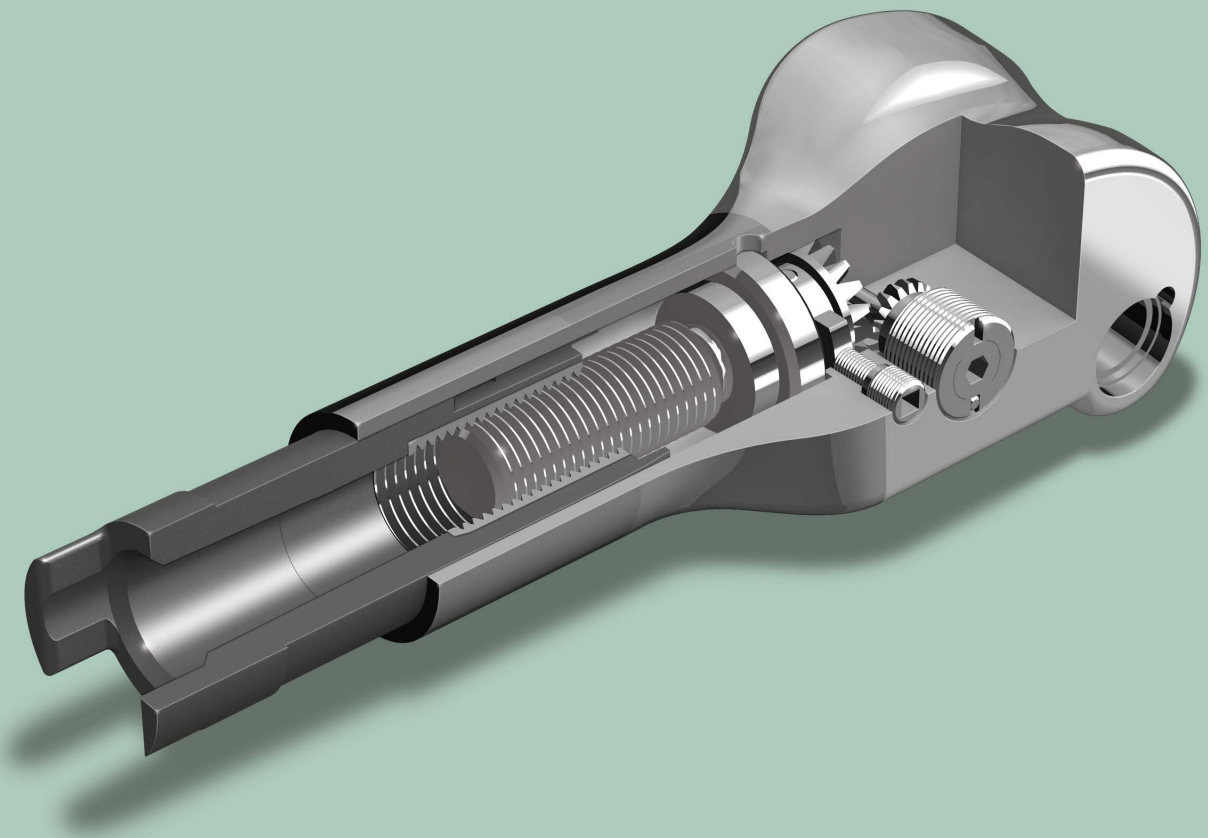
stryker

Orthopaedics

Distal Femoral Growing Prosthesis

Surgical Protocol

This document is intended to be used by healthcare professionals only.



Distal Femoral Growing Prosthesis
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Table of Contents

Section 1: Introduction

The Stryker Distal Femoral Growing Prosthesis provides a means to reconstruct large bone defects resulting from bone resection in skeletally immature patients. The device can be expanded as a patient grows so that leg-length equality can be achieved. The device utilizes a rotating hinge design. The expansion process is mechanical and is conducted with subsequent minimally invasive procedures following the initial implantation surgery.

The system consists of distal femoral components, extension pieces, and stems. It also includes a complete set of trial components and instrumentation.

The modular implants are assembled by impacting a male/female taper design, securely locking them together.

Section 2: Indications and Contraindications

The Stryker Distal Femoral Growing Prosthesis is indicated for pediatric patients who have not achieved full skeletal maturity (open epiphysis), where radical resection and replacement of the distal femur and/or proximal tibia is required with the following conditions:

- Oncology indications
- Severe trauma
- Noninflammatory degenerative joint disease including osteoarthritis
- Correction of functional deformity
- Rheumatoid arthritis
- Revision procedures where other treatments or devices have failed

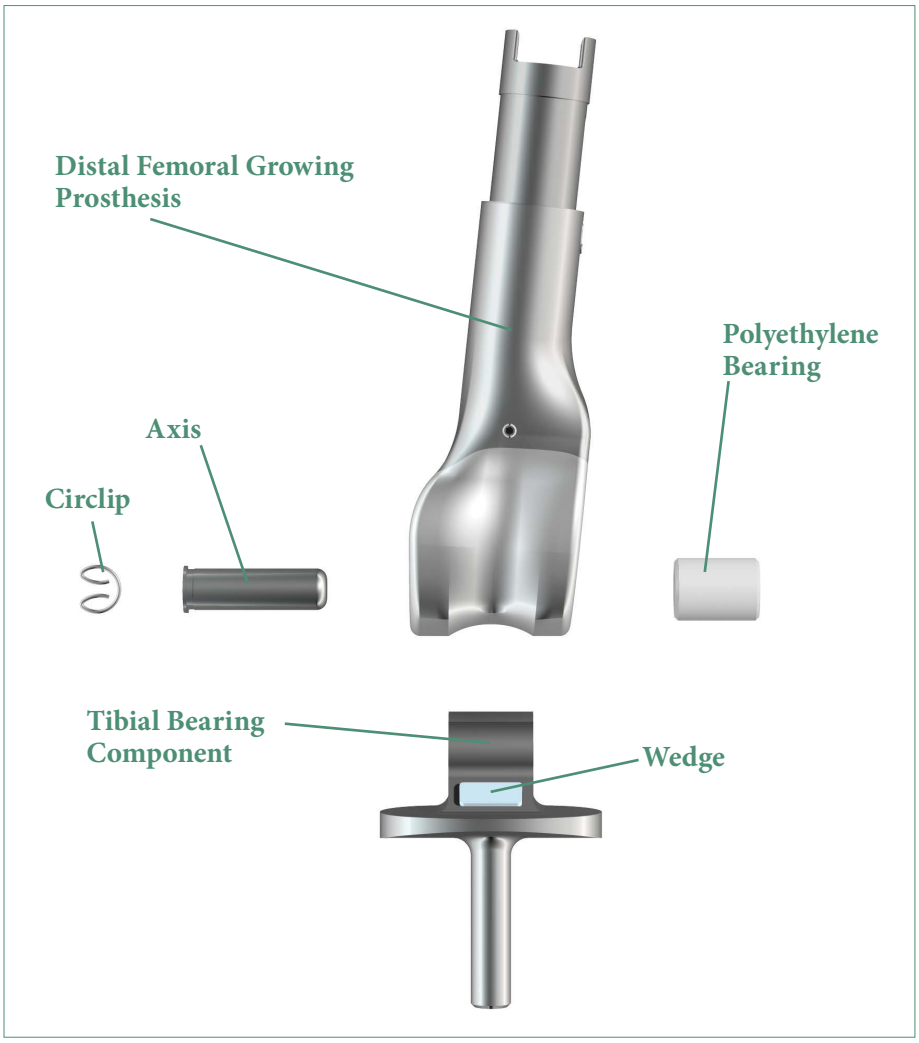
The devices are single use implants intended only for implantation with bone cement.

The contraindications for use of the Stryker Distal Femoral Growing Prosthesis include:

1. As related to Bone Tumors
   Not all bone tumors may be treated successfully by segmental resection. Any condition that may have already resulted in either local or distant spread of the tumor may be a contraindication. Examples of such conditions include:
   - Pathological fracture;
   - Overt infection;
   - Inopportune placement of biopsy incision; and,
   - Rapid disease progression beyond a respectable margin.
2. Adult or skeletally mature patients (at time of surgery)
3. Skeletally immature patients who have insufficient soft tissue for closure.
4. Any active or suspected latent infection in or about the operative joint.
5. Any mental or neuromuscular disorder which would create an unacceptable risk of prosthesis instability, prosthesis fixation failure, or complications in postoperative care.
6. Bone stock compromised by disease, infection or prior implantation which cannot provide adequate support and/or fixation to the prosthesis.
7. Any patellar deficiency that would require use of a patellar component.

SEE PACKAGE INSERT FOR WARNINGS, PRECAUTIONS, ADVERSE EFFECTS AND OTHER ESSENTIAL PRODUCT INFORMATION.

Section 3: Stryker Distal Femoral Growing Prosthesis Components and System Offerings



Distal Femoral Growing Prosthesis

The Distal Femoral Growing Prosthesis is available in left and right configurations, and replacement lengths from 150mm to 200mm in 10mm increments. The Distal Femoral Growing Prosthesis measures 43.5mm in the A/P and 45mm in the M/L.

Caution:

Not all sizes are readily available. Please contact your Stryker sales representative regarding availability at the beginning of the treatment cycle to ensure device availability.

The Distal Femoral Growing Prosthesis, after initial implantation, may be expanded utilizing two hex screwdrivers. A 2mm Hex Screwdriver is utilized to lock/un-lock the prosthesis, and a 3.5mm Hex Screwdriver is utilized to expand/retract the prosthesis.

Stem Components

The GMRS cemented stems are available in six styles: straight, curved and long curved; each style with or without extra-cortical porous-coated body sections. The extra-cortical porous-coated body section has a 40mm replacement length. The stems are also available without the extra-cortical porous-coated body section, with an 11mm replacement length.

All stems are available in 8, 9 , 10, 11, 13, 15 and 17mm diameters. Their respective seat diameters at the resection level are as follows:

GMRS Cemented Stem Options Available for the Growing Distal Femur

Stem Diameter	Seat Diameter	Straight Stem Length	Bowed Stem Length
8mm	22mm	102mm	102mm
9mm	22mm	102mm	102mm
10mm	24mm	102mm	102mm
11mm	24mm	127mm	127mm, 203mm
13mm	28mm	127mm	127mm, 203mm
15mm	32mm	127mm	127mm, 203mm
17mm	36mm	127mm	127mm, 203mm

The stems are designed to be cemented into the medullary canal. Optional stem centralizers are available for the 10-17mm diameter (for the straight and short-curved stems only).

Extension Pieces

The extension pieces are used to customize the replacement length and are available in 30, 40, 50, 60, 70, 80, 100, 120, 140, 160, 180, 200, and 220mm lengths. This component features a male and female taper, which attaches a stem to a distal femoral component.

Total Femur

The Growing Prosthesis can also be assembled to a connection piece and proximal femoral component to reconstruct the entire femur.

The proximal femoral components are available in two styles, standard and trochanteric. The components are available in three different configurations but only the neutral configuration should be used for total femoral replacement. All components have a replacement length of 70mm, which is measured to the center of the standard length (zero offset) femoral head. The components accept Stryker femoral head implants with the 5°40' taper (V40 femoral heads). The proximal femoral components have a 135° neck angle and fixation holes to re-attach the abductor mechanism.

The connection pieces are available in 80 or 90mm replacement lengths and left and right configurations. This component features a double male taper design to connect the Distal Femoral Growing Prosthesis to either a proximal femoral component or an extension piece if additional replacement length is required.

Tibial Components

There are three tibial component options for use with the Distal Femoral Growing Prosthesis: the Pediatric All-Polyethylene Tibial Component, the Modular Rotating Hinge Tibial Baseplate, and the GMRS Small Proximal Tibia. Each tibial component option requires a different Tibial Bearing Component:

Tibial Component Options and Associated Tibial Bearing Components

Tibial Component	Tibial Bearing Component
Pediatric All Poly Tibia	6497-2-301
MRH Tibial Baseplate GMRS Proximal Tibia	6497-2-302
GMRS Small Proximal Tibia	6497-2-303

Pediatric All-Polyethylene Tibial Component

The Pediatric All-Polyethylene Tibial Component is available in two sizes (PT1 and PT2), each in 2 thicknesses (8 and 11mm) and are made from DURATION Stabilized Ultra High Molecular Weight Polyethylene (UHMWPE).

Modular Rotating Hinge Tibial Baseplate

If the bone quality is suspect or the component cannot be properly supported, the Modular Rotating Hinge (MRH) tibial baseplate is recommended.

The MRH Tibial Baseplate is available in four sizes (Small 1, Small 2, Medium 2 and Large 2), with modular stem options (80 and 155mm lengths, 10-23mm diameter). The tibial inserts are available in two sizes (Small 1 / Small 2 and Medium 2 / Large 2), each in 5 thicknesses (10, 13, 16, 20, and 24mm) and are made from DURATION Stabilized Ultra High Molecular Weight Polyethylene (UHMWPE). A comprehensive range of modular stem extensions are available to be assembled with these Tibial Baseplates.

GMRS Proximal Tibial Component

The GMRS Proximal Tibial Component is available in two sizes (Small and Standard) and has a replacement length of 80mm, measured to the sulcus of the thinnest, 10mm, tibial insert. The Proximal Tibial Component has fixation holes in the Anterior-Posterior (A/P) and Medial-Lateral (M/L) direction to re-attach soft tissues. The Proximal Tibial Component accepts the small GMRS Tibial Inserts (6495-3-0XX). The tibial inserts are available in five thicknesses (10, 13, 16, 20, and 24mm) and are made from DURATION Stabilized Ultra High Molecular Weight Polyethylene (UHMWPE). The GMRS Small Proximal Tibial Component accepts the GMRS cemented stems.

Instrumentation

The Distal Femoral Growing Prosthesis utilizes a combination of selected instrumentation from the GMRS Instrument Set and selected other instruments. Please refer to the instrument bars throughout the technique and the instrument listing on page 34 through 35.

Section 4: Primary Surgical Technique

Pre-Operative Plan

- The primary goal is wide resection of the lesion or affected area.
- The extent of the tumor and/or the amount of resection required should be determined during pre-operative planning.
- Depending on the patient's expected remaining growth, the surgeon can determine if an expandable prosthesis is the appropriate treatment. If this is the case, the patient's expected remaining growth should be used to appropriately plan for future expansions of the device.

Distal Femur Resection Lengths and Maximum Expansion

Distal Femur Replacement Lengths*		
Stem without Body = 11mm		
Stem with Body = 40mm		
Total Replacement Length (L)		Maximum Expansion
Stem without Body	Stem with body	
150mm	179mm	35mm
160mm	189mm	45mm
170mm	199mm	55mm
180mm	209mm	65mm
190mm	219mm	75mm
200mm	229mm	85mm

Caution:

Not all sizes are readily available. Please contact your Stryker sales representative regarding availability at the beginning of the treatment cycle to ensure device availability.

Exposure

- Tumor exposure is gained through an extensile approach as dictated by the tumor or necessary resection.
- An applicable approach is an anterior approach with a medial parapatellar arthrotomy. However a lateral approach will allow for future expansions of the device through the same incision.
- Biopsy tracts are incorporated into the incision and elipsed out.
- Tumor and any soft tissue extension is exposed through careful dissection.
- Collateral and cruciate ligaments are dissected from the tibia.
- Bone segment is measured and resected en bloc based on pre-operative plan.
- Tumor margins are confirmed.
- Femoral osteotomy is planned.

Distal Femoral Growing Prosthesis
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Figure 1: Distal Femoral Template

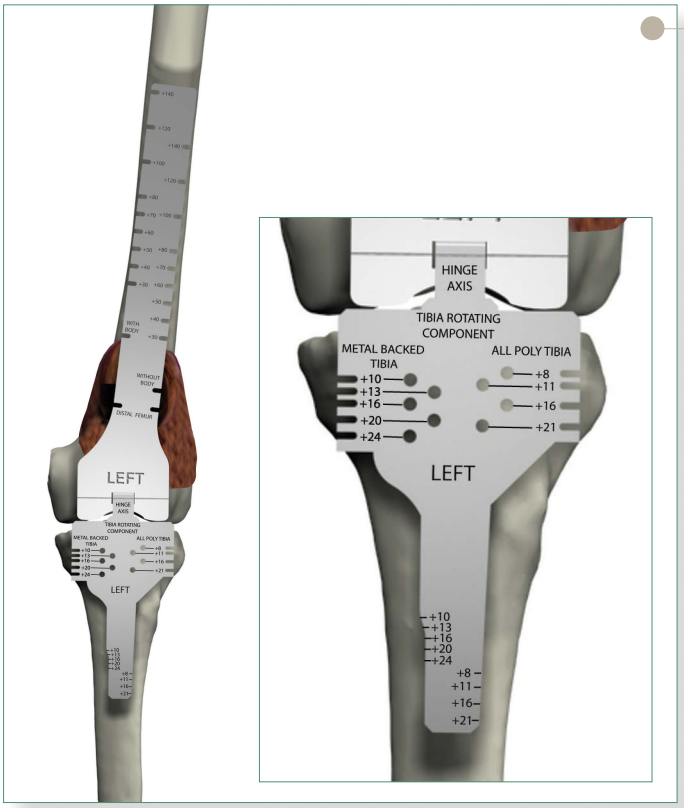

Figure 2: MRH/All-Poly Tibial Template

Planning the Resection Length

- The resection length of the Stryker Distal Femoral Growing Prosthesis is both marked on the device and included on the label of the device. The Distal Femoral Template from the GMRS Instrument Set can be used to select resection level that can be reproduced by the available implants. The Distal Femoral Template is placed on the bone so that the silhouette of the template coincides with the distal condyles of the femur **(Figure 1)**. The Distal Femoral Template is read at the appropriate marking depending on whether the stem being used is with or without extra-cortical porous-coated body section.

With regards to the resection length the following must be taken into account when planning for the tibial cut:

- If the surgeon intends to use the Modular Rotating Hinge (MRH) baseplate with the Stryker Distal Femoral Growing Prosthesis, an 18 mm resection is usually required for the MRH baseplate. Typically, 10-12mm of bone from the medial tibial sulcus is removed from the proximal tibia and the femoral resection is therefore, 6-8mm longer than the prosthesis. However if the tibial growth plate is still open, a 2mm resection from the medial tibial sulcus of the proximal tibia preserves the growth plate, allows for continued tibial growth and requires less expansion of the prosthesis. The joint line corrects over time as prosthesis expansion exceeds tibial growth.
- Alternatively, the MRH/All-Poly Tibial Template can be attached to the Distal Femoral Template. The slots in the Tibial Template coincide with the level of the proximal tibial resection for the different All-Poly Tibial components or the MRH Tibial Insert thickness options **(Figure 2)**. This is a provisional marking only; no bone resection is performed at this time. The resection is made at a later point in the procedure utilizing EM alignment instrumentation.
- If the surgeon intends to use the Proximal Tibia, please refer to the GMRS Proximal Tibial Surgical Protocol (LSPK39) for instructions on planning the tibial resection.

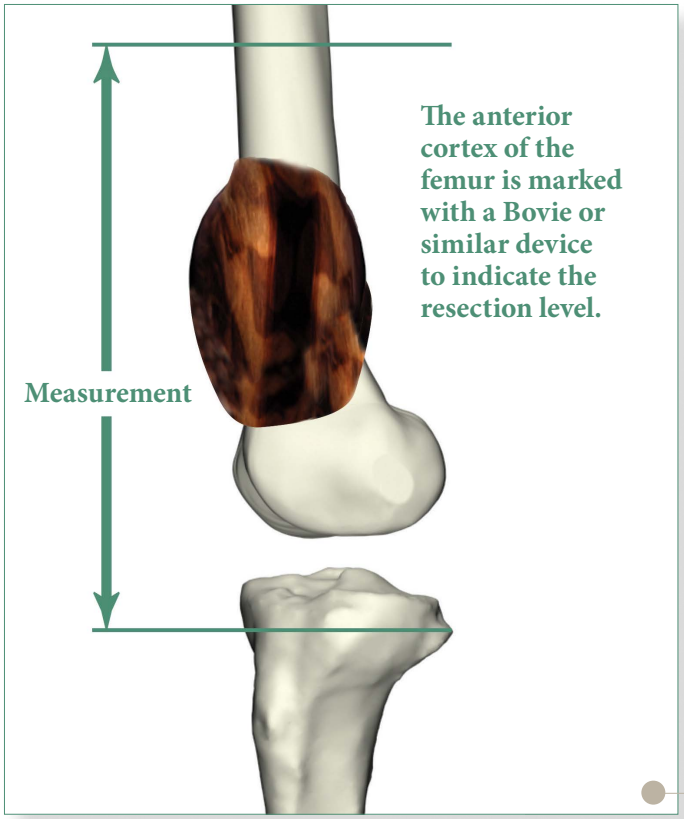

Figure 3: Total Resection Measurement

Please refer to the table below to equate the Distal Femoral Template to equivalent lengths of Growing Prosthesis construct:

Note:

It is important to ensure proper patellar tracking by means of proper placement of the device. The length of the femoral resection and prosthetic replacement must be considered with the tibial resection to recreate leg length and establish proper patellar tracking. Preservation of the tibial growth plate, patellar tracking, tibial resection, and leg length must be taken into consideration when making the femoral resection.

Tech Tip:

As an aid to restoring leg length, a reference measurement can be established across the joint. A mark is made on the femur, proximal to the femoral resection, along with a mark on the tibia, distal to the tibial resection. **(Figure 3)** The distance between these marks can be measured before the resection is made, and checked again, with the trials or implants in place, after the resection is made.

Instrument Bar

6496-9-069
Distal Femoral Template

6496-9-071
MRH/All Poly Tibial Template

Figure 3A: Replacement Length Measurement

GMRS Distal Resection Template Measurement		Femoral Component Length (L)
Without Body	With Body	
+70	+40	150mm
+80	+50	160mm
	+60	170mm
+100	+70	180mm
	+80	190mm
+120		200mm
	+100	150mm + 60mm Body Segment
+140		150mm + 70mm Body Segment
	+120	150mm + 80mm Body Segment
	+140	150mm + 100mm Body Segment

Caution:

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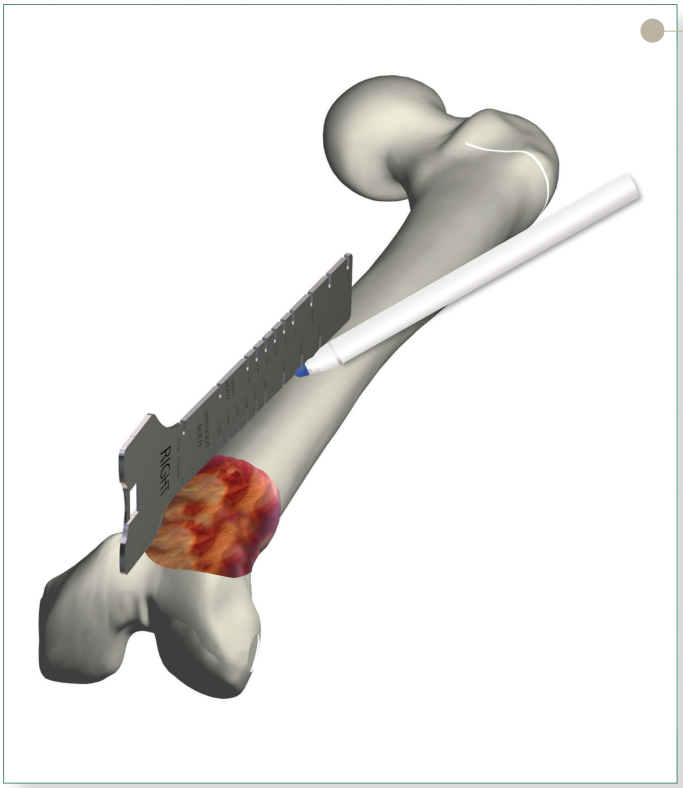

Figure 4: Marking for Rotational Alignment

Rotational Alignment

- Using a straight edge, the anterior cortex of the distal femur is marked above the resection level in line with the trochlear groove of the distal femur **(Figure 4)**.
- The line should be directly anterior to the linea aspera. This reference mark will be used later to aid in rotational orientation of the prosthetic components. Rotational alignment can also be determined or verified during trial evaluation.
- The Stem Implants and Trials are marked in line with the trochlear groove of the Distal Femoral Component. As a guide to rotational orientation, the alignment marking on the implant stem can be oriented to the mark made on the anterior cortex above the resection level.

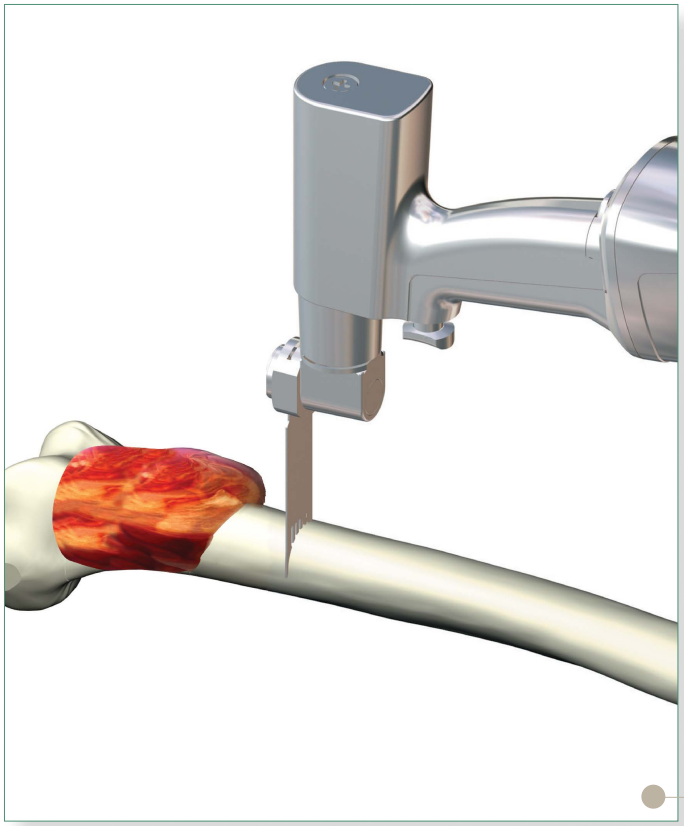

Figure 5: Osteotomy

Femoral Osteotomy

Tech Tip:

It is preferable to resect the femur a millimeter or two distal to the marked resection level. This will allow the Facing Reamer to plane accurately up to the mark at a 90° angle.

Note:

It is extremely important not to distract the extremity following the resection. The end of the femoral osteotomy should be kept well padded to protect the femoral vessels. The length of the resected specimen should be checked and measured again following resection.

Instrument Bar

6496-9-069
Distal Femoral Template

6496-9-071
MRH/All Poly Tibial Template

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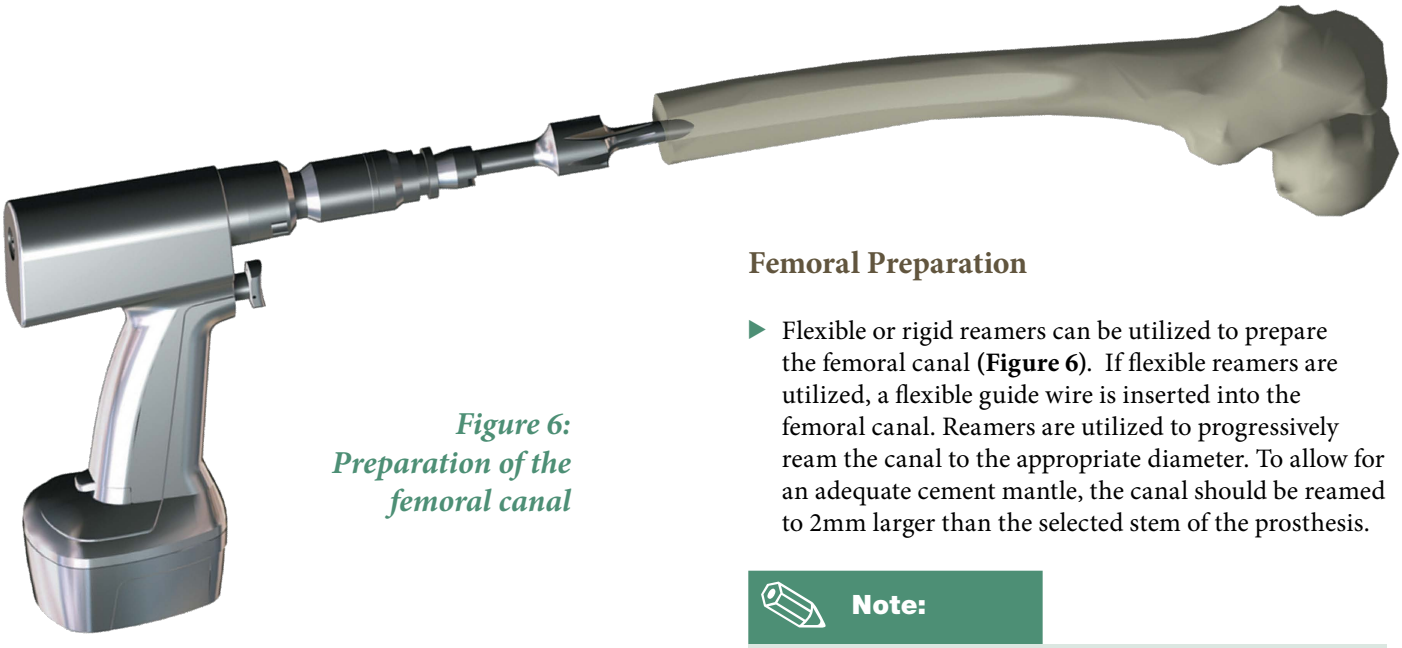

Figure 6: Preparation of the femoral canal

Femoral Preparation

- Flexible or rigid reamers can be utilized to prepare the femoral canal (**Figure 6**). If flexible reamers are utilized, a flexible guide wire is inserted into the femoral canal. Reamers are utilized to progressively ream the canal to the appropriate diameter. To allow for an adequate cement mantle, the canal should be reamed to 2mm larger than the selected stem of the prosthesis.

Note:

The seven stem diameters are 8mm, 9mm, 10mm, 11mm, 13mm, 15mm and 17mm.

Stem Diameter	Suggested Flexible Reamer Diameter	Seat Diameter
8mm	10mm	22mm
9mm	11mm	22mm
10mm	12mm	24mm
11mm	13mm	24mm
13mm	15mm	28mm
15mm	17mm	32mm
17mm	19mm	36mm

- The appropriate Facing Reamer is used to plane the osteotomy site so as to ensure direct contact and accurate seating of the prosthesis upon the cortices.
- The chosen Trial Stem is inserted to evaluate ease of insertion and an appropriate cement mantle. The trial cemented stems are exactly size for size as compared to the implant and do not account for the cement mantle.
- If there is any difficulty inserting the trial stem, continue progressively reaming until the Trial Stem fits freely into the canal, or re-assess the Trial Stem size. It is extremely important to verify the close apposition of the seat of the Trial Stem to the cortex.

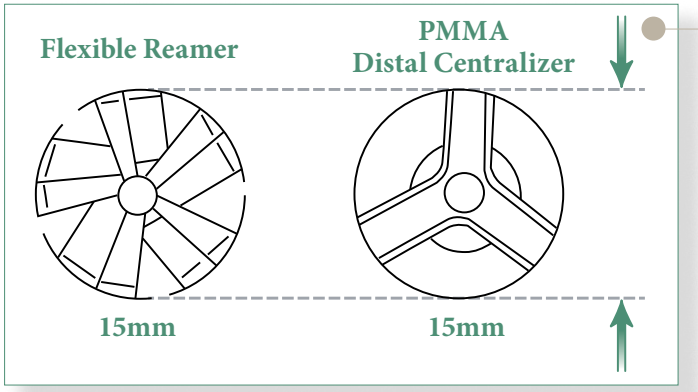

Figure 7

- Optional stem centralizers are available for the 10-17mm diameter stems (for the 102 and 127mm length stems only). The last size reamer used corresponds to the diameter of the distal centralizer necessary for correct positioning of the stem tip.

Proximal Tibial Resection

- This technique illustrates the preparation for the Pediatric All-Poly Tibial Component which articulates with the Distal Femoral Growing Prosthesis.
    - The technique for the Modular Rotating Hinge Tibial Baseplate which also articulates with the Distal Femoral Growing Prosthesis, is illustrated in the GMRS Distal Femoral Surgical Protocol (LSPK38).
    - The technique for the GMRS Proximal Tibia which also articulates with the Distal Femoral Growing Prosthesis, is illustrated in the GMRS Proximal Tibial Surgical Protocol (LSPK39).
- The required proximal tibial cut is neutral to the tibial axis in all planes, i.e. cut in classic alignment with no posterior slope. The amount of tibial bone removed in addition to the planned femoral resection will need to be replaced in order to reconstruct pre-operative leg length.
- The instrumentation provides four options for determining the resection level of the proximal tibia. This technique illustrates the method for establishing the depth of the tibial cut referenced from extramedullary referencing.
    - The other three options can be reviewed in the GMRS Distal Femoral Surgical Protocol (LSPK38).

Instrument Bar

6496-9-2XX
Facing Reamer

See Catalog
Cemented Stem Trial

Distal Femoral Growing Prosthesis
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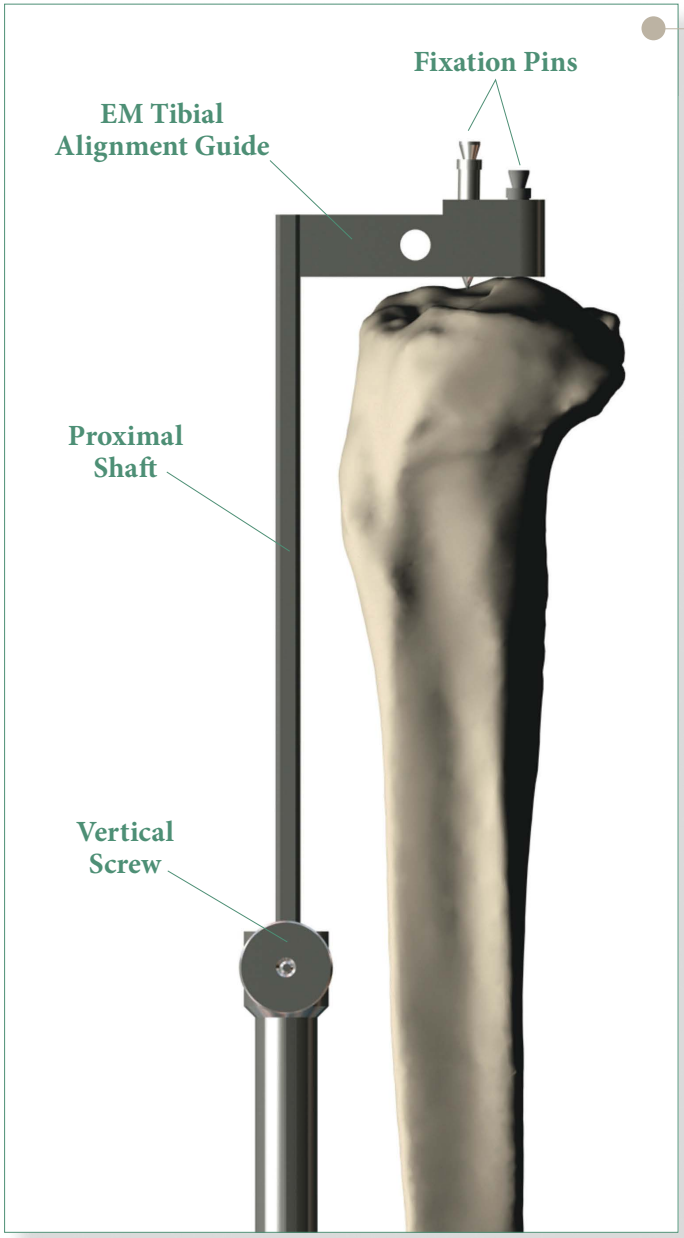


Figure 8

- With the knee flexed, place the EM Tibial Alignment Guide on the tibial shaft. Place the Ankle Clamp around the distal tibia just above the malleoli.
- Place the Fixation Pins of the instrument over the tibial eminence. There should be a finger's breadth clearance between the proximal shaft of the Alignment Guide and the anterior cortex when the Fixation Pins are positioned properly. Center the Proximal Fixation Pins over the tibial eminence and tap in the most posterior pin first to fix the anterior/posterior location of the head. Rotation is now adjusted and then set by anchoring the second pin. Tighten the vertical screw to secure the proximal shaft of the guide.

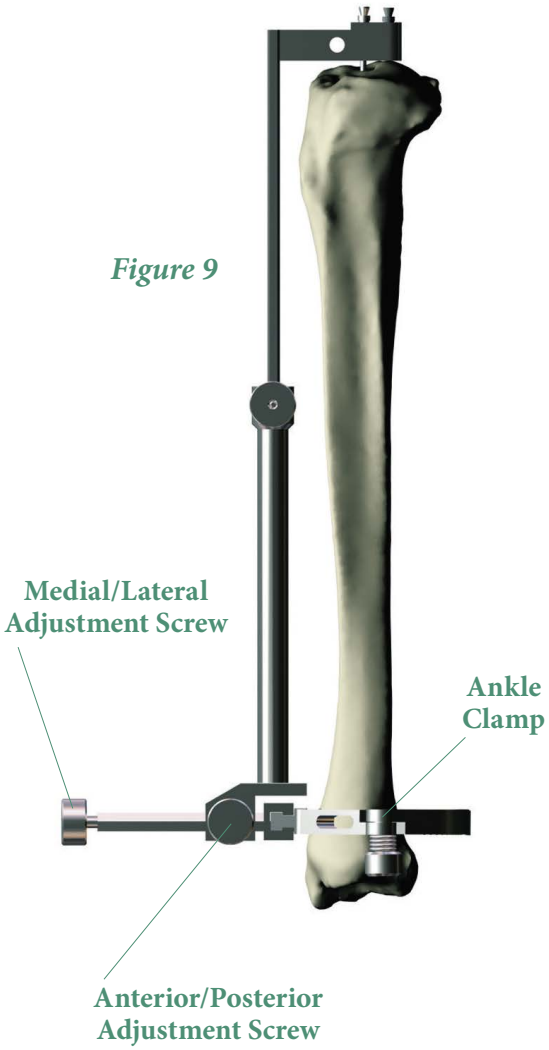


Figure 9

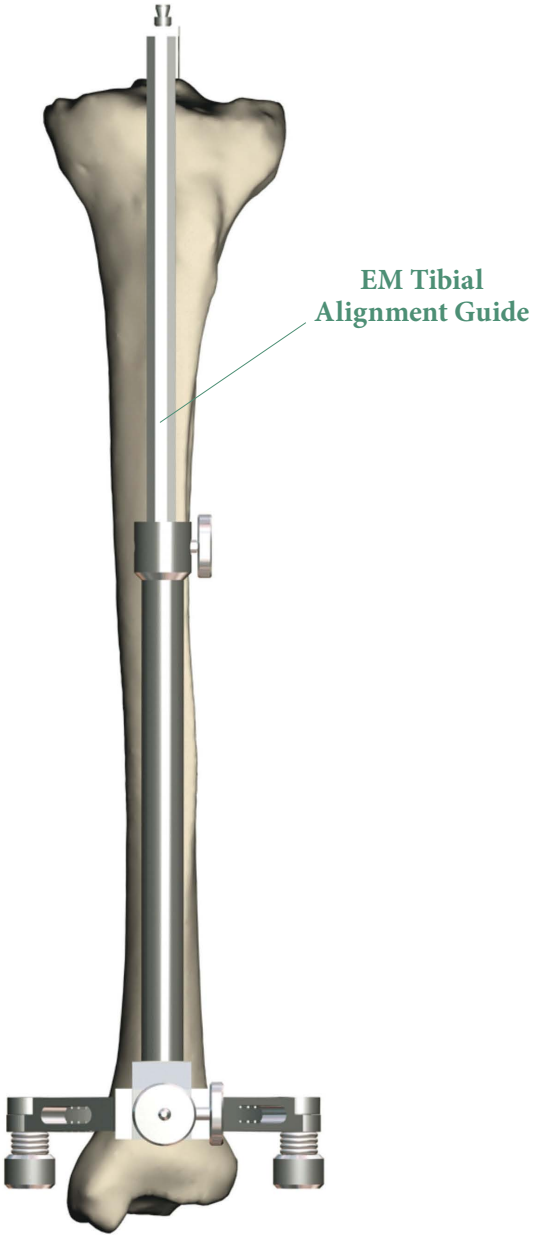


Figure 10

- Axial alignment is achieved when the vertical shaft of the instrument parallels the long axis of the tibia in both the anterior/posterior and medial/lateral planes **(Figures 9 and 10).**

Instrument Bar

8000-1040
EM Tibial Ankle Clamp

8000-1056
Spiked Proximal Rod

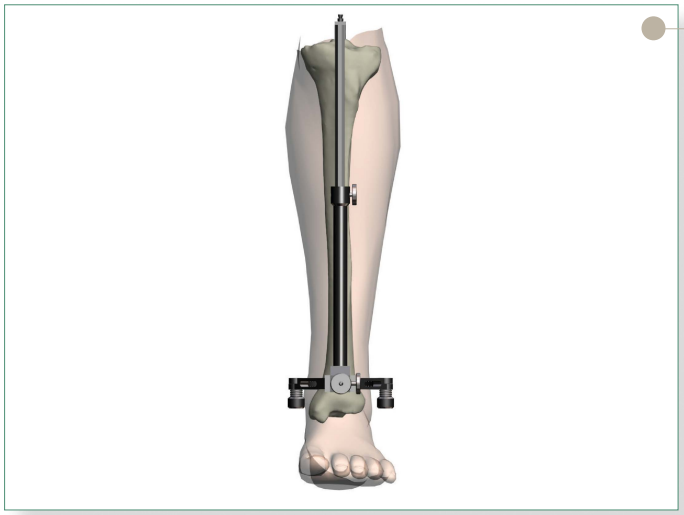


Figure 11

- Landmarks used to obtain correct axial alignment and rotation are:

  Second Metatarsal – The second metatarsal generally is in line with the center of the ankle **(Figure 11)**.

- Once axial alignment is established, tighten the anterior/posterior and medial/lateral adjustment thumbscrews **(Figure 12)**.

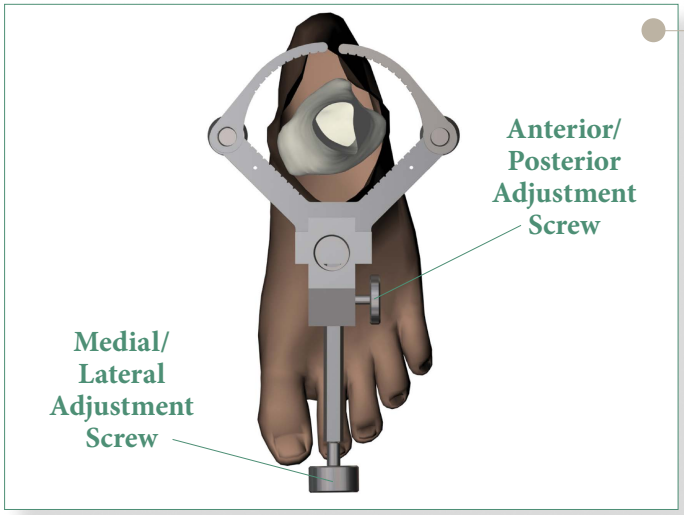


Figure 12

Tibial Resection Level

- If templates were used to plan the tibial resection level earlier in the procedure, this marking can be used as a guide.
- Alternatively, a tibial stylus can be utilized to set the tibial resection level. Assemble the Tibial Stylus to the Tibial Resection Guide by depressing the locking button on the top of the Tibial Stylus, inserting the stylus into either the medial or lateral holes on the top of the Tibial Resection Guide and releasing the button to lock the Stylus into place **(Figure 13)**.
- The Stylus has two depth setting options for the Tibial Resection Guide (12 or 18mm), depending on which end of the stylus is used. An 18mm resection from the medial tibial sulcus is required from the tibia if the distal most aspect of the femoral replacement is placed at the same level of the original anatomy. Typically, a 12mm resection from the medial tibial sulcus would be preferred, which requires resecting an additional 6mm from the femur. However if the tibial growth plate is still open, a 2mm resection from the medial tibial sulcus of the proximal tibia preserves the growth plate, allows for continued tibial growth and requires less expansion of the prosthesis. The joint line corrects over time as prosthesis expansion exceeds tibial growth.
- The level of the patella should be checked to optimize proper patellar position.

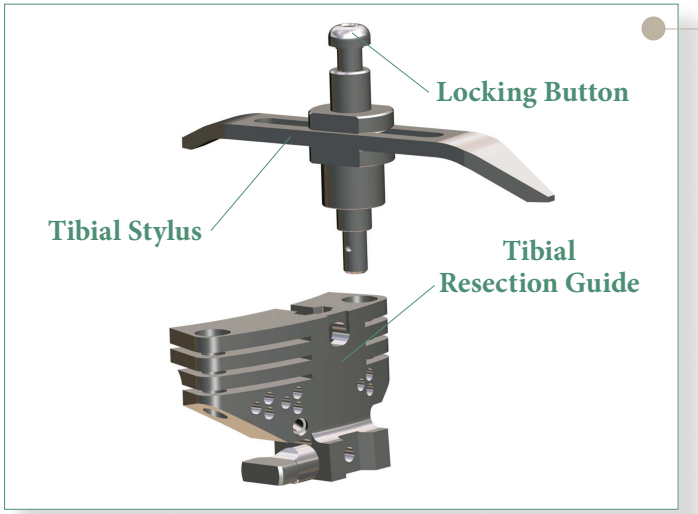


Figure 13

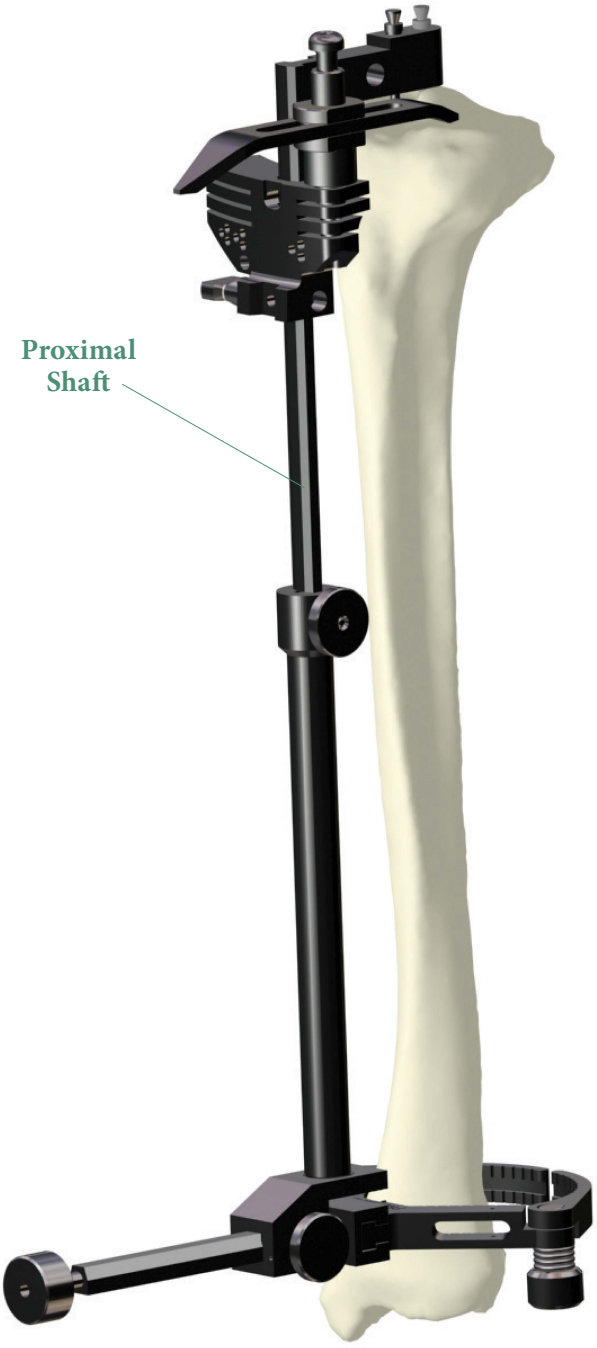


Figure 14

- Attach the Tibial Resection Guide/Tibial Stylus assembly to the External Tibial Alignment Guide by sliding it over the top of the proximal shaft, adjusting the stylus to reference the desired point on the tibial plateau **(Figure 14)**.

Instrument Bar

8000-1040
EM Tibial Ankle Clamp

8000-1056
Spiked Proximal Rod

7650-1072
Tibial Stylus

6496-9-051/052
Tibial Cutting Block

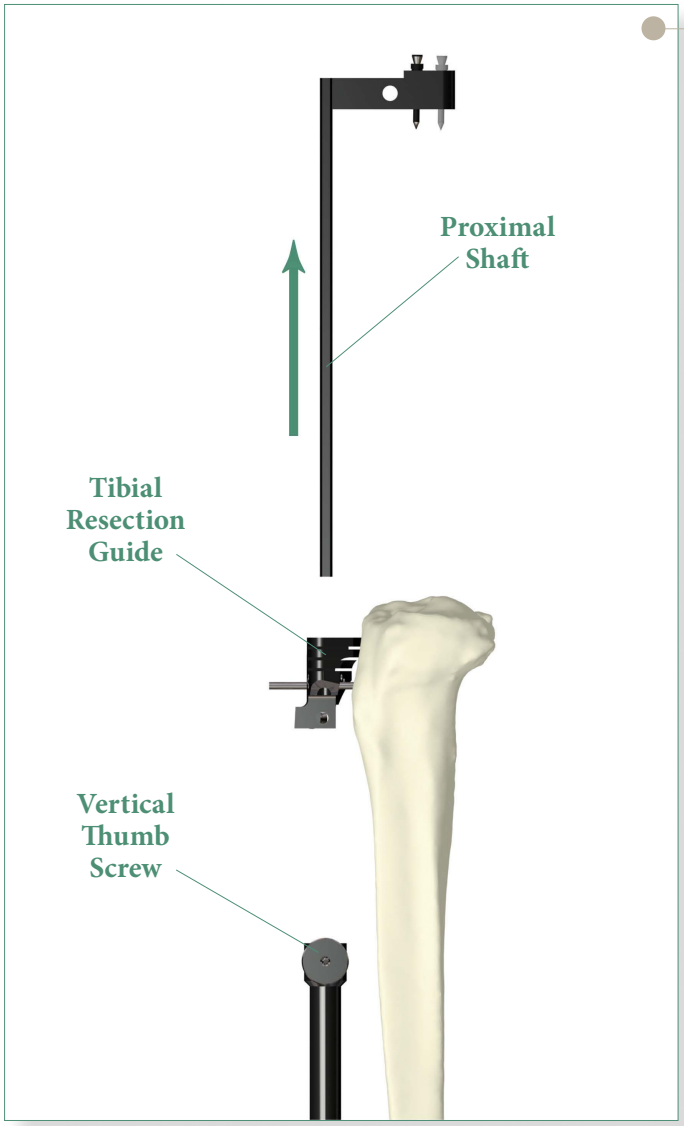


Figure 15

Proximal Tibial Resection

- Secure the Tibial Resection Guide to the proximal tibia using two 1/8" Drill Pins, drilling through the "N" holes. Loosen the thumbscrew that holds the Tibial Resection Guide to the External Tibial Alignment Guide. Loosen the vertical adjustment thumbscrew on the shaft of the Alignment Guide.
- Extract the two headed Fixation Pins on the top of the Alignment Guide from the proximal tibia. Remove the proximal shaft of the Alignment Guide by sliding it up through the top of the Resection Guide **(Figure 15).**
- Slide the Tibial Resection Guide posteriorly until it comes in contact with the anterior tibia. Placing a 1/8" Drill Pin through the "X" pin hole will further secure the Resection Guide to the tibia.
- The Alignment Handle may be used with an Alignment Pin, referencing the same landmarks as outlined previously to verify proper alignment.

Figure 16

- Resect the plateau using a .050" (1.27mm) Saw Blade **(Figure 16)**.

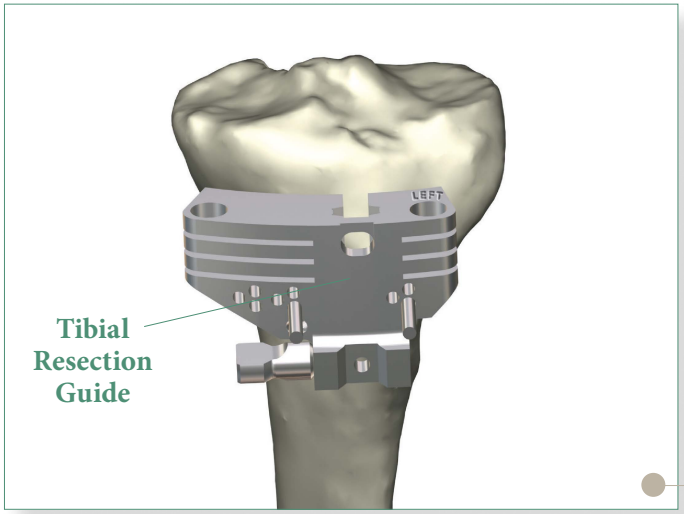


Figure 17

- If desired, 2mm or 4mm of additional bone may be resected by repositioning the guide over the pins through the -2 or -4 holes respectively

Note:

If the "X" Pin hole is used, this pin must be removed prior to repositioning the Tibial Resection Guide.

- The Tibial Resection Guide is removed by first removing the "X" pin, then sliding the guide off over the two 1/8" drill pins.

Instrument Bar

8000-1040
EM Tibial Ankle Clamp

8000-1056
Spiked Proximal Rod

6496-9-051/052
Tibial Cutting Block

7650-1035
Headless Pin Driver

7650-1038
Headless Pins

6633-7-250
Alignment Handle

6838-7-220/230
Alignment Pin

6633-7-605
Pin Puller

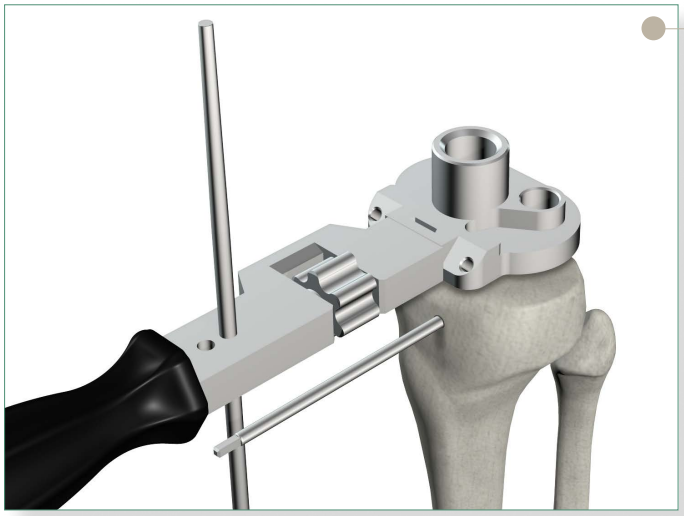


Figure 18

Tibial Preparation for the Pediatric All Poly Tibial Component

- Select the appropriate Pediatric Tibial Template and lock it onto the Tibial Alignment Handle. The appropriate size Template will achieve cortical support around the periphery of the template.
- The long Alignment Pin assembled with the Alignment Handle verifies rotational, Varus/Valgus, and flexion/extension alignment **(Figure 18)**.

Figure 19

- Rotational alignment is correct when the drill bit placed in a hole from the tibial resection step is parallel to the handle **(Figure 19)**. Varus/Valgus and flexion/extension is verified with a Long Alignment Pin.
- Holes are located on the anterior face and posterior surface of the Template. Headed Nails or drills through these holes may be used to temporarily fix the Template.

Note:

It is important that the correct size be selected to fully support the All-Poly Tibial Component around the periphery with cortical bone.

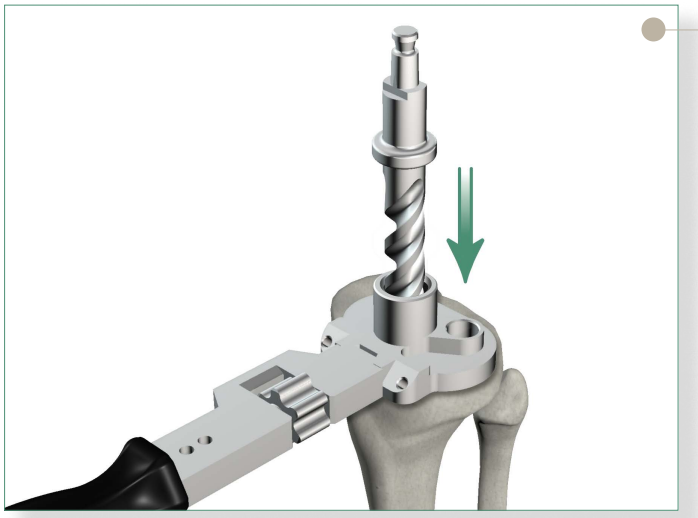


Figure 20

- Using the Pediatric Stem Drill, prepare for the central tibial stem by drilling through the raised central hole in the Pediatric Tibial Template **(Figure 20)**.
- The Pediatric Stem Drill has a stop and will bottom out on the Pediatric Tibial Template.

Figure 21

- Then complete the tibial preparation by using the Counter Sink Drill to prepare for the tibial pegs through the two posterior raised holes in the Pediatric Tibial Template **(Figure 21)**.
- Both drills have a stop and each drill should bottom out on the Pediatric Tibial Template.
- Remove the headed nails with the Headed Nail Impactor/Extractor and remove the Pediatric Tibial Template.

Instrument Bar

6737-8-500/505
Pediatric Tibial Template

6633-7-250
Alignment Handle

6838-7-220/230
Alignment Pin

7650-1038
Headless Pins

6737-8-510
Pediatric Stem Drill

8000-7845
Counter Sink Drill

7650-1035
Headless Pin Driver

6633-7-605
Pin Puller

6633-7-610
Headed Nail Impactor Extractor

6633-7-600/615
Headed Nails

Figure 22

Trial Reduction

- The purpose of the trial reduction is to determine the ease of insertion of the femoral and tibial components prior to cementation, and to determine whether the length of the prosthesis is appropriate. If the prosthesis is too long, too much tension will be placed upon the neurovascular structures when the knee is extended. In addition, the extensor mechanism will be tight, causing loss of flexion and difficulty in closing the soft tissues.
- The two most important factors in accepting final length are:
  1. Proper patellar tracking
  2. Distal pulses
- To determine the appropriate length, one must extend the knee and monitor the distal pulse with the trial prosthesis in place. Based on tibial component selection, insert the appropriate tibial trial into the tibia, and impact it until it is flush with the tibial osteotomy. The GMRS Small Distal Femoral trials are used in conjunction with extension piece trials to recreate the length of the Distal Femoral Growing Prosthesis for purposes of trial reduction:

Femoral Component Length	Equivalent GMRS Trial Construct		
150mm	GMRS Small Distal Femoral Trial	+	70mm Extension Piece Trial
160mm			80mm Extension Piece Trial
170mm			60mm + 30mm Extension Piece Trials
180mm			100mm Extension Piece Trial
190mm			80mm + 30mm Extension Piece Trials
200mm			120mm Extension Piece Trial

Caution:

Not all sizes are readily available. Please contact your Stryker sales representative regarding availability at the beginning of the treatment cycle to ensure device availability.

Instrument Bar

6496-2-010/020
Distal Femoral Trial - Small

6496-6-0X0
Trial Extension Piece

See Catalog
Cemented Stem Trial

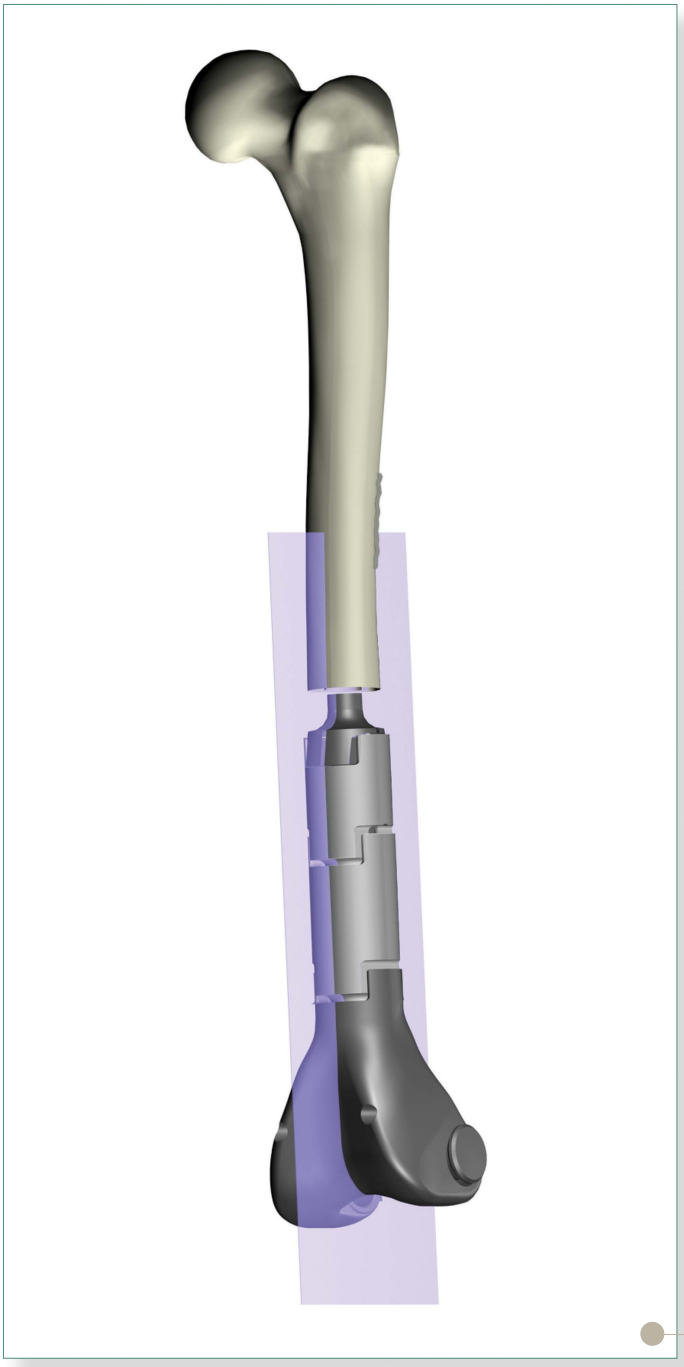


Figure 23

- Construct the Trial Femoral Prosthesis by joining the Trial Cemented Stem with the Trial Extension Piece and with the Trial Distal Femoral Component. Insert the stem of the trial femoral assembly into the femur. As a guide to rotational orientation, align the rotational alignment mark on the femoral stem segment with the rotational reference mark previously made on the anterior cortex of the femur **(Figure 23)**.

Distal Femoral Growing Prosthesis
Surgical Protocol

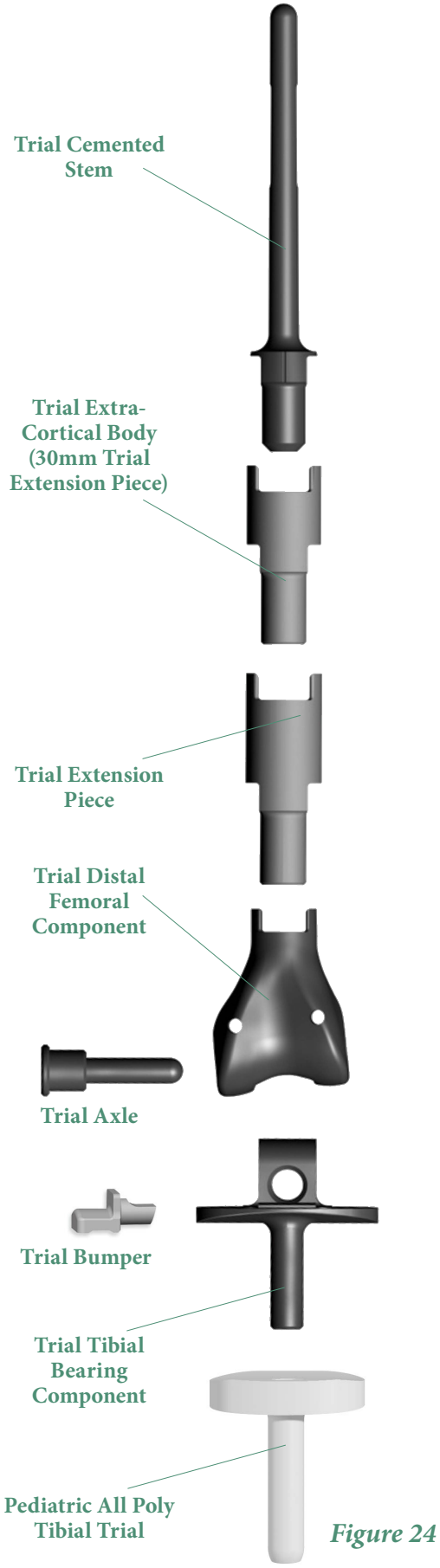


Figure 24

- Insert the Trial Tibial Bearing Component into the tibial trial. Bring the Trial Tibial Bearing Component up between the femoral condyles and insert the Trial Axle. Then insert the Trial Bumper through the anterior hole of the Trial Tibial Bearing Component **(Figure 24)**. Hold the trial femoral assembly in one hand to prevent rotation and fully extend the leg. Palpate the femoral vessels to determine the status of the pulse. If the pulse is diminished, flex the knee to determine if it increases. This will indicate the need for either modifying the length of the prosthesis or for removing additional bone from the distal femur or proximal tibia.

Tech Tip:

As an aid in checking leg length, the distance between the leg-length reference marks on the tibia and femur can now be rechecked.

- In order to determine if proper patellar tracking has been achieved, the final femoral implant construct must be assembled (See Assembly of the Femoral Prosthesis on pages 25 and 26). Insert the femoral implant construct into the femoral canal without cement. Manipulating the knee through its range of motion may be used to determine the appropriate rotation of the femoral component. If the evaluation identifies a rotation different than that already marked, an additional mark should be made or the rotation should be noted relative to the existing mark. Slight external rotation may aid in patellar tracking.
- A final test of the range of motion of the knee with the patella tracking in place is then performed. A full range of motion should be obtained. Note whether the capsular mechanism can be closed. These factors, taken together, will determine the adequacy of the length of the resection.
- If it is determined that the prosthetic construct is too long, the length of the distal femoral bone resected should be rechecked against the length of the assembled prosthesis. The primary means to address a construct that is too long should be to remove additional bone from the femur. Other alternatives include shortening the prosthesis (if it has been expanded), selecting a shorter extension piece (if applicable), or evaluation of a thinner tibial construct if possible.
- If it is determined that the prosthetic construct is too short, expand the prosthesis to the appropriate length (See Expansion of the Stryker Distal Femoral Growing Prosthesis on pages 30 through 32).

Tech Tip:

The replacement length should err on the side of being too short rather than too long. A reconstruction that is too long can lead to challenges with wound closure. Additionally, with children maintaining motion is critical. Children have the potential to lose motion over time as they are not as disciplined as adults in following their physical therapy regimen.

- The decision can now be made if a gastrocnemius flap or muscle transfer will be required, dependent upon the presence or absence of the capsule or portions of the quadriceps.

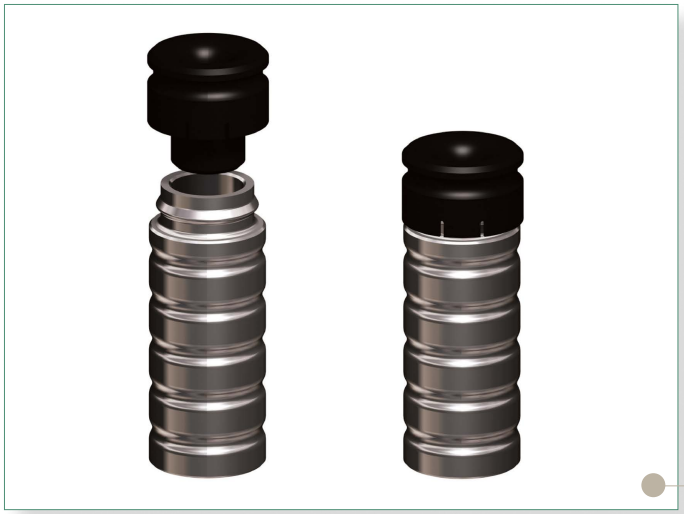


Figure 25

Assembly of the Femoral Prosthesis

- The femoral prosthesis consists of the Stem, Extension Piece (when needed based on the length of the reconstruction), and the Distal Femoral Component. Check that the correct side (left or right) and replacement length for the Distal Femoral Growing Prosthesis, and that the correct sizes of all other components have been chosen before assembly. If necessary, it is acceptable to stack two Extension Pieces to construct the necessary length. The instruments used for the assembly of the prosthesis are the Impaction Tube, the appropriate Impaction Tube Insert, the 5-in-1 Impactor and the Impaction Block, if necessary, along with a Mallet.
- The Impaction Tube Insert corresponding to the stem diameter is assembled to the Impaction Tube **(Figure 25)**.

Instrument Bar

See Catalog
Cemented Stem Trial

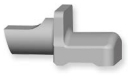
6496-6-0X0
Trial Extension Piece

6496-2-010/020
Distal Femoral Trial - Small

6496-2-115
Trial Axle

6481-4-107
Trial Tibial Bearing Comonent - Pediatric

6496-2-130/133
Trial Bumper



6496-9-053
Impaction Tube

6496-9-065/066
Impaction Insert

6486-8-0XX
Trial Pediatric All Poly Tibia

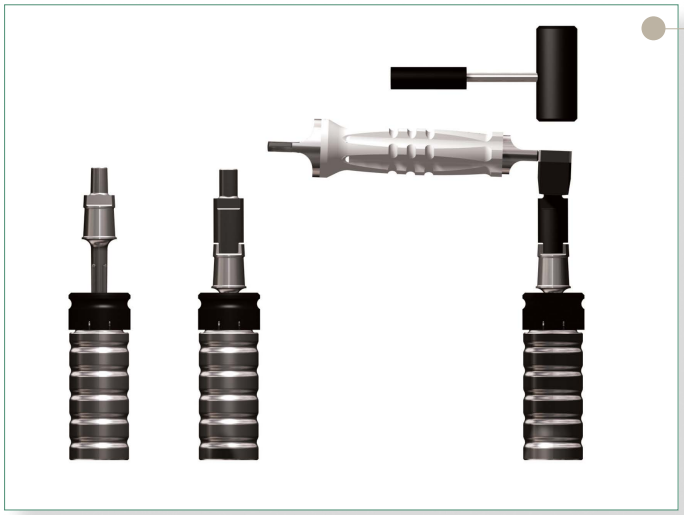


Figure 26

- The Extension Piece (if required) and the cemented Stem are assembled first. The cemented Stem is placed into the Impaction Tube and the Extension Piece is mated with it. The 5-in-1 Impactor is placed over the taper of the Extension Piece and impacted with a heavy Mallet to lock the tapers **(Figure 26)**.

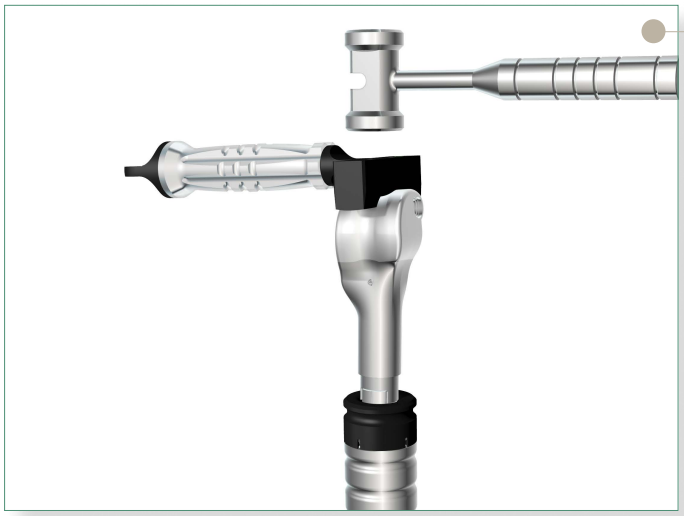


Figure 27

- Next, the Stem/Extension piece construct is assembled to the Distal Femoral Component. Place the Distal Femoral Component onto the Extension Piece or Stem. The 5-in-1 Impactor is inserted between the condyles of the Distal Femoral Component so that its handle is parallel to the axis of the bushing holes and impacted with a Mallet **(Figure 27)**.

Figure 28

- If a 203mm long curved cemented Stem is to be implanted, the Distal Femoral Component is inserted into the Impaction Support Block. An Extension Piece, if required, is inserted into the Distal Femoral Component and then the appropriate diameter cemented Stem is inserted into the Extension Piece or Distal Femoral Component **(Figure 28)**.
- Verify that the bow of the cemented stem curves towards the posterior of the Distal Femoral Component. The Impaction Tube is inverted and placed over the cemented Stem and impacted with a heavy mallet, or by sliding the Impaction Tube over the stem like a Slap Hammer.

Implantation and Orientation of the Femoral and Tibial Components

- Please reference the following surgical technique for assembly and implantation of each tibial option for use with the Stryker Distal Femoral Growing Prosthesis:
  - All-Polyethylene Tibia: LSPK38 (Appendix II)
  - MRH Baseplate: LSPK38
  - GMRS Proximal Tibia: LSPK39

Tech Tip:

If a stem centralizer is not being used, plug the hole in the stem with bone cement.

- The prosthesis is then inserted into the femoral canal until the stem seat is flush with the host bone at the osteotomy site. Excess cement is removed from around the prosthesis. Care is taken to prevent cement from getting into the Extra-Medullary porous-coated section. It is firmly held in place at the rotational orientation determined by the trial reduction while the cement cures.

Tech Tip:

When cementing the tibial component, it is best to not cement through the tibial growth plate, and to select a stem that will engage the diaphyseal tibial cortex to facilitate continued healthy tibial growth.

Instrument Bar

6496-9-053
Impaction Tube

6496-9-063
5-In-1 Impactor/Wrench

6496-9-064
Impaction Support Block

6496-9-065/066
Impaction Insert

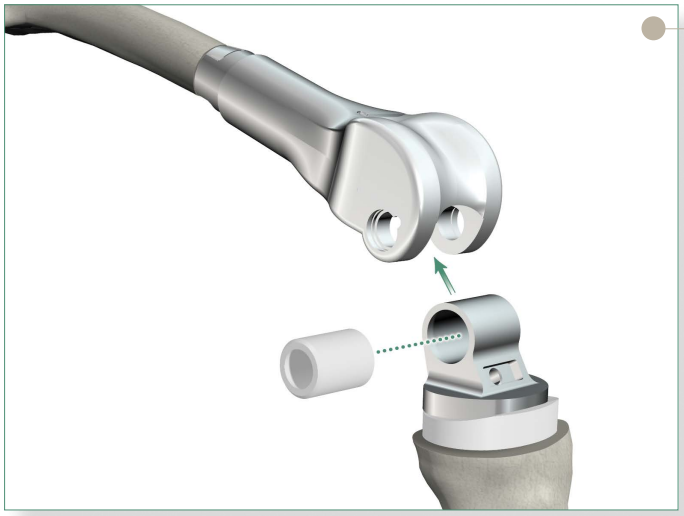


Figure 29

- Place the polyethylene bearing through the proximal hole of the Tibial Bearing Component. Then, insert the bearing in between the condyles of the housing of the Distal Femoral Growing Prosthesis, and then insert the metal Axis through the construct **(Figure 29)**.

Note:

Check the rotational alignment of the prosthesis again and if it is adequate, the Axis of the prosthesis should be inserted from the side of the skin incision by hand.

If the GMRS Proximal Tibia or MRH Tibial component has been selected:

- With the Femoral Prosthesis and Tibial Baseplate implanted, prior to selection of the final tibial insert thickness, it is possible to use the Distal Femoral Growing Prosthesis assembled with Axis, Tibial Bearing Component and Trial Tibial Insert to verify that the appropriate motion, stability and patellar tracking have been achieved. It is recommended not to assemble the wedge or circlip until the final tibial insert has been assembled to the baseplate. With the knee in full extension this also assists in loading the femoral and tibial baseplate components while the cement is curing to provide an optimal bond between implant and bone.

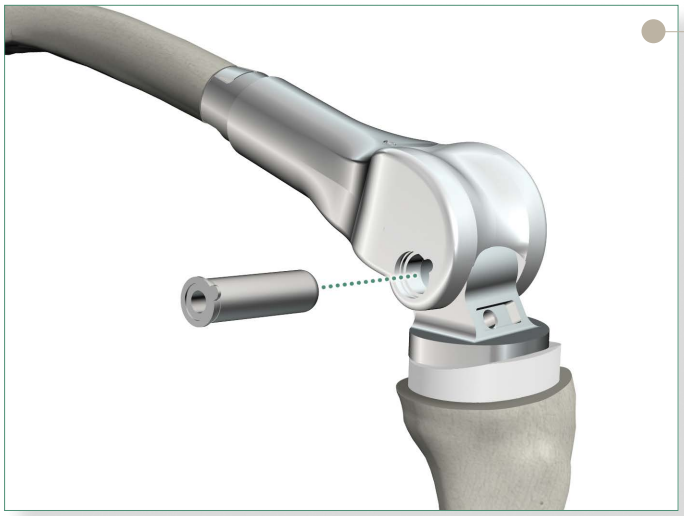


Figure 30

- Once the tibial insert thickness has been determined, deconstruct the Axis and Tibial Bearing Component and remove the Trial Tibial Insert. Snap-in the appropriate thickness Tibial Insert corresponding to the tibial component, drop in the Tibial Bearing Component, and reinsert the Axis **(Figure 30)**.

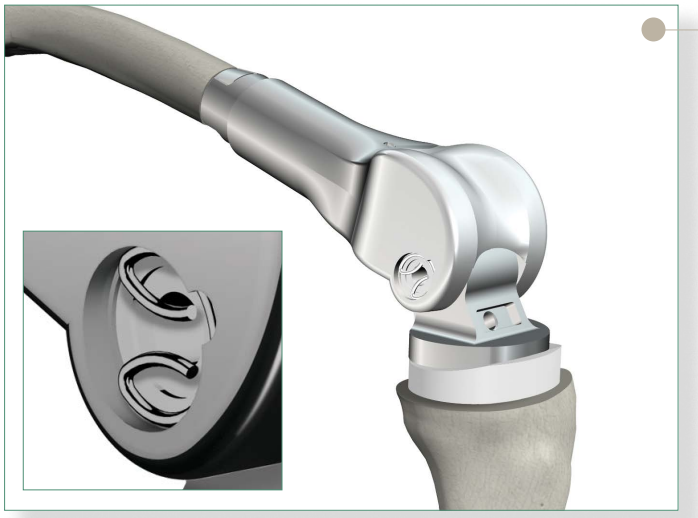


Figure 31

- A hemostat should be utilized to assemble the circlip to the prosthesis. Insert the each tip of the forceps into one of the loops of the circlip. Reduce the diameter of the circlip by squeezing it, and place the circlip in the groove on the inside of the Axis counterbore. Release the circlip once it is fully engaged within the channel **(Figure 31)**. The clip can be placed on either the medial or lateral side of the implant based upon intraoperative ease of exposure.

Tech Tip:

A right angle hemostat may provide more control in inserting the circlip. Serrated teeth will aid in retention of the circlip in the hemostat prior to insertion. By assembling the circlip on the lateral side, it can be accessed through the same incision as the expansion mechanism.

6497-2-300
2mm Hex Screwdriver for Distal Femoral Growing Prosthesis

Figure 32

- The wedge is then inserted by hand (pressed in) into the bore on the bearing component **(Figure 32)**. If the wedge sits too proud, soft impaction with a mallet may be conducted.

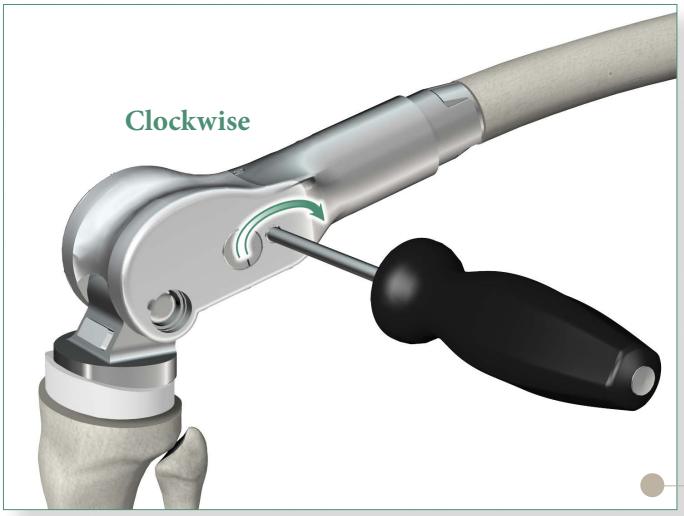


Figure 33

- Ensure that the device is locked prior to closure. Insert the smaller hex screwdriver into the locking hole and turn clock-wise **(Figure 33)**. An audible click from the locking screwdriver handle will indicate that the device is locked.

Figure 34

Appendix I: Expansion of the Stryker Distal Femoral Growing Prosthesis

- The Distal Femoral Growing Prosthesis can be expanded using a minimally invasive procedure following the initial implantation surgery as determined by the patient's growth.

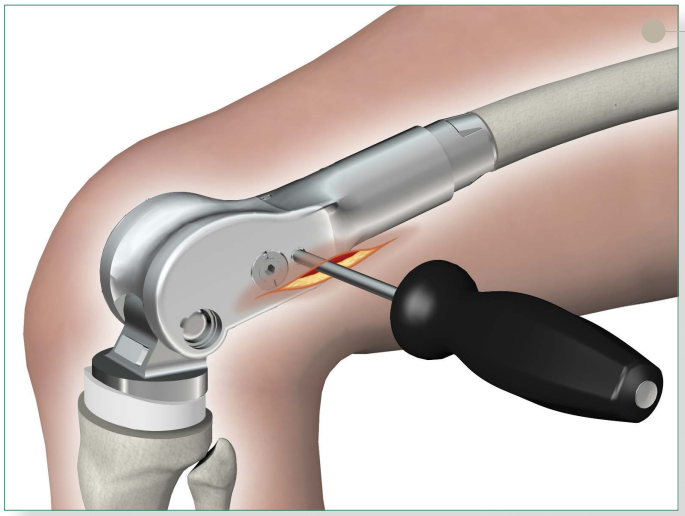


Figure 35

Incision

- A lateral approach is utilized. For the initial expansion, a 1-2cm incision is made as close to the locking and expansion screws as possible **(Figure 35)**. For subsequent expansions, the incision should be made along the original incision site. The locking and expansion screws can be located by palpation or fluoroscopic imaging.

Note:

If utilizing the identical incision site for subsequent lengthening procedures, the locking and expansions screws will progressively move distally relative to the incision.

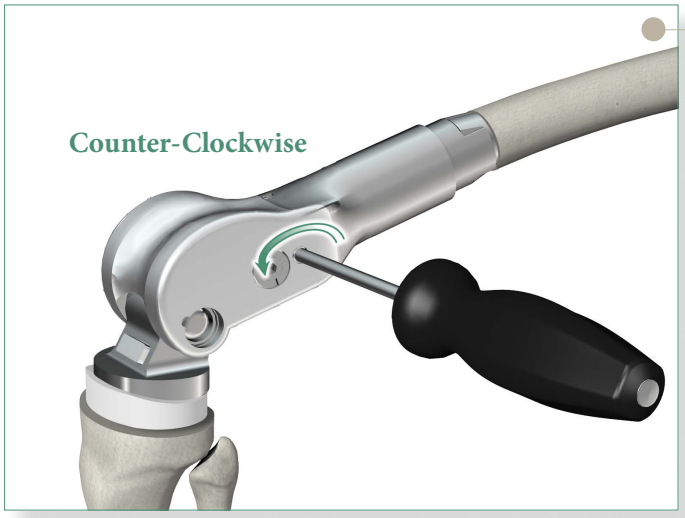


Figure 36

Unlock Prosthesis

- Once exposure to the device has been gained on the lateral side, to unlock the expandable prosthesis, insert the smaller hex screwdriver into the hole indicated and turn counter-clockwise **(Figure 36)**. Do not bend the screwdriver. Ensure that the smaller hex screwdriver is fully seated in the hole prior to unlocking the device.

Caution:

Unlocking the prosthesis requires loosening of the locking screw only. Do not continue to turn the locking screw counter-clockwise after loosening it. The smaller hex screwdriver is only torque limiting in the locking direction.

Figure 37

Expansion of the Prosthesis

- After unlocking the prosthesis, insert the larger hex screwdriver into the device in the hole indicated **(Figure 37)**. Turn counter-clockwise as required to expand the prosthesis. One complete turn of the screwdriver is equivalent to approximately 1mm of expansion.

Tech Tip:

It is recommended to expand at intervals where at least 1cm of expansion is required in order to minimize the number of surgical procedures. Undue or excessive expansion can cause neurologic complications.

Expansion Conversion Table

Expansion	# of Turns
0.5cm	5
1.0cm	11
1.5cm	17
2.0cm	22

Instrument Bar

6497-2-300
2mm Hex Screwdriver for Distal Femoral Growing Prosthesis

702429
Teardrop Handle Large w/AO Quick Fitting

1806-0292
Screwdriver Shaft, 3.5 x 85mm

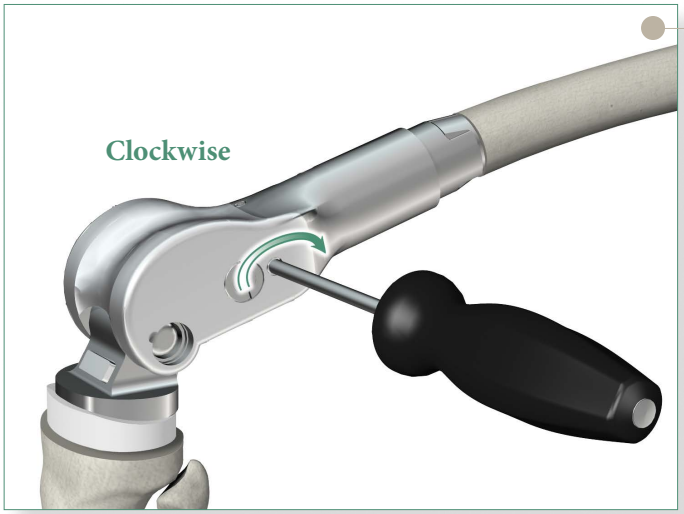


Figure 38

Lock the Prosthesis

- Once the prosthesis has been expanded to the desired length, lock the prosthesis again by re-inserting the smaller hex screwdriver into the same hole used to unlock the prosthesis and turn clock-wise **(Figure 38)**. An audible click from the locking screwdriver handle will indicate that the device is locked. Do not bend the screwdriver. Ensure that the smaller hex screwdriver is fully seated in the hole prior to locking the device.

Appendix II: Taper Disassembly

- Should it be necessary to disengage an assembled taper joint, a taper separator is provided. The taper separator utilizes the mechanical advantage of a wedge(s) and lever arm to overcome the locking forces of the tapers and separate the components. It is important that the separator be positioned so that the wedge(s) does not act against the anti-rotation tabs of the implants. The correct orientation is in an anterior-to-posterior direction. The implants are designed to withstand the forces generated by the separator in this direction. Placement of the separator wedges against the anti-rotation tabs may damage them, making disengagement difficult. The separator may be used via three different methods.

Figure 39

Method 1

- The wedges are initially advanced by hand to bring them in contact with the implant at the joint to be disengaged. The wedges are advanced by turning the nut in a clockwise direction, until resistance is felt **(Figure 39).** The wedges are then further advanced, using the wrench end of the 5-in-1 impactor provided, until the tapers disengage.

Figure 40

Method 2

- The wedges of the separator are advanced until they are sufficiently tight against the taper junction to be separated using the wrench end of the 5-in-1 impactor. A mallet can then be used to impact the chisel component of the separator. The separator is designed to allow the nut and chisel to travel a small distance when impacted to ease separation.

Method 3

- The separator can be disassembled and the chisel component of the assembly can be used by itself to separate a taper junction **(Figure 40).** The chisel is inserted anteriorly at the location to be separated and impacted with a mallet until separation is achieved. Caution should be taken when disengaging any taper-locked joint. The high forces that hold a taper-locked joint together may result in a sudden and forceful action upon disengagement along the axis of the tapers.

Appendix III: Growing Prosthesis Sterilization Instructions

- To sterilize the Growing Prosthesis (using a Pressure/ Vacuum Sterilizer):
  - Device must be double wrapped, using steam sterilization compatible pouches or wrap (i.e.: blue wrap).
  - Adequate monitoring of the sterilization cycle is required:
    Chemical Monitor: Class 6 integratorBiological Monitor: Biological indicator (BI) Challenge Test Pack (16 towel test pack per AAMI)
- Parameters for sterilization
  - Method: Moist Heat
  - Cycle: Pre-Vacuum (Pre-Vac)
  - Temperature: 132°C (270°F)(minimum)
  - Time: 20 minutes (minimum)
  - Dry Time: 30 minutes (in chamber)
  - Cooling: 30 minutes (room temperature) (as required)
- After sterilization, inspect sterilization pouches/wraps prior to use for any breaches, residual moisture, or particulate contamination. If particulate contamination is evident, the implant must be deemed contaminated and shall not be used. In the event of contamination, the product must be discarded. If a breach of a pouch/ wrap and/or moisture is evident, the implant can be resterilized using the above parameters (with an increased drying time for residual moisture).
- Device must be implanted within seven (7) days after sterilization. If held for more than seven (7) days, resterilization is required.
- Prior to immediate use, the implant shall be aseptically removed from the sterilization pouches/wraps.
- Stryker Orthopaedics has validated the above recommended sterilization cycle. Other sterilization methods and cycles may also be suitable. However, individuals or hospitals are advised to validate whichever method they deem appropriate at their institution.
- EtO sterilization and cold sterilization techniques are not recommended.

Instrument Bar

6497-2-300
2mm Hex Screwdriver for Distal Femoral Growing Prosthesis

6496-9-054/055/056
Taper Separator - Assembly

6496-9-063
5-In-1 Impactor/Wrench

Catalog #	Description	GMRS Kit Number
Growing Prosthesis Instrument Part Numbers		
6496-9-069	Distal Femoral Template	1A
6496-9-071	MRH/All Poly Tibial Template	1A
6496-9-208	8mm Facing Reamer	4A
6496-9-209	9mm Facing Reamer	4A
6496-9-210	10mm Facing Reamer	4A
6496-9-211	11mm Facing Reamer	4A
6496-9-213	13mm Facing Reamer	4A
6496-9-215	15mm Facing Reamer	4A
6496-9-217	17mm Facing Reamer	4A
8000-1040	EM Tibial Ankle Clamp	8A
8000-1056	Spiked Proximal Rod	8A
6496-9-051	Tibial Cutting Block - LEFT	8A
6496-9-052	Tibial Cutting Block - RIGHT	8A
6496-9-068	Tibial Stylus	8A
7650-1072	Tibial Stylus	N/A
7650-1035	Headless Pin Driver	8A
7650-1038	Headless Pins	8A
6633-7-250	Alignment Handle	8B
6838-7-220	Short Alignment Pin	8B
6838-7-230	Long Alignment Pin	8B
6633-7-605	Pin Puller	8B
6737-8-505	Pediatric Tibial Template PT1	8B
6737-8-500	Pediatric Tibial Template PT2	8B
6633-7-610	Headed Nail Impactor Extractor	8B
6633-7-600	Headed Nails 1.5"	8A
6633-7-615	Headed Nails 0.75"	8A
6737-8-510	Pediatric Stem Drill	8B
8000-7845	Counter Sink Drill	8B
6496-2-010	Distal Femoral Trial - SMALL LEFT	1A
6496-2-020	Distal Femoral Trial - SMALL RIGHT	1A
6496-6-030	30mm Trial Extension Piece	1A
6496-6-040	40mm Trial Extension Piece	1A
6496-6-050	50mm Trial Extension Piece	1A
6496-6-060	60mm Trial Extension Piece	1A
6496-6-070	70mm Trial Extension Piece	1A
6496-6-080	80mm Trial Extension Piece	1A
6496-6-100	100mm Trial Extension Piece	1B
6496-6-120	120mm Trial Extension Piece	1B
6496-6-140	140mm Trial Extension Piece	1B
6496-6-160	160mm Trial Extension Piece	1B
6496-6-180	180mm Trial Extension Piece	1B
6496-6-200	200mm Trial Extension Piece	1B
6496-6-220	220mm Trial Extension Piece	1B

Catalog #	Description	GMRS Kit Number
Growing Prosthesis Instrument Part Numbers (Continued)		
6486-3-018	8mm Cemented Stem Trial Straight - 102mm	4A
6486-3-019	9mm Cemented Stem Trial Straight - 102mm	4A
6486-3-010	10mm Cemented Stem Trial Straight - 102mm	4A
6486-3-111	11mm Cemented Stem Trial Straight - 127mm	4A
6486-3-113	13mm Cemented Stem Trial Straight - 127mm	4A
6486-3-115	15mm Cemented Stem Trial Straight - 127mm	4A
6486-3-117	17mm Cemented Stem Trial Straight - 127mm	4A
6486-3-318	8mm Cemented Stem Trial Bowed - 102mm	4B
6486-3-319	9mm Cemented Stem Trial Bowed - 102mm	4B
6486-3-310	10mm Cemented Stem Trial Bowed - 102mm	4B
6486-3-811	11mm Cemented Stem Trial Bowed - 127mm	4B
6486-3-813	13mm Cemented Stem Trial Bowed - 127mm	4B
6486-3-815	15mm Cemented Stem Trial Bowed - 127mm	4B
6486-3-817	17mm Cemented Stem Trial Bowed - 127mm	4B
6486-3-611	11mm Cemented Stem Trial Bowed - 203mm	4B
6486-3-613	13mm Cemented Stem Trial Bowed - 203mm	4B
6486-3-615	15mm Cemented Stem Trial Bowed - 203mm	4B
6486-3-617	17mm Cemented Stem Trial Bowed - 203mm	4B
6486-8-004	Trial Pediatric All Poly Tibia 8mm - PT1	7B
6486-8-005	Trial Pediatric All Poly Tibia 11mm - PT1	7B
6486-8-006	Trial Pediatric All Poly Tibia 8mm - PT2	7B
6486-8-007	Trial Pediatric All Poly Tibia 11mm - PT2	7B
6481-4-107	Trial Tibial Bearing Component - Pediatric	7B
6496-2-115	Trial Axle	1A
6496-2-130	Neutral Trial Bumper	1A
6496-2-133	3 Degree Trial Bumper	1A
6496-9-053	Impaction Tube	4A
6496-9-065	Impaction Insert - 7-11mm	4A
6496-9-066	Impaction Insert - 13-17mm	4A
9469-9-063	5-IN-1 Impactor/Wrench	3
6496-9-064	Impaction Support Block	1A
6496-9-054	Taper Separator - Body	3
6496-9-055	Taper Separator - Nut	3
6496-9-056	Taper Separateor - Chisel	3
702429	Teardrop Handle Large w/AO Quick Fitting	N/A
1806-0292	Screwdriver Shaft, 3.5 x 85mm	N/A
6497-2-300	2mm Hex Screwdriver for Distal Femoral Growing Prosthesis	N/A

Catalog #	Description
Growing Prosthesis Implant Part Numbers	
6497-1-150	Distal Femoral Growing Prosthesis, Left 150mm
6497-1-160	Distal Femoral Growing Prosthesis, Left 160mm
6497-1-170	Distal Femoral Growing Prosthesis, Left 170mm
6497-1-180	Distal Femoral Growing Prosthesis, Left 180mm
6497-1-190	Distal Femoral Growing Prosthesis, Left 190mm
6497-1-200	Distal Femoral Growing Prosthesis, Left 200mm
6497-1-550	Distal Femoral Growing Prosthesis, Right 150mm
6497-1-560	Distal Femoral Growing Prosthesis, Right 160mm
6497-1-570	Distal Femoral Growing Prosthesis, Right 170mm
6497-1-580	Distal Femoral Growing Prosthesis, Right 180mm
6497-1-590	Distal Femoral Growing Prosthesis, Right 190mm
6497-1-600	Distal Femoral Growing Prosthesis, Right 200mm
6366-9-220	Axis
6466-9-230	Circlip
6465-6-018	Bearing
6465-6-007	Wedge
6497-2-301	Tibial Bearing Cmpt - Distal Femoral Growing to Pediatric All-Poly Tibia
6497-2-302	Tibial Bearing Cmpt - Distal Femoral Growing to MRH Keel Tibial Baseplate
6497-2-303	Tibial Bearing Cmpt - Distal Femoral Growing to GMRS Small Proximal Tibia
6495-6-030	Extension Piece - 30mm
6495-6-040	Extension Piece - 40mm
6495-6-050	Extension Piece - 50mm
6495-6-060	Extension Piece - 60mm
6495-6-070	Extension Piece - 70mm
6495-6-080	Extension Piece - 80mm
6495-6-100	Extension Piece - 100mm
6495-6-120	Extension Piece - 120mm
6495-6-140	Extension Piece - 140mm
6495-6-160	Extension Piece - 160mm
6495-6-180	Extension Piece - 180mm
6495-6-200	Extension Piece - 200mm
6495-6-220	Extension Piece - 220mm

Catalog #	Description
Growing Prosthesis Implant Part Numbers (Continued)	
6485-3-008	Cemented Stem with Porous Coated Body Section, 8mm
6485-3-009	Cemented Stem with Porous Coated Body Section, 9mm
6485-3-000	Cemented Stem with Porous Coated Body Section, 10mm
6485-3-011	Cemented Stem with Porous Coated Body Section, 11mm
6485-3-013	Cemented Stem with Porous Coated Body Section, 13mm
6485-3-015	Cemented Stem with Porous Coated Body Section, 15mm
6485-3-017	Cemented Stem with Porous Coated Body Section, 17mm
6485-3-018	Cemented Stem without Porous Coated Body Section, 8mm
6485-3-019	Cemented Stem without Porous Coated Body Section, 9mm
6485-3-010	Cemented Stem without Porous Coated Body Section, 10mm
6485-3-111	Cemented Stem without Porous Coated Body Section, 11mm
6485-3-113	Cemented Stem without Porous Coated Body Section, 13mm
6485-3-115	Cemented Stem without Porous Coated Body Section, 15mm
6485-3-117	Cemented Stem without Porous Coated Body Section, 17mm
6485-3-308	Cemented Curved Stem with Porous Coated Body Section, 8mm
6485-3-309	Cemented Curved Stem with Porous Coated Body Section, 9mm
6485-3-300	Cemented Curved Stem with Porous Coated Body Section, 10mm
6485-3-711	Cemented Curved Stem with Porous Coated Body Section, 11mm
6485-3-713	Cemented Curved Stem with Porous Coated Body Section, 13mm
6485-3-715	Cemented Curved Stem with Porous Coated Body Section, 15mm
6485-3-717	Cemented Curved Stem with Porous Coated Body Section, 17mm
6485-3-318	Cemented Curved Stem without Porous Coated Body Section, 8mm
6485-3-019	Cemented Curved Stem without Porous Coated Body Section, 9mm
6485-3-310	Cemented Curved Stem without Porous Coated Body Section, 10mm
6485-3-811	Cemented Curved Stem without Porous Coated Body Section, 11mm
6485-3-813	Cemented Curved Stem without Porous Coated Body Section, 13mm
6485-3-815	Cemented Curved Stem without Porous Coated Body Section, 15mm
6485-3-817	Cemented Curved Stem without Porous Coated Body Section, 17mm
6485-3-311	Cemented Long Curved Stem with Porous Coated Body Section, 11mm
6485-3-313	Cemented Long Curved Stem with Porous Coated Body Section, 13mm
6485-3-315	Cemented Long Curved Stem with Porous Coated Body Section, 15mm
6485-3-317	Cemented Long Curved Stem with Porous Coated Body Section, 17mm
6485-3-611	Cemented Long Curved Stem without Porous Coated Body Section, 11mm
6485-3-613	Cemented Long Curved Stem without Porous Coated Body Section, 13mm
6485-3-615	Cemented Long Curved Stem without Porous Coated Body Section, 15mm
6485-3-617	Cemented Long Curved Stem without Porous Coated Body Section, 17mm

Catalog #	Description
Growing Prosthesis Implant Part Numbers (Continued)	
6485-2-508	Pediatric All Poly Tibia - PT1, 8mm
6485-2-511	Pediatric All Poly Tibia - PT1, 11mm
6485-2-608	Pediatric All Poly Tibia - PT2, 8mm
6485-2-611	Pediatric All Poly Tibia - PT2, 11mm
6481-3-210	MRH Tibial Insert - S1/S2, 10mm
6481-3-213	MRH Tibial Insert - S1/S2, 13mm
6481-3-216	MRH Tibial Insert - S1/S2, 16mm
6481-3-220	MRH Tibial Insert - S1/S2, 20mm
6481-3-224	MRH Tibial Insert - S1/S2, 24mm
6481-3-310	MRH Tibial Insert - M2/L2, 10mm
6481-3-313	MRH Tibial Insert - M2/L2, 13mm
6481-3-316	MRH Tibial Insert - M2/L2, 16mm
6481-3-320	MRH Tibial Insert - M2/L2, 20mm
6481-3-324	MRH Tibial Insert - M2/L2, 24mm
6481-3-110	MRH Keel Tibial Baseplate - S1
6481-3-111	MRH Keel Tibial Baseplate - S2
6481-3-112	MRH Keel Tibial Baseplate - M2
6481-3-113	MRH Keel Tibial Baseplate - L2
6476-8-260	Cemented Stem Extender - 80mm
6476-8-270	Cemented Stem Extender - 155mm
6478-6-395	Cobalt Chrome Stem - 80mm x 10mm
6478-6-396	Cobalt Chrome Stem - 80mm x 11mm
6478-6-397	Cobalt Chrome Stem - 80mm x 12mm
6478-6-398	Cobalt Chrome Stem - 80mm x 13mm
6478-6-399	Cobalt Chrome Stem - 80mm x 14mm
6478-6-400	Cobalt Chrome Stem - 80mm x 15mm
6478-6-405	Cobalt Chrome Stem - 80mm x 16mm
6478-6-410	Cobalt Chrome Stem - 80mm x 17mm
6478-6-415	Cobalt Chrome Stem - 80mm x 18mm
6478-6-420	Cobalt Chrome Stem - 80mm x 19mm
6478-6-425	Cobalt Chrome Stem - 80mm x 21mm
6478-6-430	Cobalt Chrome Stem - 80mm x 23mm
6478-6-435	Cobalt Chrome Stem - 155mm x 10mm
6478-6-436	Cobalt Chrome Stem - 155mm x 11mm
6478-6-437	Cobalt Chrome Stem - 155mm x 12mm
6478-6-438	Cobalt Chrome Stem - 155mm x 13mm
6478-6-439	Cobalt Chrome Stem - 155mm x 14mm
6478-6-440	Cobalt Chrome Stem - 155mm x 15mm
6478-6-445	Cobalt Chrome Stem - 155mm x 16mm
6478-6-450	Cobalt Chrome Stem - 155mm x 17mm
6478-6-455	Cobalt Chrome Stem - 155mm x 18mm
6478-6-460	Cobalt Chrome Stem - 155mm x 19mm
6478-6-465	Cobalt Chrome Stem - 155mm x 21mm
6478-6-470	Cobalt Chrome Stem - 155mm x 23mm

Catalog #	Description
Growing Prosthesis Implant Part Numbers (Continued)	
6478-6-600	Titanium Fluted Stem - 80mm x 10mm
6497-6-605	Titanium Fluted Stem - 80mm x 11mm
6478-6-610	Titanium Fluted Stem - 80mm x 12mm
6478-6-615	Titanium Fluted Stem - 80mm x 13mm
6478-6-620	Titanium Fluted Stem - 80mm x 14mm
6478-6-625	Titanium Fluted Stem - 80mm x 15mm
6478-6-630	Titanium Fluted Stem - 80mm x 16mm
6478-6-635	Titanium Fluted Stemr - 80mm x 17mm
6478-6-640	Titanium Fluted Stem - 80mm x 18mm
6478-6-645	Titanium Fluted Stem - 80mm x 19mm
6478-6-655	Titanium Fluted Stem - 80mm x 21mm
6478-6-665	Titanium Fluted Stem - 80mm x 23mm
6478-6-680	Titanium Fluted Stem - 155mm x 10mm
6478-6-685	Titanium Fluted Stem - 155mm x 11mm
6478-6-690	Titanium Fluted Stem - 155mm x 12mm
6478-6-695	Titanium Fluted Stem - 155mm x 13mm
6478-6-705	Titanium Fluted Stem - 155mm x 14mm
6478-6-710	Titanium Fluted Stem - 155mm x 15mm
6478-6-715	Titanium Fluted Stem - 155mm x 16mm
6478-6-720	Titanium Fluted Stem - 155mm x 17mm
6478-6-725	Titanium Fluted Stem - 155mm x 18mm
6478-6-730	Titanium Fluted Stem - 155mm x 19mm
6478-6-730	Titanium Fluted Stem - 155mm x 21mm
6478-6-750	Titanium Fluted Stem - 155mm x 23mm
6495-3-101	Proximal Tibial Component - Small
6495-3-010	GMRS Tibial Insert for Small Proximal Tibia - 10mm
6495-3-013	GMRS Tibial Insert for Small Proximal Tibia - 13mm
6495-3-016	GMRS Tibial Insert for Small Proximal Tibia - 16mm
6495-3-020	GMRS Tibial Insert for Small Proximal Tibia - 20mm
6495-3-024	GMRS Tibial Insert for Small Proximal Tibia - 24mm

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