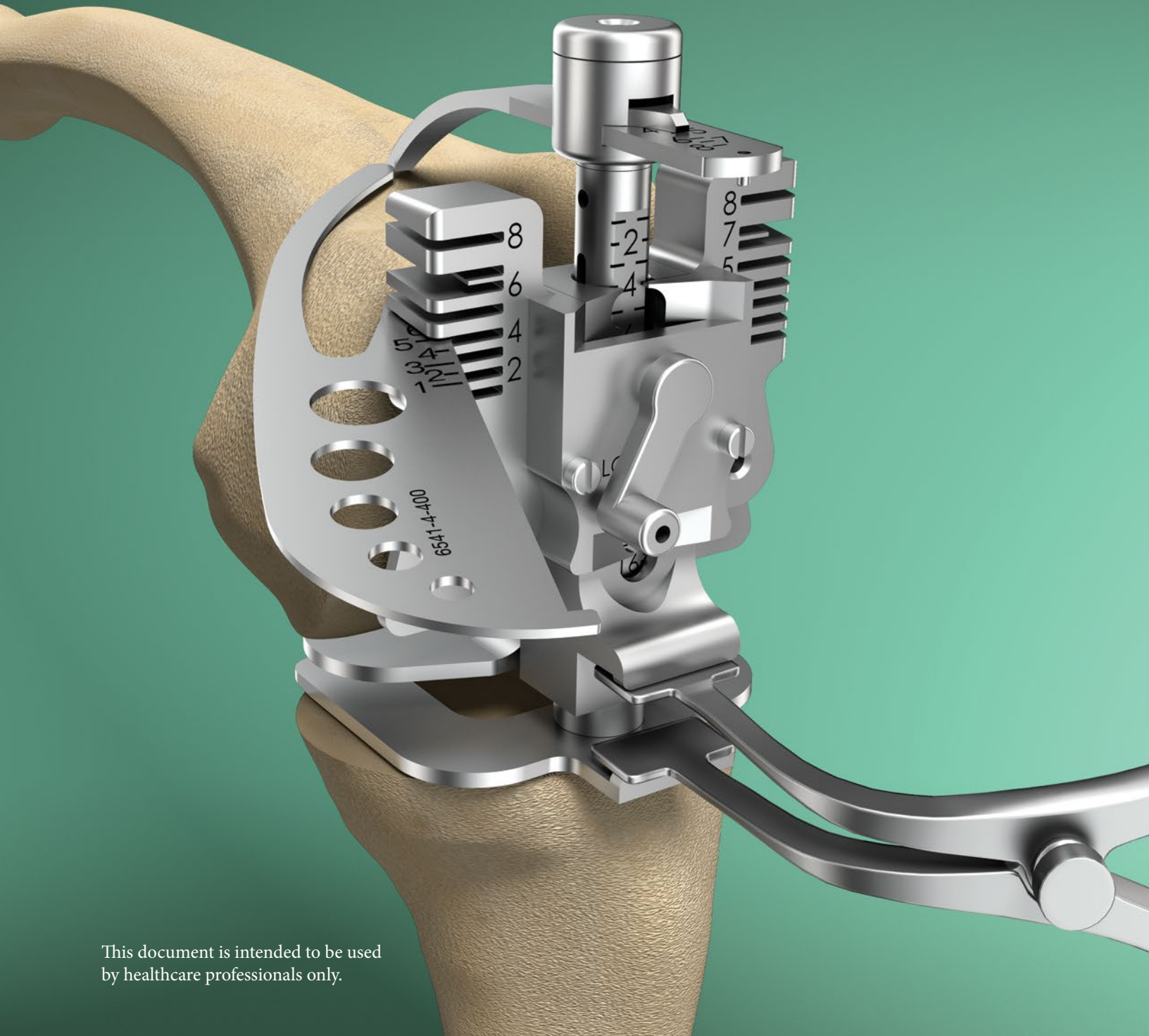


# Triathlon® Knee System

## Gap Balancing Technique Surgical Protocol Addendum



# Triathlon Knee System

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### ***Indications***

General Total Knee Arthroplasty (TKR) Indications include:

- Painful, disabling joint disease of the knee resulting from: non-inflammatory degenerative joint disease (including osteoarthritis, traumatic arthritis or avascular necrosis) or rheumatoid arthritis.
- Post-traumatic loss of knee joint configuration and function.
- Moderate varus, valgus, or flexion deformity in which the ligamentous structures can be returned to adequate function and stability.
- Revision of previous unsuccessful knee replacement or other procedure.
- Fracture of the distal femur and/or proximal tibia that cannot be stabilized by standard fracture management techniques.

### ***Additional Indications for Posterior Stabilized (PS) Components***

- Ligamentous instability requiring implant bearing surface geometries with increased constraint.
- Absent or non-functioning posterior cruciate ligament.
- Severe anteroposterior instability of the knee joint.

The Triathlon Tritanium Tibial Baseplate and Tritanium Metal-Backed Patella components are indicated for both uncemented and cemented use.

The Triathlon Total Knee System beaded and beaded with Peri-Apatite components are intended for uncemented use only.

### ***Contraindications***

- Any active or suspected latent infection in or about the knee joint.
- Distant foci of infection which may cause hematogenous spread to the implant site.
- Any mental or neuromuscular disorder which would create an unacceptable risk of prosthesis instability, prosthesis fixation failure, or complications in post-operative care.
- Bone stock compromised by disease, infection or prior implantation which cannot provide adequate support and/or fixation to the prosthesis.
- Skeletal immaturity.
- Severe instability of the knee joint secondary to the absence of collateral ligament integrity and function.

See package insert for warnings, precautions, adverse effects, information for patients and other essential product information.

### ***Before using Triathlon Gap Balancing instrumentation, verify:***

- Instruments have been properly disassembled prior to cleaning and sterilization;
- Instruments have been properly assembled post-sterilization;
- Instruments have maintained design integrity; and,
- Proper size configurations are available.

For Instructions for Cleaning, Sterilization, Inspection and Maintenance of Orthopaedic Medical Devices, refer to LSTPI-B.

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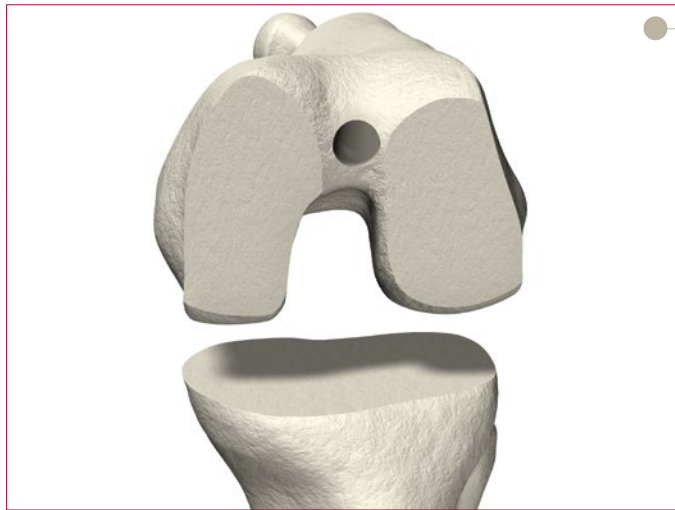
### Introduction

Gap Balancing is a traditional surgical technique used by many orthopaedic surgeons worldwide. This addendum contains one approach to this technique that may be used to streamline and simplify the process of balancing the knee ligaments and promoting equal flexion and extension gaps. This technique uses conventional instruments as well as a Sizer-Balancer and a lamina spreader. The surgeon employs conventional instruments to resect the distal femur and proximal tibia in his or her preferred order. The Sizer-Balancer and lamina spreader are then used to help balance the knee, equalize gaps, set femoral rotation and size the knee. The rest of the procedure is completed using standard instruments.



# Triathlon Knee System

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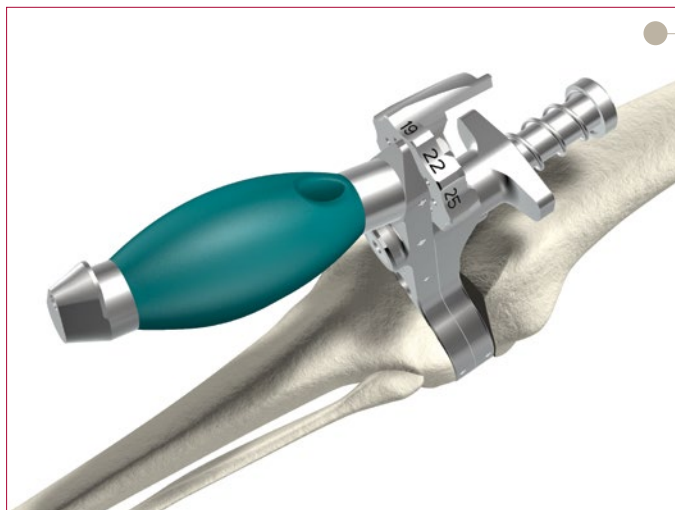


*Figure 1*

### Gap Balancing Using a Sizer-Balancer

#### *1. Perform Distal Femoral and Proximal Tibial Resections*

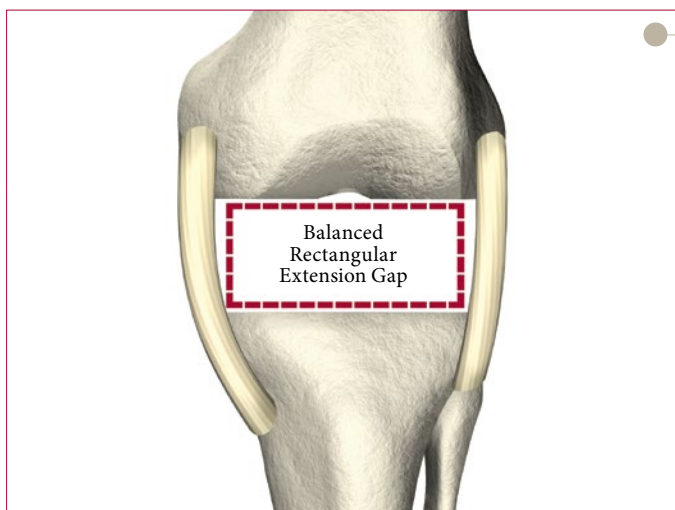
- ▶ Following exposure, perform proximal tibial and distal femoral resections using standard instrumentation and approaches (cf. LSPK42, LSPK45, LSPK47, LSPK49, LTMIS-ST) (**Figure 1**). If desired, verify that the cut surface of the tibia is perpendicular to the long axis of the tibia.



*Figure 2*

#### *2. Extension Gap Assessment & Initial Ligament Balancing*

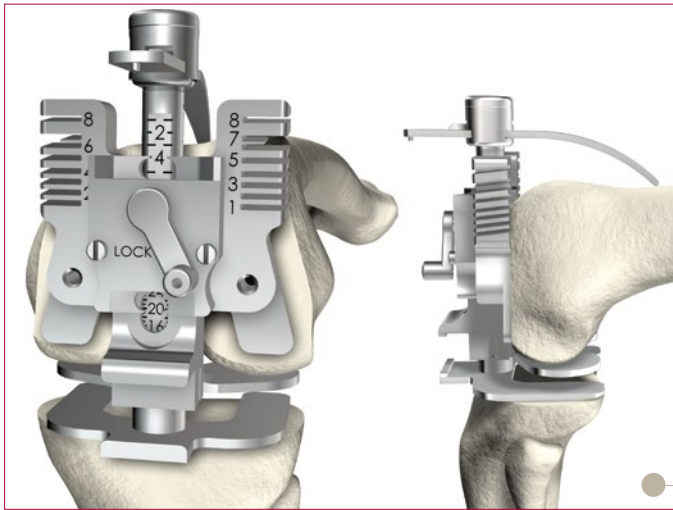
- ▶ Once the Distal Femoral and Proximal Tibial Cuts are completed, trim osteophytes and complete initial ligament balancing. Placing leg in extension, insert spacer block into extension gap.



*Figure 3*

- ▶ If needed, Balance Extension Gap using release of ligaments until extension gap is rectangular. After extension gap is balanced and rectangular, measure the gap in millimeters that equates to a Triathlon insert (see chart on page 4).

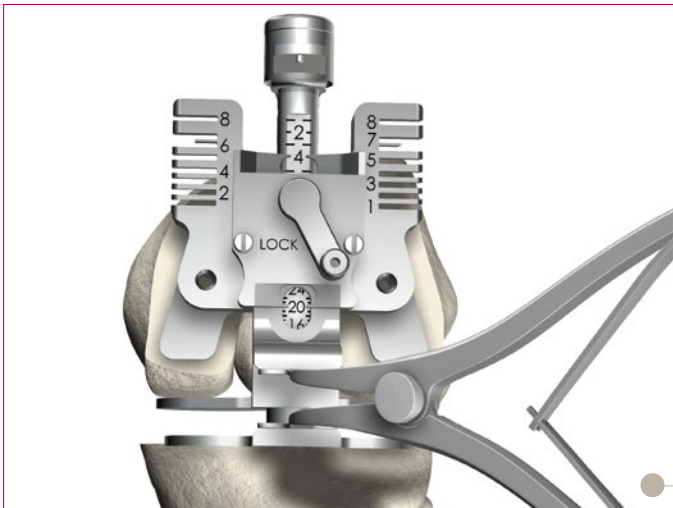
## Instrument Bar



**Figure 4**

### 3. Setting Femoral Rotation

- ▶ Remove the spacer block and bring leg into 90 degrees of flexion.
- ▶ Be sure that the Sizer-Balancer's lock lever is set to the unlocked position (to the right). Insert the Sizer-Balancer, placing the feet between the cut tibial surface and the uncut posterior condyles, as shown.



**Figure 5**

- ▶ Inserting a lamina spreader into the notch on the front of the Sizer-Balancer, apply sufficient force to tension both medial and lateral collateral ligaments equally.

**Note:** The medial collateral ligament will engage first; the femur will then internally rotate, tightening the lateral collateral ligament until equal tensioning of both collaterals is achieved.



**6541-4-610**

Adjustable Spacer Block



**I-K2710KB00**

Triathlon Gap Sizer-Balancer



Generic Lamina Spreader

# Triathlon Knee System

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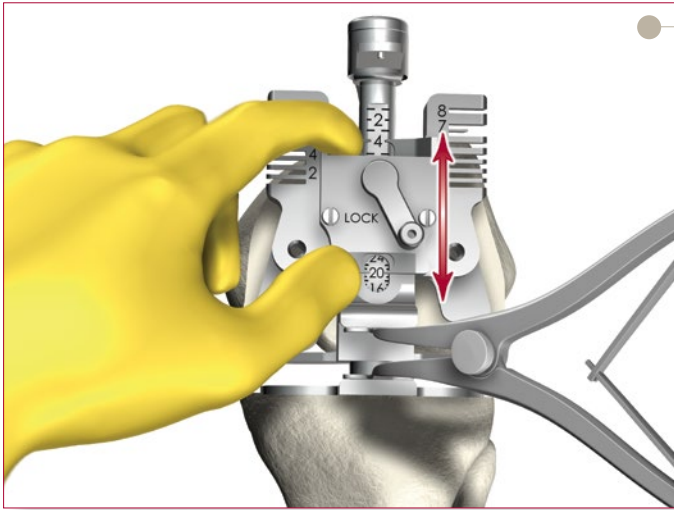


Figure 6

#### 4. Set Flexion Gap to Equal Extension Gap

- ▶ Once equally tensioned, set and lock the gauge to equal the previously noted extension gap (Figures 6 & 7).
- ▶ If flexion gap cannot be set equal to the noted extension gap and the flexion gap is greater than the extension gap, remove the Sizer-Balancer and increase distal femoral resection level using standard instrumentation.

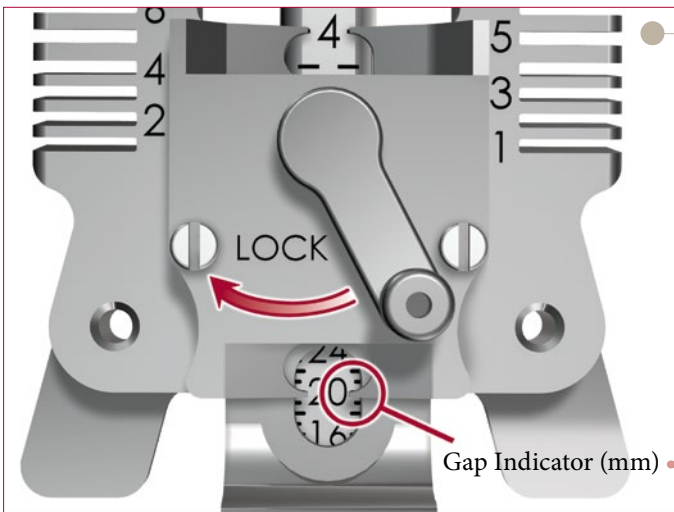


Figure 7

#### Gap and Insert Thickness Correspondence

Gap	Insert Thickness
17mm	9mm
19mm	11mm
21mm	13mm
24mm	16mm

Gap thicknesses are approximate; for simplicity, femoral implant thickness of 8.5mm is rounded to 8mm. Insert thickness includes the insert and baseplate.

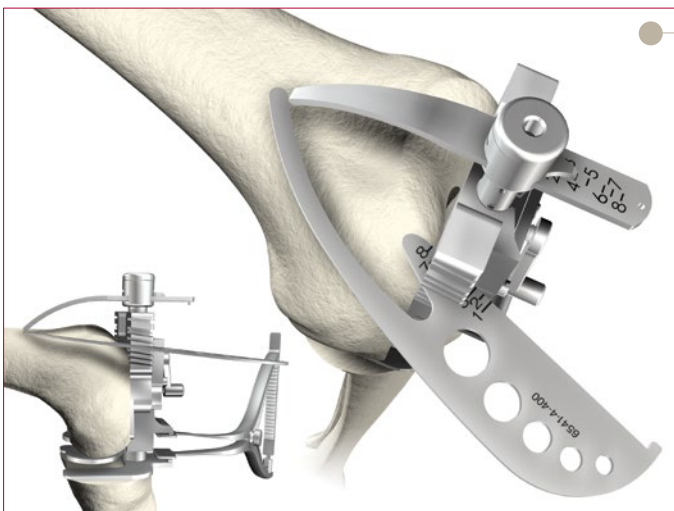


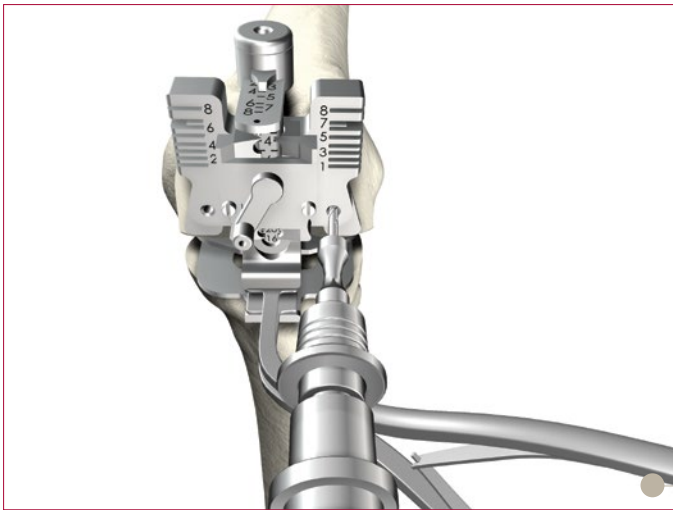
Figure 8

#### 5. Confirm Rotation and Size Femur

- ▶ Confirm rotation using the transepidcondylar axis or Whiteside's Line.
- ▶ Using either the stylus or Bladerunner and lateral slots on the Sizer-Balancer, size femur appropriately with tip of stylus or Bladerunner touching the inflection point of the anterior femur on the lateral side (Figure 8).

## Instrument Bar

- ▶ Size to ensure no anterior notch; if between sizes, the surgeon may use the Medial/Lateral width reference as a check. If the runout indicates a notch cut, the situation may be addressed as follows:
  1. Upsize the femoral component (flexion gap will not be affected by this change as the femoral component grows anteriorly in size.)
- OR -
- 2. Unlock the lock and shift the central sizer body a maximum of 1.5mm anteriorly to eliminate the notch, then relock. This will anteriorize the pin holes and increase the flexion gap and may or may not require a recut of the distal femur.



**Figure 9**

- ▶ Once size has been established, use the 1/8" Peg Drill to create fixation pin holes (for the 4:1 Cutting Block) through the holes on the face of Sizer-Balancer (**Figure 9**).

### 6. Complete Procedure

- ▶ Use standard instrumentation to complete preparation of femur, tibia, and patella, as well as trialing and final implantation (cf. LSPK42, LSPK45, LSPK47, LSPK49, LTMIS-ST).



**I-K2710KB00**

Triathlon Gap Sizer-Balancer



Generic Lamina Spreader



**6541-4-400**

Bladerunner



**6541-4-518**

1/8" Peg Drill



**6541-4-801**

Universal Driver





## Femoral Component/Insert Compatibility

Size Matching: One up, one down, e.g., size 5 femur with size 4 or 6 insert/baseplate.

**Note:** Cementless implants are not to be used with cement.

		Insert Type			
		CR	CS	PS	TS
<b>Cementless</b>	CR Cemented	✓	✓	No	No
	PS Cemented	No	✓	✓	✓
	TS Cemented	No	No	✓	✓
	CR Beaded	✓	✓	No	No
	PS Beaded	No	No	✓	No
	CR Beaded with PA	✓	✓	No	No
	PS Beaded with PA	No	No	✓	No

## Femoral Component/Patella Compatibility

Size Matching: Every patella articulates with every femur due to a common radius across all sizes.

		Patella Type			
		Asymmetric	Asymmetric Metal Backed	Symmetric Metal Backed	Symmetric
<b>Cementless</b>	CR Cemented	✓	✓	✓	✓
	PS Cemented	✓	✓	✓	✓
	TS Cemented	✓	✓	✓	✓
	CR Beaded	✓	✓	✓	✓
	PS Beaded	✓	✓	✓	✓
	CR Beaded with PA	✓	✓	✓	✓
	PS Beaded with PA	✓	✓	✓	✓

## Tibial Insert/Baseplate Compatibility

Size Matching: Size Specific, e.g., size 4 insert to be used only with size 4 baseplate.

**Note:** TS insert can only be used with the cemented universal baseplate.

		Insert Type			
		CR	CS	PS	TS
<b>Cementless</b>	Cemented Cruciform	✓	✓	✓	No
	Cemented Universal	✓	✓	✓	✓
	Beaded Cruciform	✓	✓	✓	No
	Beaded Screw Fix	✓	✓	✓	No
	Beaded with PA Cruciform	✓	✓	✓	No
	Beaded with PA Screw Fix	✓	✓	✓	No
	Tritanium	✓	✓	✓	No

## Triathlon TS Augments

Distal Augments are for use with both the medial and lateral portions of the side indicated, e.g. #4 right is used for medial and lateral compartments on a right femur.

Posterior Augments are universal size specific, e.g. size 4 posterior augments are for the size 4 femur.

Tibial Augments are size specific and come in left medial/right lateral or right medial/left lateral configurations.

## Reconstructive

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Hips  
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Trauma & Extremities  
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