shaft into the tibial tunnel until it is visible in the joint. Push the tip of the Drive Shaft through the center of the Cutting Blade.

6. Connect the Cutting Blade to the Blade Drive Shaft by turning the Drive Shaft 90 degrees and pull distally to engage the blade.

   a. To lock the Tibial Cutting system, push the sheath in an upward motion and rotate 90 degrees so the Lock Indicator on Blade Drive Shaft is positioned over the Dowel Pin and Laser Mark line. Release to lock Cutting Blade into position. Attach the Powered Drill to the laser mark indicated on the distal end of the Drive Shaft.

7. Using a Powered Drill, begin rotation counterclockwise to normalize the blade to the tibial plateau. This will help ensure even cutting engagement of the Cutting Blade into the plateau. Care should be taken to avoid the meniscus. Begin to prepare the inlay implant socket using a clockwise blade rotation. Drilling is complete when the Cutting Blade comes in contact and stops on the proximal end of the Blade Stop.
8. With Cutting Blade remaining in place, insert the appropriate sized Sizing Trial based on the mapping determined with the Tibial Template. Confirm fit at anterior/posterior and medial/lateral margins of the Sizing Trial. If the Trial is proud at the margins, use the Blade Stop Wrench to rotate the Blade Stop clockwise. Each 90 degree turn of the Blade Stop with Blade Stop Wrench lowers the Blade Stop 1mm. Reattach the Powered Drill and re-ream to the new depth. This will lower the implant depth in the tibial socket.

9. With the Sizing Trial set at the appropriate height, begin removing the instrumentation. Raise the Drive Shaft so the Cutting Blade can be grasped for removal. To unlock and remove the Cutting Blade push the sheath in an upward motion and rotate 90 degrees counter clockwise so the Unlock Indicator on Blade Drive Shaft is positioned over the Dowel Pin. Release to unlock Cutting Blade. Push Drive Shaft upwards to free it from the Cutting Blade and turn the Drive Shaft 90 degrees. Pull distally on the Drive Shaft and remove from the tibial tunnel. Use a grasper to remove the Cutting Blade.
10. Open Tibial Component Kit. Using the Suture Retriever capture the suture and pull suture through and out of the distal tibial drill hole. Introduce the Tibial Component into the tibial socket using the Delivery Tool.

11. Advance the Slot Driver into the tibial tunnel to rotate the Tibial Component (via the distal slot on the bottom of the component) to its optimal orientation if needed.

NOTE: Prepare Femoral Component prior to final placement of Tibial Component.
12. Implant **Tibial Component** with cement using the **Arthrosurface**® **Cement Ejector**. When discharging cement, allow the back pressure from the cement extraction to lift the implant up 2mm and then continue to back fill the tibial tunnel with cement. Utilize the **Tibial Template** through the portal to apply downward pressure onto the **Tibial Component** to seat it in its final position. This will allow for optimal cement integration.

**Cement Ejector Assembly**

- a. Mix low viscosity cement according to manufacturers’ directions.
- b. Place cement into the **Delivery Syringe**. Remove **Funnel** when **Delivery Syringe** is full.
- c. Insert **Plunger** into **Delivery Syringe**. Insert into **Ejector Handle**.
- d. Attach **Drive Rod** onto **Ejector Handle**.
- e. Place **Threaded Sheath** into tibial tunnel to prevent cement extrusion.
- f. A powered drill with Jacobs chuck is used to advance the **Drive Rod**.
- g. Deliver cement to undersurface of implant through tibial tunnel and draw **Cement Ejector** retrograde as tibial tunnel is filled.
1. With knee at 60 degrees of flexion and working through an anteromedial incision, locate the Femoral Drill Guide on the distal femur to develop a working axis perpendicular to the articular surface.

![Fig 1a Femoral Drill Guide](image1)

2. Drill the 2.0mm Threaded Pin through the central axis of the Femoral Drill Guide into bone to the laser mark line on the 2.0mm Threaded Pin. Remove the Femoral Drill Guide.

![Fig 1b Femoral Drill Guide with 4 points of contact (1-4)](image2)

3. Drive the Femoral Centering Shaft over the Threaded Pin so the laser mark line is at the height of the original articular surface. Good practice is to leave the etch mark proud initially and the advance by hand with the Driver.

![Fig 3a Femoral Centering Shaft](image3)

![Fig 3b Laser mark line at height of original articular cartilage](image4)
4. Place the 40mm **Contact Probe** over the **Femoral Centering Shaft**. Read the **Contact Probe** to take the superior and inferior offsets and mark them onto the appropriate sizing card.

5. Repeat using the 20mm **Contact Probe** to obtain the offsets medially and laterally and mark the sizing card.
6. Select the appropriately sized **Central Femoral Reamer** based on the average medial to lateral mapped offset. This will either be a 2mm or 3mm reamer. Prepare central femoral cut by advancing the **Central Femoral Reamer** over the **Centering Shaft** until it contacts the stop. Remove **Centering Shaft**.

7. Select the appropriately sized **Guide Block** based on the average anterior/posterior offset from the sizing card (6mm to 10mm by 1mm increments) and attach it to the **Femoral Drill Guide**. Realign **Femoral Drill Guide** on the distal femur. Maintain four points of contact to ensure accurate placement of guide pins.

7a. Insert the **Pin Sleeves** into the slots located superior and inferior on the **Femoral Drill Guide**. Beginning with the superior **Pin Sleeve**, drill the **Short Threaded Pins** through the **Pin Sleeves** into bone to the laser mark line on the **Short Threaded Pin**. Remove the **Pin Sleeves** and remove the **Femoral Drill Guide**.
8. Confirm proper pin alignment before continuing. The short pins should intersect the central reamed circle or within 1mm of its outside margins. From a sagittal view, the pins should be equally spaced. If the pins are not in the indicated position, reattach the Femoral Guide and reinsert the short pins.

9. Select the appropriate Outer Femoral Reamer based on the medial/lateral mapped offsets (same size as the Central Reamer - 2 or 3mm) Beginning with the inferior Threaded Pin, advance the Outer Femoral Reamer until it contacts the stop in the slotted window.
10. Select the appropriately sized Femoral Sizing Trial, attach to Sizing Trail Handle and place into position. Leave superior and inferior Short Threaded Pins in place. Confirm fit at anterior/posterior margins and medial/lateral margins of the Femoral Sizing Trial.

11. Before preparing the pilot hole for the Taper Post, be sure Femoral Trial is seated so the edges are flush or slightly recessed to the cartilage. Advance the Femoral Pilot Drill through the Sizing Trial Handle until the laser mark is flush with the end of the handle and leave it in position. Replace the 2.0mm Threaded Pin.
12. Remove **Sizing Trial Handle**. Advance **Femoral Step Drill** over the **Femoral Pilot Drill** until it contacts the stop on the **Femoral Pilot Drill** in the slotted window.

![Fig 12 Femoral Pilot Drill](image)

13. Advance the **Tap** until the back of the **Femoral Pilot Drill** is flush with the end of the **Tap** handle. Remove the **Tap** and **Femoral Pilot Drill**.

![Fig 13 Tap Femoral Pilot Hole](image)
14. Insert the **Taper Post** into the **Sizing Trial Handle**. Attach the **Handle** and **Taper Post** assembly onto the **Femoral Sizing Trial**. Insert the **Hex Driver** into the **Handle** and advance the **Taper Post** into the bone. Stop advancing the **Hex Driver** when the raised stop on the **Driver Shaft** contacts the top of the **Sizing Trial Handle** and the **Femoral Sizing Trial** is flush with the surrounding cartilage. Remove the **Sizing Trial**.

15. Apply pea-sized balls of bone cement to underside of **Femoral Component**. Position **Femoral Component**. Use a slight tap on the **Impactor** to mate **Femoral Component** to **Taper Post**.

**NOTE:**
Complete implantation of **Tibial Component**.
Warnings

Improper selection, placement, positioning, alignment, and fixation of the implant components may reduce the service life of the prosthetic components. Inadequate preparation and cleaning of the implant components mating surfaces may result in improper fixation of the device. Improper handling of the implants can produce scratches, nicks or dents that may have adverse clinical effects on mating joint surfaces. Do not modify implants. The surgeon shall be thoroughly familiar with the implants, instruments, and surgical technique prior to performing surgery.

The all-polyethylene tibial component is intended to be used in conjunction with activity restrictions. When taking readings of articular surfaces, care should be taken to ensure that the distal tip of contact probe is making contact on articular surfaces and free from any soft tissue structures to ensure accuracy. Use light pressure on contact probe to slightly indent articular surface at chosen points, this will ensure selected implant will be recessed just below articular surface at margins of implant.

When placing implant, carefully trim articular cartilage debris around margin of implant. Remove bone particles and lavage thoroughly. To ensure mechanical interlock of the taper post and implant, carefully clean taper post with provided instruments. All drilling or reaming should be done with vigorous lavage to minimize heat effects to adjacent bone and cartilage tissues.

Ensure that care is taken to obtain complete and uniform bone cement coverage at implant site. Unsupported components or unevenly supported components may result in implant failure.

Accepted practices in post-operative care should be used. The patient is to be instructed and monitored to ensure a reasonable degree of compliance to post operative instructions and activity restrictions. Excessive activity, impact, and weight gain have been implicated in the reduction of the benefit and service life of prosthetic devices.

Precautions

This implant is intended to be fitted and installed with the matched instrument set. Use of instruments from other systems may result in improper implant selection, fitting, and placement which could result in implant failure or poor clinical outcome. The instrument set should be regularly inspected for any signs of wear or damage. Do not reuse implants.

Possible Adverse Effects

1. Material sensitivity reactions. Implantation of foreign material in tissues can result in histological reactions. Particulate wear debris and mild tissue discoloration from metallic components have been noted in other prosthetic devices constructed of similar materials. Some types of wear debris have been associated with osteolysis and implant loosening.
2. Infection or allergic reaction.
3. Loosening, migration or loss of fixation of implant.
4. Fretting and crevice corrosion can occur at the interface between the implant components.
5. Fatigue fracture of the implants as a result of bone resorption around the implant components.
6. Wear and damage to the implant articulating surface.
7. Wear and damage to the adjacent and opposed articular cartilage surfaces or soft tissue support structures.
8. Intraoperative or postoperative bone fracture.
9. Postoperative pain or incomplete resolution of preoperative symptoms.
10. Periarticular calcification or ossification, with or without impediment of joint mobility.
11. Incomplete range of motion due to improper selection or positioning of components.
12. Transient peroneal palsy.
Instrumentation

Instruments are oriented left to right in the order of surgery.
Implant Boxes and Accessory Kits

Tibial Cutter Kit

Includes: Tibial Cutting Blade  
Tibial Drive Shaft  
Suture Passer  
2.0mm Drill Tip Pin  
2 x Short Threaded Pins

Taper Post Kit

Includes: Taper Post  
2 x Threaded Pins  
2 x Short Threaded Pins  
2 x Pin Sleeves  
Alignment Bushing  
Taper Cleaner  
Femoral Sizing Card

Femoral Articular Component Kit

Includes: Femoral Component  
Suction Cup
**Femoral Articular Components**

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**Taper Post - Femoral**

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**Tibial Articular Components - 20mm**

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<td>U205-1015</td>
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**Accessories**

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<tr>
<td>U000-0100</td>
<td>Tibial Cutter Kit</td>
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<tr>
<td>U000-0510</td>
<td>Cement Cartridge Kit</td>
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<tr>
<td>U000-0200</td>
<td>Pin Kit includes: 2.0mm Drill Tip Pin</td>
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<tr>
<td></td>
<td>2.0mm Threaded Pin</td>
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<tr>
<td></td>
<td>(2) 2.0mm Short Threaded Pin</td>
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Arthrosurface’s resurfacing systems are also available for the following joints:

- Patello-Femoral
- Shoulder
- MTP
- Femoral Condyle (*Available in most International markets via CE mark and as part of a IDE study in the US.*)
- Hip

For all orders call +1-508-520-3003
Toll Free call +1-866-261-9294