ELEOS™ Limb Salvage System

Surgical Technique
Hinge Knee Replacement

The ELEOS Limb Salvage System offers options for patients with significant bone loss due to cancer, trauma, or previous surgical procedures. The locking taper design has a history of clinical use in a variety of orthopaedic applications. With an array of options in a multitude of sizes, the ELEOS system provides the surgeon the ability to meet a variety of patient needs.

ONKOS SURGICAL™

HINGE KNEE SURGICAL TECHNIQUE

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Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for informational purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training, experience and patient condition. Prior to the use of the system, the surgeon should refer to the product package insert for additional warnings, precautions, indications, contraindications and adverse effects. Instruction for use are available on www.onkossurgical.com/ELEOS/IFU

PRODUCT DESCRIPTION

The ELEOS Hinge Knee System consists of six components that create a hinged knee: Resurfacing Femur, Tibial Hinge Component, Axial Pin, Tibial Baseplate, Tibial Polyethylene Spacer, and Stem Extensions. A Stem Extension is required on the femur but optional to be used on the tibia.

> **NOTE |** A Cemented Resurfacing Patella and Block and Augments are available if needed.

The Resurfacing Femur (2500(X)00(X)) features a deepened patellar groove and a 5° valgus angle to assist in the restoration of patello-femoral kinematics, reduction of patellar subluxation and promotion of normal loading patterns. Internal/external rotation of the hinge can be controlled with a component that has a stop set for +/- 15° or a hinge component without a stop can be used.

Stem Extensions are available in lengths ranging from 30-140mm in either cemented or canal filling options **| TABLE 1**.

Table 1.

Stem Extensions – Cemented				
Stem	**Description**	**Length**	**Diameter**	**Collar**
KSC01530E	Straight Cylindrical, Fluted, Titanium (bullet tip)	30mm	15mm	None
KSC0(XX)65E	Straight Cylindrical, Fluted, Titanium	65mm	10, 12, 14, 16, 18mm	None
KSC(XX)100E	Straight Cylindrical, Fluted, Titanium	100mm	10, 12, 14, 16, 18mm	None
Stem Extensions – Canal Filling				
Stem	**Description**	**Length**	**Diameter**	**Collar**
KSP(XX)100E	Straight, Cylindrical, Splined, Slotted, Titanium	100mm	11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23mm	None
KSP(XX)140E	Straight, Cylindrical Splined, Slotted, Titanium	140mm	11, 12, 13, 14, 15, 16, 17, 18, 19, 21mm	None

The Tibial Baseplate (2500220(X)E) is available in five sizes for optimal tibial cortical rim coverage. The Tibial Baseplate also accepts optional Block Augments (5, 10 & 15mm) that can be independently placed on the medial or lateral compartment to address specific patient bone deficiencies **| TABLE 2.**

Table 2.

BLOCK AUGMENTS		
PART #	**DESCRIPTION**	**SIZE**
KTAGB(XXX)E	ELEOS TIBIAL BLOCK AUGMENT	(1, 2, 3, 4, 5) X (5, 10, 15mm)

The Tibial Polyethylene Spacer (250012(XX)E) is available in 8, 10, 12, 16 and 20mm thicknesses.

The ELEOS Hinge Knee System offers distal femoral bone replacement of 28mm. The Resurfacing Femur is available in left and right configurations in three sizes (60, 65 and 70mm) for intraoperative flexibility.

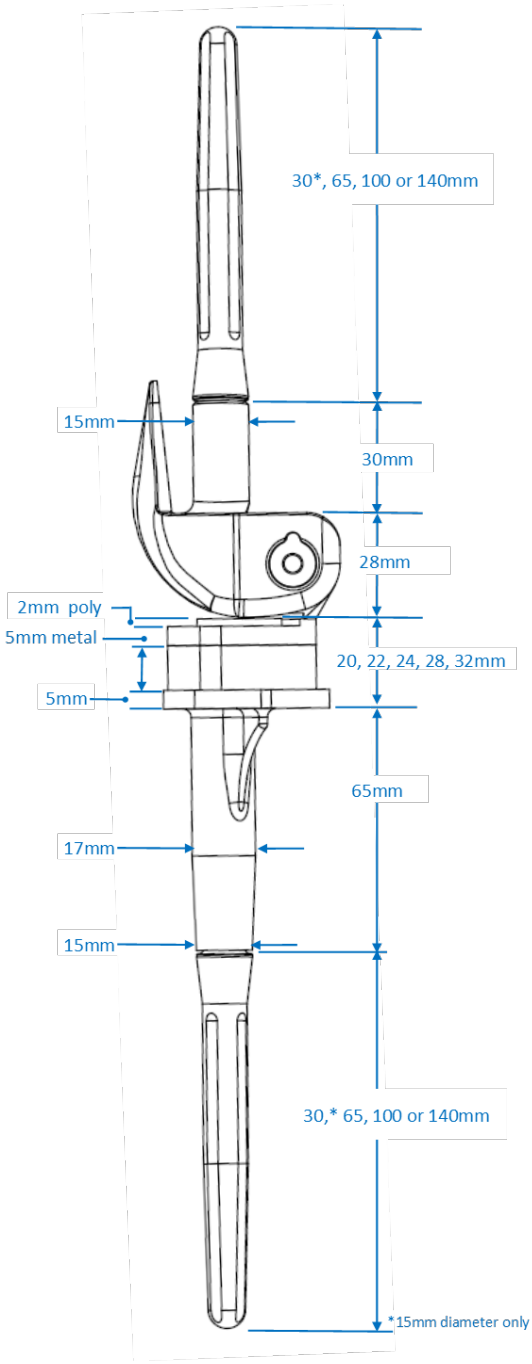
Table 3.

HINGE KNEE COMPONENT RESECTIONS

Part Number	Component	Resection
2500(X)00(X)E	Resurfacing Femur	28mm*
N/A	Tibial Assembly	20mm+

* Distal resection does not change. It is 28mm for all sizes. The Resurfacing Femur grows in M/L and A/P.

+ The 20mm Tibial Resection is with an 8mm polyethylene spacer and the thickness of the Tibial Hinge Component (5mm metal and 2mm poly). The actual resection may be less depending on joint line positioning and ligament compliance.



SURGICAL TECHNIQUE STEPS

FEMORAL PREPARATION

NOTE | It is surgeon preference if the femoral resection or tibial resection is done first.

FEMORAL REAMING

Initiate an opening in the femoral canal with the Starter Drill Bit 3/8 in. The entry point is placed medial and anterior to the anteromedial corner of the intercondylar notch.

Figure 1.

CAUTION | Hand reaming may be appropriate to avoid a thin femoral cortex that could result in a fracture. Care should be taken if reaming with power.

A preliminary reaming process is initiated to establish the anatomic axis of the distal femur. Begin incrementally reaming with the 10mm or appropriate sized Cylindrical Reamer **| FIGURE 1.** Cylindrical Reamers are available in diameters from 10-23mm in 1/2 mm increments and are marked at 65, 100 and 140mm lengths **A IN | FIGURE 3.**

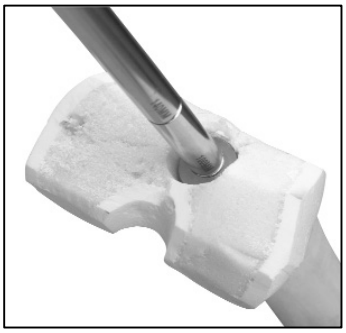


Figure 2.

NOTE | The markings on the reamer account for the additional material of the resurfacing femur (implant thickness and boss length). Therefore, a 65mm mark corresponds to an actual depth of 115mm, and a 100mm mark corresponds to an actual depth of 150mm length, and a 140mm mark to a depth of 190mm. If the distal resection is made as would be in a revision scenario, reaming to this line will extend past the distal end of the stem extension.

NOTE | The Stem Extension diameters from Table 1 are equal to Reamer diameters. When determining the appropriate Cylindrical Reamer size for the desired cement mantle, the difference will represent the cement mantle. For instance, reaming to a 13mm diameter will provide a line-to-line fit with a 13mm stem. Reaming to a 14mm will provide a 0.5mm cement mantle per side, while reaming to 15mm will provide a 1mm cement mantle per side.

Make sure to ream in an elliptical fashion with the first few reamers to ensure the distal bone does not dictate the path of the reamer.

CAUTION | During the reaming process, the intramedullary canal of the femur should be repeatedly irrigated and aspirated to reduce the chance of fat emboli.

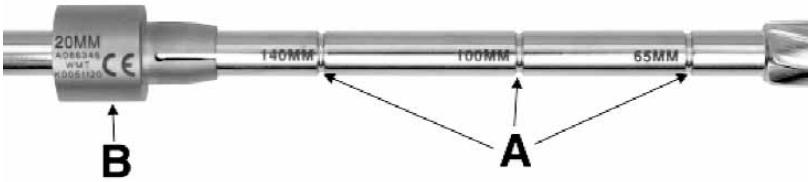


Figure 3.

Cylindrical Reamers are marked with depth references and can be used for appropriate reaming for stem choices. The marking on the reamers correspond to the overall length of the Stem Extensions when attached to the Resurfacing Femur **A IN | FIGURE 3**. The size of the canal filling and cemented Stem Extensions indicates the overall outside diameter of the implant.

> **NOTE |** Care should be taken if reaming a primary knee versus a resected femur after the primary implant was removed.
>
> **NOTE |** Sink the reamer past 158mm for a sufficient depth to accommodate for the resurfacing femoral component. If surgeon preference is to make the distal femoral cut prior to reaming, sink the reamer at least 130mm.

With desired reaming complete, ensure the Reamer provides a stable construct for additional femoral preparation. If additional stability is required due to a large opening at the distal femur, Stabilizing Collets are available in 16, 18, 20, 22, and 24mm diameters **B IN | FIGURE 3.** Place the appropriate size Stabilizing Collet over the reamer shank, proximal to the distal surface of the femur **| FIGURE 3.**

Ensure that the Stabilizing Collet is recessed below the planed level of distal femoral resection so that the Valgus Angle Alignment Guide can be seated flush to the distal surface.

DISTAL FEMORAL ALIGNMENT

The Valgus Angle Alignment Guide should be set at 5° (left or right) to match the 5° valgus orientation of the Resurfacing Femur. Set the valgus angle to 5° and tighten the small thumb screw **A IN | FIGURE 4.** Attach the Distal Femoral Resection Guide to the Valgus Angle Alignment Guide and tighten the small screw by hand or with a screwdriver **B IN | FIGURE 4.** Slide the entire construct over the fixed Cylindrical Reamer and lock the guide to the reamer by tightening the large thumb screw **C IN | FIGURE 4.**

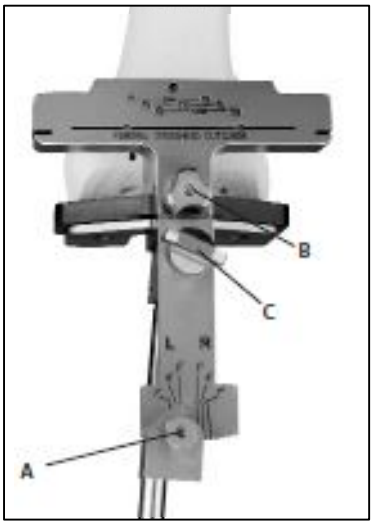


Figure 4.

DISTAL FEMORAL RESECTION

NOTE | All femoral resection slots are designed for use with a .050" (1.3mm) thick saw blade. The distal femoral resection depth is set using the 9mm Femoral Distal Spacer between the platform of the Valgus Angle Alignment Guide and the most proximal condyle if a femoral component was removed as in a revision situation **| FIGURE 5.**

Figure 5.

The 9mm Femoral Distal Spacer accounts for the distal thickness of a primary femoral implant that was removed. Once assembled, the spacer will provide a 28mm resection along the most prominent condyle surface from the joint line.

A secondary check is available by referencing the small slots on the Distal Femoral Resection Guide. By matching the position of these slots to the transepicondylar axis, a theoretical placement of the original joint line is indicated **| FIGURE 6.**

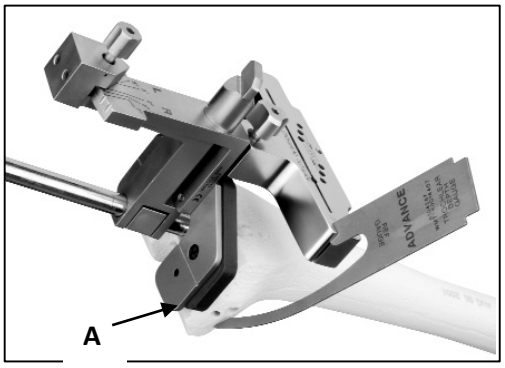


Figure 6.

CAUTION | Placing the Valgus Angle Alignment Guide paddles **A IN | FIGURE 6** or the 9mm Femoral Distal Spacer if needed flush against the distal surface, will result in a 28mm distal resection from the joint line (where the paddles touch the femur).

With the guide properly positioned, pin the Distal Femoral Resection Guide by placing 1/8" (3.2mm) Headless Fixation Pins or Drill Bits into the holes, marked "STD" **A IN | FIGURE 7**. The distal femoral resection can be performed with or without the Cylindrical Reamer and Valgus Angle Alignment Guide in place. If the guide is left, take caution to avoid the IM reamer while making the resection. To remove the guide, loosen both thumb screws **B IN | FIGURE 7** and disengage the Valgus Angle Alignment Guide from the Distal Femoral Resection Guide. Utilize the Quick Disconnect T-handle to remove the reamer. A distal resection is performed through the resection slot **C IN | FIGURE 7.**

After the resection is complete, remove the Distal Femoral Resection Guide and pins from the bone.

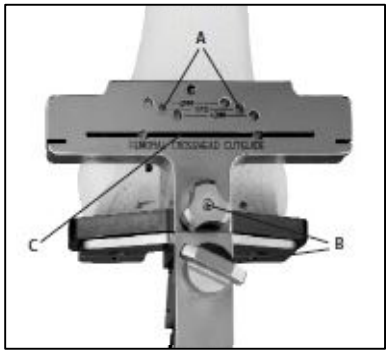


Figure 7.

FEMORAL SIZING

Femoral implant sizing can be approximated by one of the following methods: **1 |** use of trial femoral components **2 |** pre-operative radiographic evaluation of both knees.

ANTERIOR AND POSTERIOR RESECTIONS

If the Cylindrical Reamer was removed to make the distal resection, the Reamer needs to be inserted again to accommodate attachment of the Femoral A/P Resection Guide.
Select the Femoral A/P Resection Guide corresponding to the size Resurfacing Femur previously determined. Assemble the 5° IM Revision Angle Locator with the correct "Left" or "Right" marking facing the arrow on the Femoral A/P Resection Guide **A IN | FIGURE 8** and place the entire assembly over the fixed Cylindrical Reamer. Two laser marks on the face of the block indicate the M-L width of the Resurfacing Femur for a final check of femoral sizing **B IN | FIGURE 8.**

External rotation can be set by referencing either the medial and lateral epicondyles (transepicondylar axis) or A/P axis of the femur (perpendicular plane to the patella groove). Tighten the thumbscrew **C IN | FIGURE 8** and stabilize the block using fixation pins on the medial and lateral sides of the block. The fixation holes can be predrilled with a Drill Bit. 1/8 in. Femoral resections are performed through the anterior and posterior resection slots. The anterior femoral resection is 6° divergent to the posterior resection.

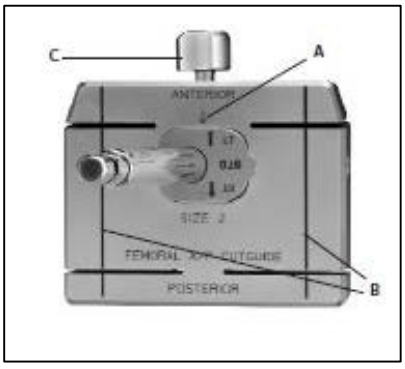


Figure 8.

RESURFACING FEMUR TRIAL ASSEMBLY

Assemble the appropriate size Trial Stem Extension to the Trial Resurfacing Femur. Using the Femoral Impactor, impact the Trial Resurfacing Femur onto the prepared bone **| FIGURE 9.**

Figure 9.

TIBIAL PREPARATION

The tibial resection is performed using Intramedullary (IM) Referencing instrumentation. Consider that the tibial components (Tibial Baseplate, Tibial Poly Spacer, and Tibial Hinge Component) will add 20mm of length when using an 8mm spacer; confirm that enough tibial bone is removed.

> **NOTE |** The ELEOS Tibial implants are designed for a perpendicular tibial base orientation to the IM canal. Hence, IM instrumentation helps ensure a neutral resection.

TIBIAL REAMING

A Starter Drill Bit 3/8 in. is used to initiate an opening in the proximal tibia just posterior to the anterior cruciate ligament tibial attachment.

Figure 10.

> **NOTE |** Drill to approximately 1-1.5 inches in depth and toggle the drill to increase the opening diameter to allow the 11 in. Reamer/IM Rod to locate the central axis.

Attach the Quick Disconnect T-handle to the 11 in. Reamer/ IM Rod and ream to establish the anatomical axis of the proximal tibia **| FIGURE 10** and to allow for the assembly of the IM Tibial Alignment Guide.

> **NOTE |** If Stem Extensions are to be used, continue reaming with consecutive larger reamer diameters until the desired diameter is achieved after the tibial resection has been made. See "Tibial Stem Extension (Optional)."

> **CAUTION |** Hand reaming is recommended when a patient has poor bone quality.

TIBIAL RESECTION

Preassemble the IM Tibial Alignment guide and IM Tibial Resection guide on the back table. Remove the Quick Disconnect T-Handle from the 11in. Reamer/IM Rod.

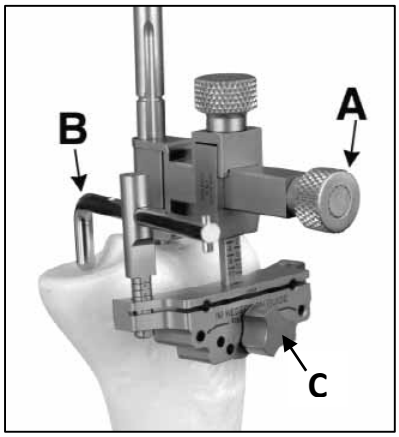


Figure 11.

Slide the IM Tibial Alignment and Resection Guide Assembly onto the 11in. Reamer/IM Rod until the bottom surface of the guide rests against the tibial surface **| FIGURE 11.**

Turn the locking screw to lock the guide to the 11in. Reamer/IM Rod **A IN | FIGURE 11.**

The Depth Stylus and/or Dual Reference Gauge (also known as crab claw/angel wing) can be used to set the proximal/distal position of the IM Tibial Resection guide to the desired level of tibial resection **B IN | FIGURE 11.**

> **NOTE |** The IM Tibial Resection Guide can be moved an additional 3mm down if the initial pin is placed in the "0" hole to get the desired resection level.

The Depth Stylus can be set to measure a depth of resection of 2mm or 10mm.

After desired resection level is achieved, tighten the knob on the IM Tibial Resection Guide. **C IN | FIGURE 11.**

Pin the IM Tibial Resection Guide to the proximal tibia.

After the desired alignment is achieved and pins are in place, loosen the locking screw **A IN | FIGURE 11** and knob on the IM Tibial Resection Guide **C IN | FIGURE 11.** Remove the top of the IM Tibial Alignment Guide leaving the IM Tibial Resection Guide pinned into the tibia.

Make the tibial resection and remove IM Tibial Resection Guide.

TIBIAL STEM EXTENSION (OPTIONAL)

Stem Extensions are available in either canal-filling or cemented options **| See Table 1.** If a Stem Extension is to be used, continue reaming with consecutive larger reamer diameters until the desired diameter.

Cylindrical Reamers are available in 10mm-23mm diameters in 0.5mm increments, and are marked for 65mm, 100mm, and 140mm lengths **A IN | FIGURE 12.**

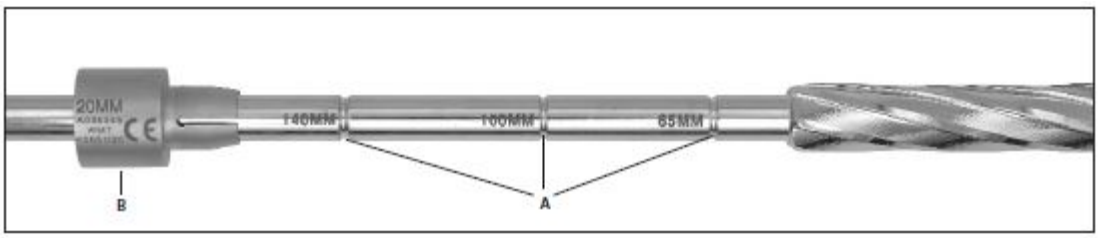


Figure 12.

CAUTION | Hand reaming may be appropriate to avoid thinning the tibial cortex which could result in a fracture.

NOTE | The markings on the Reamer account for the additional material of the resurfacing femur (implant thickness and boss length). Therefore, a 65mm mark corresponds to an actual depth of 115mm, a 100mm mark corresponds to an actual depth of 150mm length, and a 140mm mark to a depth of 190mm.

NOTE | Due to the length of the Tibial Baseplate, ream approximately 20mm past the 65mm, 100mm, and 140mm mark on the reamers to accommodate the appropriate Stem Extension. These marks are referenced on the tibial plateau after the tibial resection.

NOTE | The Stem Extension diameters from Table 1 are equal to Reamer diameters. When determining the appropriate Cylindrical Reamer size for the desired cement mantle, the difference will represent the cement mantle. For instance, reaming to a 13mm diameter will provide a line-to-line fit with a 13mm stem. Reaming to a 14mm will provide a 0.5mm cement mantle per side, while reaming to 15mm will provide a 1mm cement mantle per side.

With desired reaming complete, ensure the Reamer provides a stable construct for additional tibial preparation.

NOTE | If additional stability is required due to a large opening at the proximal tibia, Stabilizing Collets **B IN | FIGURE 12** are available in 16mm, 18mm, 20mm, 22mm, and 24mm diameters.

TIBIAL BASEPLATE PREPARATION

Select the Trial Tibial Baseplate Template that provides the optimal proximal tibial bone coverage **| FIGURE 13.**

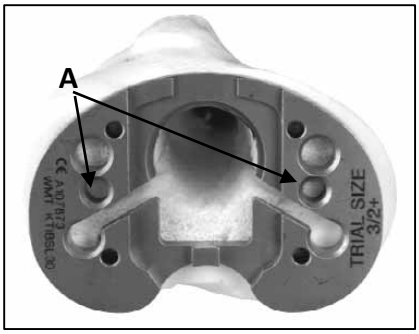


Figure 13.

> **NOTE |** If Augments are used, see "Block Augments (Optional)" on Page 20 and attach the appropriate size and thickness Trial Augment to the Trial Tibia Baseplate Template **| FIGURE 13.**

Place the Trial Tibial Baseplate Template on the proximal tibia **| FIGURE 13.** If the size is appropriate, attach the Trial Tibial Base Handle/Drill Guide and External Check Rod and place the Trial Tibial Baseplate Template on the proximal tibia and pin it to the tibia using Tibial Baseplate Fixation Pins **| FIGURE 14.**

Figure 14.

> **NOTE |** Align the distal end of the External Check Rod with the second toe.

Remove the Tibial Baseplate Handle and External Check Rod

Loosely attach the Keel Punch Guide Handle to the Keel Punch Guide. Align the pegs on the bottom of the Keel Punch Guide to the center holes in the Trial Tibial Baseplate Template **A IN | FIGURE 15.**

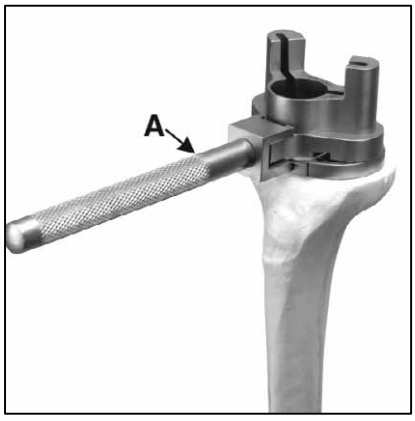


Figure 15.

Secure the Keel Punch Guide to the Trial Tibial Baseplate by turning the knurled handle, ensuring that the Keel Punch Guide Handle is in the correct orientation shown in **A IN | FIGURE 15.**

TIBIAL BASEPLATE REAMING

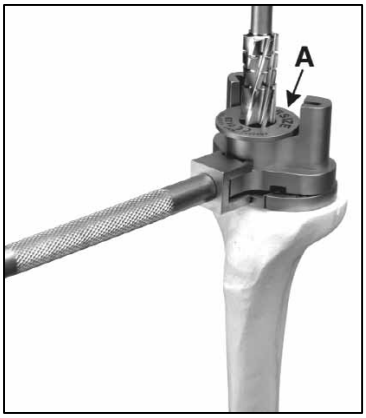


Figure 16.

Align the Press Fit Reamer Guide or Cemented Reamer Guide through the Keel Punch Guide **A IN | FIGURE 16.** If a thin cement mantle is preferred, utilize the Press Fit Reamer Guide and Press Fit Reamer; if a thicker cement mantle is preferred, use the Cemented Reamer Guide and Cemented Reamer.

Using the appropriate reamer, ream until no teeth are visible above the Reamer Guide **| FIGURE 16.**

> **NOTE |** Make certain that the Tibial Baseplate Template stays flush to the resection surface during the reaming and punching steps.

Remove the Reamer Guide from Keel Punch Guide.

TIBIAL BASEPLATE KEEL PUNCH

Using the Keel Punch Impactor and the Press Fit or Cemented Keel Punch, slide the punch through the guide until the punch is fully seated **| FIGURES 17 AND 18.** If Stem Extension reaming was performed, attach appropriate size Trial Stem Extension to the chosen Keel Punch.

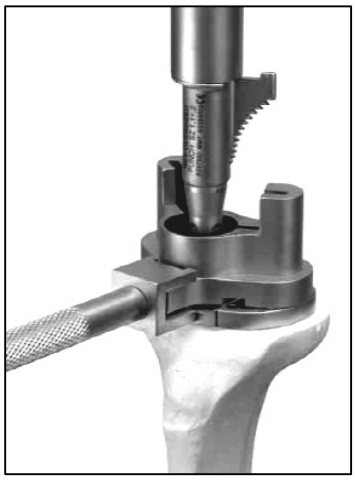


Figure 17.

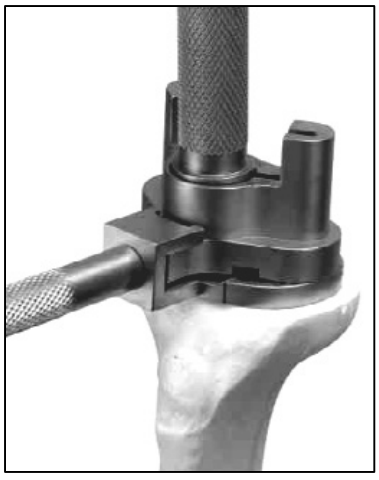


Figure 18.

Disassemble and remove all tibial preparation instruments. Use the Pin Puller to remove fixation pins.

TRIALING

TIBIAL TRIAL ASSEMBLY

Assemble the Trial Tibial Baseplate, Trial Stem Extension (optional), Trial Tibial Poly Spacer, Trial Block Augment (optional) and Trial Tibial Hinge Component according to previously determined sizes chosen **| FIGURES 19-20.**

Insert the trial tibial component assembly into the tibia **| FIGURE 19.**

Reduce the trial femoral construct onto the trial hinge component. Next, insert the Trial Axial Pin to attach the Trial Distal Femur to the Trial Tibial Hinge Component to secure the construct for trial reduction **| FIGURE 20.**

NOTE | The Axial Pin can be inserted from the medial or lateral side.

Figure 19.

Figure 20.

TRIAL REDUCTION

Perform a trial reduction. If the soft tissues require adjustment, minor changes can be accomplished by selecting alternate Tibial Poly Spacers. More significant adjustments may require changing the resection level.

COMPONENT ASSEMBLY

FEMORAL COMPONENT

On the back table, place the Resurfacing Femur and Stem Extension in the Femoral Assembly Platform using the Trial Axial Pin, and assemble with five hard mallet blows using the Stem Assembly Impactor **| FIGURE 21.**

Figure 21.

> **NOTE |** Recommend using 2lb. mallet from general surgical OR instruments.

> **NOTE |** Utilize the match mark on the Stem Extension so that the slot accommodates the bow of the femur**.**

TIBIAL COMPONENT

If a Stem Extension is to be used, place the Tibial Baseplate on the Tibial Baseplate Assembly Platform. Assemble the Stem Extension onto the Tibial Baseplate using five hard mallet blows directly on the tip of the Stem Extension with the Stem Assembly Impactor **| FIGURE 22.**

Figure 21.

Figure 22.

> **NOTE |** Make sure to remove the protective cap on the tip of the Stem Extension before assembly.

If augments are to be used see "Block Augments (Optional)."

PREPARATION OF CEMENT

Cement mixing begins and the femoral and tibial canals are cleaned using pulsating lavage and then dried with a femoral sponge or tampon. If desired, a cement restrictor (plug) can be placed in the canal. Cement is injected in a pressurized retrograde fashion.

COMPONENT INSERTION

FEMORAL COMPONENT

Place the resurfacing femur Stem Extension in the femoral canal. Guide and impact the Resurfacing Femur into the canal with the Femoral Impactor until the implant is fully seated at the resected plane **| FIGURE 23.** Remove excess cement. Proper position of the implant should be maintained until the cement cures.

Figure 23.

TIBIAL COMPONENT

A marking on the anterior portion of the Tibial Baseplate boss provides a reference to align the slot of the Stem Extension when a canal filling stem is indicated **| FIGURE 24.**

> **NOTE|** The slot on the Stem Extension **B IN | FIGURE 24** should align with the marking on the Tibial Baseplate boss **A IN | FIGURE 24**.

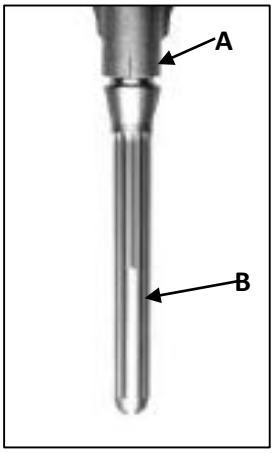


Figure 24.

Place the Tibial Baseplate and Tibial Poly Spacer into the canal using the Tibial Impactor **| FIGURE 25.** Care should be taken to anchor the final components in the appropriate position until the cement has set fully.

Figure 25.

TIBIAL HINGE ASSEMBLY

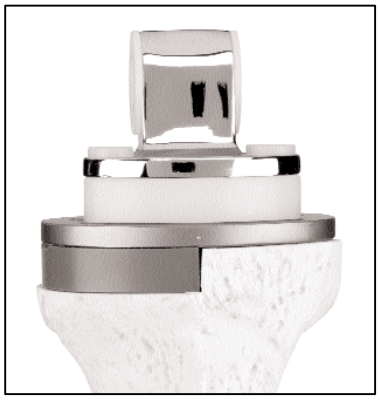


Figure 26.

Insert the tibial portion of the hinge assembly into the tibia **| FIGURE 26.**

Align the Resurfacing Femur with the Tibial Hinge Component **| FIGURE 27.**

Insert the Resurfacing Femur Axial Pin using the Axial Pin Inserter/Extractor. The Resurfacing Axial Pin size should match the size of the Femoral Resurfacing component chosen **| FIGURES 28-31**.

Figure 27.

The Resurfacing Femur Axial Pin can be inserted either on the medial or lateral side. The Axial Pin key must fall into the corresponding keyway in the femoral component. Make sure the Axial Pin is flush with the side of the Resurfacing Femur **| FIGURE 31.**

> **NOTE |** To help align the components, the Trial Axial Pin can be inserted part way into the opposite side of the final Resurfacing Axial Pin insertion. Then insert the Axial Pin into the other end and advance the pin forward, ejecting the Trial Axial Pin. Engage the Axial Pin until it is flush on both sides of the Resurfacing Femur.

Figure 28.

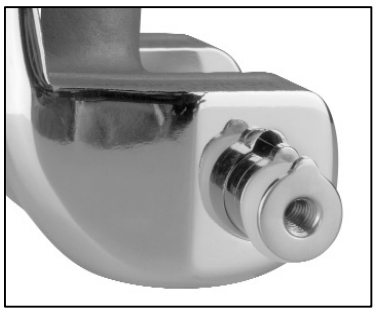


Figure 29.

Figure 30.

Figure 31.

BLOCK AUGMENTS (Optional)

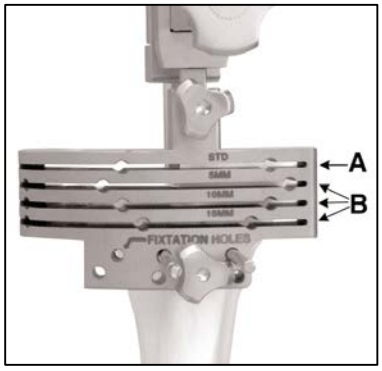


Figure 32.

During the tibial resection step of the surgical technique, if Block Augments are necessary, begin by making a proximal "clean-up" resection along the most prominent condyle through the 0mm resection slot marked “STD” in the Revision Block Augment Resection Guide **A IN | FIGURE 32.**

NOTE | The Revision Block Augment Resection Guide is available in a right and left hand version.

If block augmentation is needed, the Revision Block Augment Resection Guide provides resection slots for the 5mm, 10mm, and 15mm Augments. **B IN | FIGURE 32.**

These augments can be placed independently on the medial or lateral side of the tibia**.**

During tibial baseplate preparation, if an augment is to be used, attach the appropriate size Block Augment to the Trial Tibial Baseplate Template and proceed with tibial preparation, as specified above **| FIGURES 33-34**.

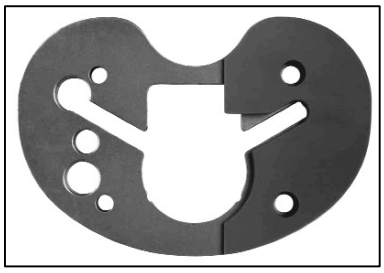


Figure 33.

Figure 34.

Using the packaged screws, assemble the Augments through the Tibial Baseplate. Plastic starter handles are provided with each augment screw and should be removed once the screw is tightened **| FIGURE 35.** A final tightening of the augment should be completed with standard 3.5mm hex head screwdriver.

Figure 35.

PATELLA RECONSTRUCTION (Optional)

Patella resurfacing is determined based on medical judgment of the clinical situation. If severe degeneration or arthritis is present on the articular surface of the patella, resurfacing may be indicated. If the patella is otherwise normal, it may be acceptable to resurface the patella or to leave it in its natural state.

RESURFACING PATELLA

The Resurfacing Patella Resection Guide can be used with or without Resurfacing Patella Resection Depth Gauges or Resurfacing Patella Minimum Thickness Gauges **| FIGURE 36**. When used without gauges, the Resurfacing Patella Resection Guide is positioned at the desired level of resection.

Securely clamp the jaws into the patella and resect the patellar bone. For a calibrated resection, the appropriate Resection Depth Gauge corresponding to the implant diameter should be attached to the top of the Resection Guide with the lock screw. Position the Resection Guide jaws parallel to the articular margin and securely clamp the guide to the bone, assuring the gauge is contacting the apex of the articular surface. The gauge can be removed to increase visibility.

Resurfacing Patella Minimum Thickness Gauges are available for preservation of 10mm or 15mm bone stock. Use of the Minimum Thickness Gauge is based on intraoperative assessment of bone quality and thickness.

Resurfacing Patella, All-Poly, Tri-Peg			
Part Number	**Description**	**Diameter**	**Thickness**
KPONTP29E	ELEOS RESURFACING PATELLA	29mm	8mm
KPONTP32E	ELEOS RESURFACING PATELLA	32mm	8mm
KPONTP35E	ELEOS RESURFACING PATELLA	35mm	8mm
KPONTP38E	ELEOS RESURFACING PATELLA	38mm	10mm
KPONTP41E	ELEOS RESURFACING PATELLA	41mm	11mm

The Resurfacing Patella Peg Drill Guide is used to size the patella and prepare holes in the bone for the implant pegs. Attach the Resurfacing Patella Drill Guide to the Patella Clamp. The Drill Guide has grooves on their surfaces indicating the patella diameter options. The Resurfacing Patella Peg Drill is used to prepare the peg holes **| FIGURE 37.**

> **NOTE |** The Resurfacing Patella have the same peg patterns between sizes and can be easily changed during trial reduction.
>
> **NOTE |** A Patella/Femoral Head Sizing Caliper is available for assessment of thickness.

Remove the Resurfacing Patella Drill Guide from the Patella Clamp and insert the Patella Clamp Seater in its place.

Once the patella surface is prepared, mix cement, wash and dry the bone, pressurize the cement, and insert the patella pegs into the prepared holes. Use the Patella Clamp with the Patella Clamp Seater attached to fully seat the patella. Remove residual cement and keep the Patella Clamp in place until cement is cured.

Figure 36.

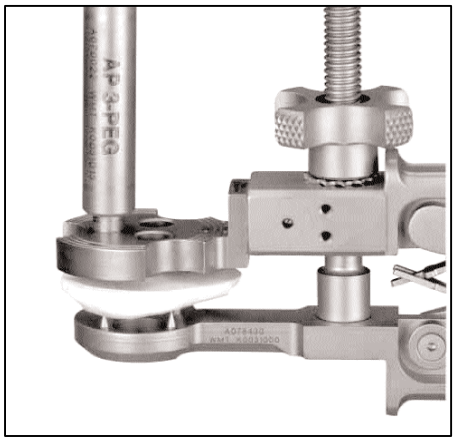


Figure 37.

COMPONENT DISASSEMBLY

To disengage the ELEOS tapers, insert the Taper Disassembly Tool into the hole on the side of the implant. Strike the end of the tool with a mallet until the components separate **| FIGURES 38-41.**

Figure 38.

Figure 39.

Figure 40.

Figure 41.

Support the implant during disassembly. Alternatively, or in concert with disassembly tools, insert the Taper Disassembly Fork around the outside of the implant, below the seam between the two components to be disassembled. Strike the end of the fork to disengage the tapers **| FIGURES 40 AND 41.** Again, support the implant during disassembly.

EXPLANTATION INFORMATION

In a revision case, when stem explantation is required, use the Stem Extractor Attachment to attach to the Slap Hammer Extractor Handle to remove the stem. To disengage Stem Extensions, use the Stem Implant Extractor-Adaptor. Assemble it to the Slap Hammer Pin Extractor. Next, thread the full assembly to the Stem Extension that needs to be removed. A Trefine from general surgical instrumentation can also be used to remove the stem by placing the Trefine over the stem to ream the interface between the stem and the bone.

IMPLANTS

STEM EXTENSIONS (CEMENTED)

PART NUMBER	DESCRIPTION	SIZE
KSC01500E	MODULAR TIBIAL BASE STEM CAP	
KSC01530E	ELEOS STEM EXTENSION	15MM X 30MM
KSC01065E	ELEOS STEM EXTENSION	10MM X 65MM
KSC01265E	ELEOS STEM EXTENSION	12MM X 65MM
KSC01465E	ELEOS STEM EXTENSION	14MM X 65MM
KSC01665E	ELEOS STEM EXTENSION	16MM X 65MM
KSC01865E	ELEOS STEM EXTENSION	18MM X 65MM
KSC10100E	ELEOS STEM EXTENSION	10MM X 100MM
KSC12100E	ELEOS STEM EXTENSION	12MM X 100MM
KSC14100E	ELEOS STEM EXTENSION	14MM X 100MM
KSC16100E	ELEOS STEM EXTENSION	16MM X 100MM
KSC18100E	ELEOS STEM EXTENSION	18MM X 100MM

STEM EXTENSIONS (CANAL FILLING)

PART NUMBER	DESCRIPTION	SIZE
KSP10100E	ELEOS STEM EXTENSION	11MM X 100MM
KSP11100E	ELEOS STEM EXTENSION	12MM X 100MM
KSP12100E	ELEOS STEM EXTENSION	13MM X 100MM
KSP13100E	ELEOS STEM EXTENSION	14MM X 100MM
KSP14100E	ELEOS STEM EXTENSION	15MM X 100MM
KSP15100E	ELEOS STEM EXTENSION	16MM X 100MM
KSP16100E	ELEOS STEM EXTENSION	17MM X 100MM
KSP17100E	ELEOS STEM EXTENSION	18MM X 100MM
KSP18100E	ELEOS STEM EXTENSION	19MM X 100MM
KSP20100E	ELEOS STEM EXTENSION	21MM X 100MM
KSP22100E	ELEOS STEM EXTENSION	23MM X 100MM
KSP10140E	ELEOS STEM EXTENSION	11MM X 140MM
KSP11140E	ELEOS STEM EXTENSION	12MM X 140MM
KSP12140E	ELEOS STEM EXTENSION	13MM X 140MM
KSP13140E	ELEOS STEM EXTENSION	14MM X 140MM
KSP14140E	ELEOS STEM EXTENSION	15MM X 140MM
KSP15140E	ELEOS STEM EXTENSION	16MM X 140MM
KSP16140E	ELEOS STEM EXTENSION	17MM X 140MM
KSP17140E	ELEOS STEM EXTENSION	18MM X 140MM
KSP18140E	ELEOS STEM EXTENSION	19MM X 140MM
KSP20140E	ELEOS STEM EXTENSION	21MM X 140MM

RESURFACING FEMURS

PART NUMBER	DESCRIPTION	SIZE
2500L002E	RESURFACING FEMUR SIZE 2 LEFT	60MM M/L
2500L003E	RESURFACING FEMUR SIZE 3 LEFT	65MM M/L
2500L004E	RESURFACING FEMUR SIZE 4 LEFT	70MM M/L
2500R002E	RESURFACING FEMUR SIZE 2 RIGHT	60MM M/L
2500R003E	RESURFACING FEMUR SIZE 3 RIGHT	65MM M/L
2500R004E	RESURFACING FEMUR SIZE 4 RIGHT	65MM M/L

RESURFACING FEMUR AXIAL PINS

PART NUMBER	DESCRIPTION	SIZE
25002112E	ELEOS RESURFACING FEMUR AXIAL PIN	SIZE 2
25002113E	ELEOS RESURFACING FEMUR AXIAL PIN	SIZE 3
25002114E	ELEOS RESURFACING FEMUR AXIAL PIN	SIZE 4

TIBIAL HINGE COMPONENTS

PART NUMBER	DESCRIPTION	SIZE
25002100E	ELEOS TIBIAL HINGE COMPONENT W/ ROTATIONAL STOP	
25002101E	ELEOS TIBIAL HINGE COMPONENT W/O ROTATIONAL STOP	

TIBIAL POLY SPACERS

PART NUMBER	DESCRIPTION	SIZE
25001208E	ELEOS TIBIAL POLY SPACER	8MM
25001210E	ELEOS TIBIAL POLY SPACER	10MM
25001212E	ELEOS TIBIAL POLY SPACER	12MM
25001216E	ELEOS TIBIAL POLY SPACER	16MM
25001220E	ELEOS TIBIAL POLY SPACER	20MM

TIBIAL BASEPLATES

PART NUMBER	DESCRIPTION	SIZE
25002201E	ELEOS TIBIAL BASEPLATE SIZE 1	60MM M/L
25002202E	ELEOS TIBIAL BASEPLATE SIZE 2	65MM M/L
25002203E	ELEOS TIBIAL BASEPLATE SIZE 3	70MM M/L
25002204E	ELEOS TIBIAL BASEPLATE SIZE 4	75MM M/L
25002205E	ELEOS TIBIAL BASEPLATE SIZE 5	80MM M/L

RESURFACING PATELLAS

PART NUMBER	DESCRIPTION	SIZE
KPONTP29E	ELEOS RESURFACING PATELLA, ALL-POLY, TRI-PEG	29MM
KPONTP32E	ELEOS RESURFACING PATELLA, ALL-POLY, TRI-PEG	32MM
KPONTP35E	ELEOS RESURFACING PATELLA, ALL-POLY, TRI-PEG	35MM
KPONTP38E	ELEOS RESURFACING PATELLA, ALL-POLY, TRI-PEG	38MM
KPONTP41E	ELEOS RESURFACING PATELLA, ALL-POLY, TRI-PEG	41MM

BLOCK AUGMENTS

PART NUMBER	DESCRIPTION	SIZE
KTAGB105E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 1 X 5MM
KTAGB110E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 1 X 10MM
KTAGB115E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 1 X 15MM
KTAGB205E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 2 X 5MM
KTAGB210E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 2 X 10MM
KTAGB215E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 2 X 15MM
KTAGB305E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 3 X 5MM
KTAGB310E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 3 X 10MM
KTAGB315E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 3 X 15MM

KTAGB405E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 4 X 5MM
KTAGB410E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 4 X 10MM
KTAGB415E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 4 X 15MM
KTAGB505E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 5 X 5MM
KTAGB510E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 5 X 10MM
KTAGB515E	ELEOS TIBIAL BLOCK AUGMENT	SIZE 5 X 15MM

INSTRUMENTS

REAMERS

PART NUMBER	DESCRIPTION	SIZE
K0051010E	CYLINDRICAL REAMER	10MM
K0050510E	CYLINDRICAL REAMER	10.5MM
K0051011E	CYLINDRICAL REAMER	11MM
K0050511E	CYLINDRICAL REAMER	11.5MM
K0051012E	CYLINDRICAL REAMER	12MM
K0050512E	CYLINDRICAL REAMER	12.5MM
K0051013E	CYLINDRICAL REAMER	13MM
K0050513E	CYLINDRICAL REAMER	13.5MM
K0051014E	CYLINDRICAL REAMER	14MM
K0050514E	CYLINDRICAL REAMER	14.5MM
K0051015E	CYLINDRICAL REAMER	15MM
K0050515E	CYLINDRICAL REAMER	15.5MM
K0051016E	CYLINDRICAL REAMER	16MM
K0050516E	CYLINDRICAL REAMER	16.5MM
K0051017E	CYLINDRICAL REAMER	17MM
K0050517E	CYLINDRICAL REAMER	17.5MM
K0051018E	CYLINDRICAL REAMER	18MM
K0050518E	CYLINDRICAL REAMER	18.5MM
K0051019E	CYLINDRICAL REAMER	19MM
K0050519E	CYLINDRICAL REAMER	19.5MM
K0051020E	CYLINDRICAL REAMER	20MM
K0050520E	CYLINDRICAL REAMER	20.5MM
K0051021E	CYLINDRICAL REAMER	21MM
K0050521E	CYLINDRICAL REAMER	21.5MM
K0051022E	CYLINDRICAL REAMER	22MM
K0050522E	CYLINDRICAL REAMER	22.5MM
K0051023E	CYLINDRICAL REAMER	23MM
K0051116E	STABILIZING COLLET	16MM
K0051118E	STABILIZING COLLET	18MM
K0051120E	STABILIZING COLLET	20MM
K0051122E	STABILIZING COLLET	22MM
K0051124E	STABILIZING COLLET	24MM
001-03-00001	REAMERS (TRAY 1)	
001-03-00016	TRAY LID STANDARD	

ASSEMBLY/DISASSEMBLY INSTRUMENTS

PART NUMBER	DESCRIPTION	SIZE
18041000E	SLAP HAMMER EXTRACTOR HANDLE	
25100008E	TIBIAL BASEPLATE ASSEMBLY PLATFORM	
25107000E	TAPER DISASSEMBLY TOOL	
25107001E	TAPER DISASSEMBLY FORK	

25107101E	FEMORAL ASSEMBLY PLATFORM
25107500E	MIDSECTION ASSEMBLY IMPACTOR
25107501E	STEM ASSEMBLY IMPACTOR
25107600E	FEMORAL IMPACTOR
25107601E	DISTAL FEMORAL EXTRACTOR
25107602E	TIBIAL IMPACTOR
001-03-00002	ASSEMBLY/DISASSEMBLY INSTRUMENTS (TRAY 2)
001-03-00016	TRAY LID STANDARD

STEM EXTENSION TRIALS

PART NUMBER	DESCRIPTION	SIZE
K0050010E	TRIAL STEM EXTENSION	10MM X 100MM
K0050011E	TRIAL STEM EXTENSION	11MM X 100MM
K0050012E	TRIAL STEM EXTENSION	12MM X 100MM
K0050013E	TRIAL STEM EXTENSION	13MM X 100MM
K0050014E	TRIAL STEM EXTENSION	14MM X 100MM
K0050015E	TRIAL STEM EXTENSION	15MM X 100MM
K0050016E	TRIAL STEM EXTENSION	16MM X 100MM
K0050017E	TRIAL STEM EXTENSION	17MM X 100MM
K0050018E	TRIAL STEM EXTENSION	18MM X 100MM
K0050020E	TRIAL STEM EXTENSION	20MM X 100MM
K0050022E	TRIAL STEM EXTENSION	22MM X 100MM
K0051005E	STEM IMPLANT EXTRACTOR-ADAPTOR	
K0051410E	TRIAL STEM EXTENSION	10MM X 140MM
K0051411E	TRIAL STEM EXTENSION	11MM X 140MM
K0051412E	TRIAL STEM EXTENSION	12MM X 140MM
K0051413E	TRIAL STEM EXTENSION	13MM X 140MM
K0051414E	TRIAL STEM EXTENSION	14MM X 140MM
K0051415E	TRIAL STEM EXTENSION	15MM X 140MM
K0051416E	TRIAL STEM EXTENSION	16MM X 140MM
K0051417E	TRIAL STEM EXTENSION	17MM X 140MM
K0051418E	TRIAL STEM EXTENSION	18MM X 140MM
K0051420E	TRIAL STEM EXTENSION	20MM X 140MM
K0051530E	TRIAL STEM EXTENSION	15MM X 30MM
K0056510E	TRIAL STEM EXTENSION	10MM X 65MM
K0056512E	TRIAL STEM EXTENSION	12MM X 65MM
K0056514E	TRIAL STEM EXTENSION	14MM X 65MM
K0056516E	TRIAL STEM EXTENSION	16MM X 65MM
K0056518E	TRIAL STEM EXTENSION	18MM X 65MM
001-03-00005	STEM EXTENSION TRIALS (TRAY 5)	
001-03-00016	TRAY LID STANDARD	

TIBIAL RESURFACING TRIALS

PART NUMBER	DESCRIPTION	SIZE
25101208E	TRIAL TIBIAL POLY SPACER	8MM
25101210E	TRIAL TIBIAL POLY SPACER	10MM
25101212E	TRIAL TIBIAL POLY SPACER	12MM
25101216E	TRIAL TIBIAL POLY SPACER	16MM
25101220E	TRIAL TIBIAL POLY SPACER	20MM
25102100E	TRIAL TIBIAL HINGE COMPONENT	
25102301E	TRIAL TIBIAL BASEPLATE	SIZE 1
25102302E	TRIAL TIBIAL BASEPLATE	SIZE 2
25102303E	TRIAL TIBIAL BASEPLATE	SIZE 3

25102304E	TRIAL TIBIAL BASEPLATE	SIZE 4
25102305E	TRIAL TIBIAL BASEPLATE	SIZE 5
001-03-00006	TIBIAL RESURFACING TRIALS (TRAY 6)	
001-03-00015	TRAY LID SMALL	

TIBIAL RESURFACING PREPARATION INSTRUMENTS

PART NUMBER	DESCRIPTION	SIZE
18410135E	SCREWDRIVER	
25107104E	PRESS FIT REAMER GUIDE	
25107105E	CEMENTED REAMER GUIDE	
25107110E	KEEL PUNCH GUIDE	
2510SL10E	TRIAL TIBIAL BASEPLATE TEMPLATE	SIZE 1
2510SL20E	TRIAL TIBIAL BASEPLATE TEMPLATE	SIZE 2
2510SL30E	TRIAL TIBIAL BASEPLATE TEMPLATE	SIZE 3
2510SL40E	TRIAL TIBIAL BASEPLATE TEMPLATE	SIZE 4
2510SL50E	TRIAL TIBIAL BASEPLATE TEMPLATE	SIZE 5
K0001112E	KEEL PUNCH IMPACTOR	
K0020211E	DEPTH STYLUS 2MM / 10MM	
K0021012E	TRIAL TIBIAL BASE HANDLE / DRILL GUIDE	
K0027101E	KEEL PUNCH GUIDE HANDLE	
K0040040E	VARUS/VALGUS TIBIAL RESECTION GUIDE	
K0041000E	IM TIBIAL ALIGNMENT GUIDE	
K0041010E	IM TIBIAL RESECTION GUIDE	
K0050001E	PRESS FIT KEEL PUNCH SIZE 1, 1+, & 2	
K0050002E	CEMENTED KEEL PUNCH SIZE 1, 1+, & 2	
001-03-00007	TIBIAL RESURFACING PREPARATION INSTRUMENTS (TRAY 7)	
001-03-00016	TRAY LID STANDARD	

GENERAL RESURFACING INSTRUMENTS

PART NUMBER	DESCRIPTION	SIZE
18055001E	UNIVERSAL HUDSON ADAPTOR	
25102211E	AXIAL PIN INSERTER/ EXTRACTOR	
25107613E	TIBIAL BASEPLATE PRESS FIT REAMER	
25107614E	TIBIAL BASEPLATE CEMENTED REAMER	
K0000900E	EXTERNAL CHECK GUIDE	
K0000901E	EXTERNAL CHECK ROD	
K0001002E	STARTER DRILL BIT 3/8 IN	
K0001005E	DRILL BIT 1/8 IN	
K0001006E	QUICK DISCONNECT FOR 1/8" DRILL BIT	
K0001015E	DRILL BIT 1/8IN X 100MM	
K0001016E	QUICK DISCONNECT T-HANDLE	
K0001101E	11 IN REAMER/IM ROD	
K0002007E	TIBIAL BASEPLATE FIXATION PIN	
K0002008E	SLAP HAMMER PIN EXTRACTOR	
K0002010E	PIN PULLER	
K0002011E	FIXATION PIN, HEADLESS	80MM
K0002015E	PIN INSERTER	
K0014407E	DUAL REFERENCE GAUGE	
001-03-00014	PIN CADDY	
001-03-00008	GENERAL RESURFACING INSTRUMENTS (TRAY 8)	
001-03-00016	TRAY LID STANDARD	

FEMORAL RESURFACING INSTRUMENTS

PART NUMBER	DESCRIPTION	SIZE
2510L002E	TRIAL RESURFACING FEMUR	SIZE 2
2510L003E	TRIAL RESURFACING FEMUR	SIZE 3
2510L004E	TRIAL RESURFACING FEMUR	SIZE 4
2510R002E	TRIAL RESURFACING FEMUR	SIZE 2
2510R003E	TRIAL RESURFACING FEMUR	SIZE 3
2510R004E	TRIAL RESURFACING FEMUR	SIZE 4
25107809E	FEMORAL DISTAL SPACER	9MM
25102113E	TRIAL AXIAL PIN	
K0056010E	IM REVISION ANGLE LOCATOR	5 DEGREE
K0011001E	VALGUS ANGLE ALIGNMENT GUIDE	
25107808E	DISTAL FEMORAL RESECTION GUIDE	
25107802E	FEMORAL A/P RESECTION GUIDE	SIZE 2
25107803E	FEMORAL A/P RESECTION GUIDE	SIZE 3
25107804E	FEMORAL A/P RESECTION GUIDE	SIZE 4
001-03-00009	FEMORAL RESURFACING INSTRUMENTS (TRAY 9)	
001-03-00016	TRAY LID STANDARD	

PATELLA INSTRUMENTS

PART NUMBER	DESCRIPTION	SIZE
18410213E	PATELLA/FEMORAL HEAD SIZING CALIPER	
18810210E	RESURFACING PATELLA RESECTION GAUGE	10MM
18810220E	RESURFACING PATELLA RESECTION GUIDE	
18810228E	RESURFACING PATELLA DEPTH GAUGE	8MM
18811210E	RESURFACING PATELLA MINIMUM THICKNESS GAUGE	10MM
18811215E	RESURFACING PATELLA MINIMUM THICKNESS GAUGE	15MM
18812211E	RESURFACING PATELLA THICKNESS RESECTION GAUGE	11MM
K0031000E	PATELLA CLAMP	
K0031001E	PATELLA CLAMP SEATER	
K0031002E	RESURFACING PATELLA PEG DRILL GUIDE	
K0031013E	RESURFACING PATELLA PEG DRILL	
KPTRTP32E	TRIAL RESURFACING PATELLA	32MM
KPTRTP35E	TRIAL RESURFACING PATELLA	35MM
KPTRTP38E	TRIAL RESURFACING PATELLA	38MM
KPTRTP41E	TRIAL RESURFACING PATELLA	41MM
001-03-00010	PATELLA INSTRUMENTS (TRAY 10)	
001-03-00016	TRAY LID STANDARD	

AUGMENT PREPARATION & TRIALING INSTRUMENTS

PART NUMBER	DESCRIPTION	SIZE
K0052002E	REVISION BLOCK AUGMENT RESECTION GUIDE	
K0052003E	REVISION BLOCK AUGMENT RESECTION GUIDE	
K0053013E	TRIAL BLOCK AUGMENT 5MM	SIZE 1
K0053014E	TRIAL BLOCK AUGMENT 5MM	SIZE 1
K0053015E	TRIAL BLOCK AUGMENT 5MM	SIZE 2
K0053016E	TRIAL BLOCK AUGMENT 5MM	SIZE 2
K0053017E	TRIAL BLOCK AUGMENT 5MM	SIZE 3
K0053018E	TRIAL BLOCK AUGMENT 5MM	SIZE 3

K0053019E	TRIAL BLOCK AUGMENT 5MM	SIZE 4
K0053020E	TRIAL BLOCK AUGMENT 5MM	SIZE 4
K0053021E	TRIAL BLOCK AUGMENT 5MM	SIZE 5
K0053022E	TRIAL BLOCK AUGMENT 5MM	SIZE 5
K0053025E	TRIAL BLOCK AUGMENT 10MM	SIZE 1
K0053026E	TRIAL BLOCK AUGMENT 10MM	SIZE 1
K0053027E	TRIAL BLOCK AUGMENT 10MM	SIZE 2
K0053028E	TRIAL BLOCK AUGMENT 10MM	SIZE 2
K0053029E	TRIAL BLOCK AUGMENT 10MM	SIZE 3
K0053030E	TRIAL BLOCK AUGMENT 10MM	SIZE 3
K0053031E	TRIAL BLOCK AUGMENT 10MM	SIZE 4
K0053032E	TRIAL BLOCK AUGMENT 10MM	SIZE 4
K0053033E	TRIAL BLOCK AUGMENT 10MM	SIZE 5
K0053034E	TRIAL BLOCK AUGMENT 10MM	SIZE 5
K0053037E	TRIAL BLOCK AUGMENT 15MM	SIZE 1
K0053038E	TRIAL BLOCK AUGMENT 15MM	SIZE 1
K0053039E	TRIAL BLOCK AUGMENT 15MM	SIZE 2
K0053040E	TRIAL BLOCK AUGMENT 15MM	SIZE 2
K0053041E	TRIAL BLOCK AUGMENT 15MM	SIZE 3
K0053042E	TRIAL BLOCK AUGMENT 15MM	SIZE 3
K0053043E	TRIAL BLOCK AUGMENT 15MM	SIZE 4
K0053044E	TRIAL BLOCK AUGMENT 15MM	SIZE 4
K0053045E	TRIAL BLOCK AUGMENT 15MM	SIZE 5
K0053046E	TRIAL BLOCK AUGMENT 15MM	SIZE 5
001-03-00013	AUGMENT PREPARATION AND TRIALING INSTRUMENTS (TRAY 13)	
001-03-00016	TRAY LID STANDARD	

X-RAY TEMPLATES

PART NUMBER	DESCRIPTION	SIZE
G015XRGSE	X-RAY TEMPLATES	

The ELEOS Limb Salvage System is compatible with the following MicroPort Orthopedics systems trademarked by MicroPort: Guardian, Advance, Gladiator, Lineage, and Transcend.

 ELSS HK.12.13.16 v0

Onkos Surgical
77 East Halsey Road
Parsippany, NJ 07054
973.264.5400 phone
www.onkossurgical.com/ELEOS