BIOMET OSS

Orthopaedic Salvage System

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One Surgeon. One Patient.

Over 1 million times per year, Biomet helps one surgeon provide personalized care to one patient.

The science and art of medical care is to provide the right solution for each individual patient. This requires clinical mastery, a human connection between the surgeon and the patient, and the right tools for each situation.

At Biomet, we strive to view our work through the eyes of one surgeon and one patient. We treat every solution we provide as if it's meant for a family member.

Our approach to innovation creates real solutions that assist each surgeon in the delivery of durable personalized care to each patient, whether that solution requires a minimally invasive surgical technique, advanced biomaterials or a patient-matched implant.

When one surgeon connects with one patient to provide personalized care, the promise of medicine is fulfilled.

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The Orthopaedic Salvage System (OSS) is the most comprehensive limb salvage family on the market delivering complete interchangeability and intraoperative flexibility, presenting surgeons with ease of application, unparalleled modularity and surgical scope.

Indications:

- Bone Loss Due To Tumor Resection
- Ligamentous Deficiencies
- Multiple Knee Revision Arthroplasties
- Multiple Hip Revision Arthroplasties

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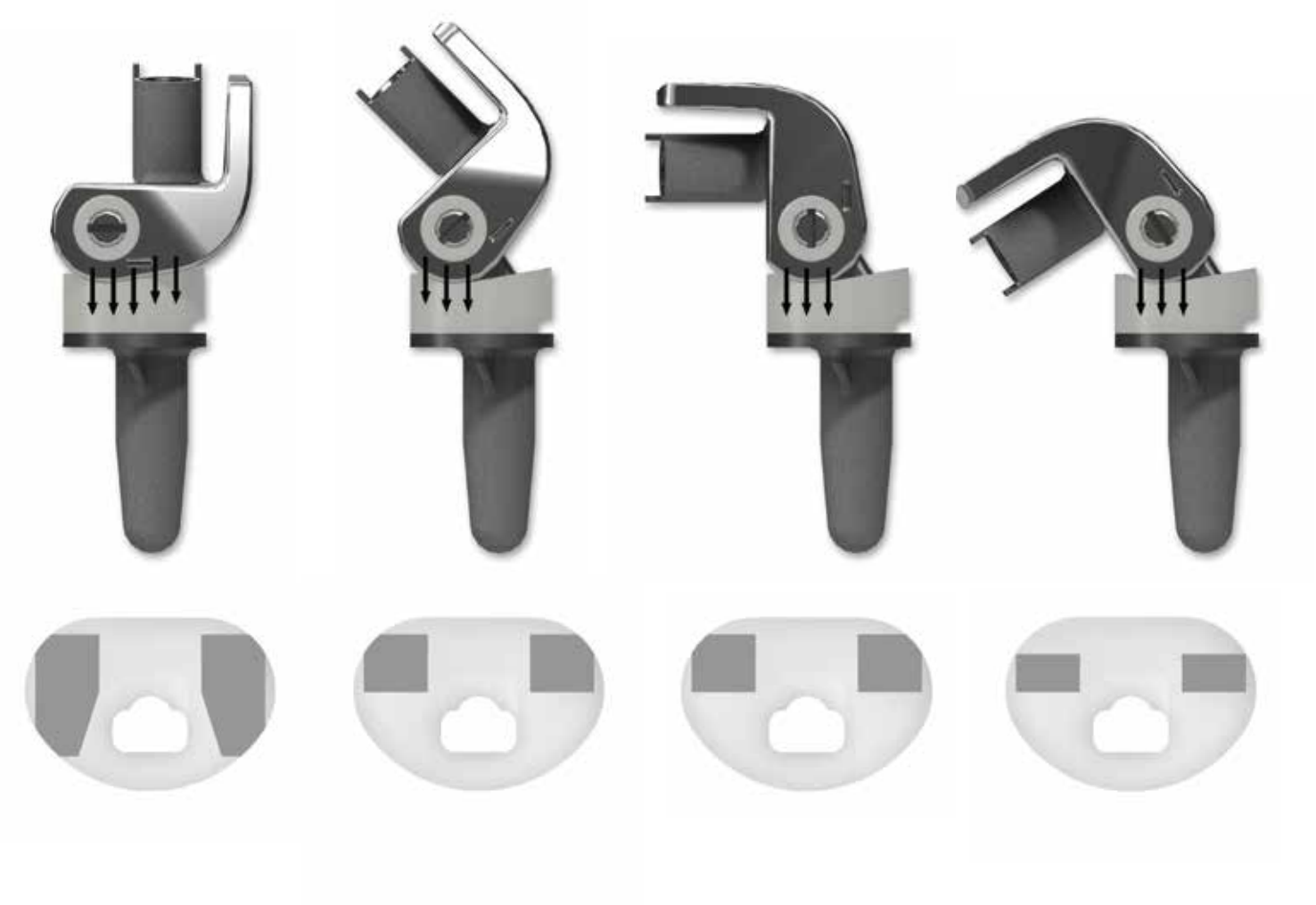
Uniform Distribution of Loading

The OSS rotating hinge design provides a condyle/tibial bearing load path similar to primary total knee replacements to recreate anatomic biomechanics. The center of rotation was optimized for effective extensor mechanism functionality.



Use with Compress Compliant Pre-stress Device

As a complement to the OSS System, the Compress Pre-stress Device is designed to replace the distal and/or proximal femur in cases of severe bone loss. It exemplifies Wolff's Law – the principle that bone, when stressed, remodels to become stronger through dynamic bone compression. This creates a stable, high pressure bone-implant interface for biologic fixation[1-3] and helps prevent stress shielding.

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Distal Femurs

The distal femoral components of both the standard and reduced size (RS) systems are offered in 12 distinct replacement designs addressing a multitude of reconstructive scenarios. A universal taper allows for complete interchangeability throughout the entire system, enabling standard and reduced size femur and tibia to be used together in any combination.

OSS Standard Distal Femur

OSS RS Distal Femur

Distal Femur Offerings

3 cm RS 3 cm

Resurfacing Distal Femur

- 3 cm implant for basic reconstruction of the distal femur
- 5 cm implant for larger defects of the distal femur
- Accepts any OSS non-collared stem option

Available Sizing (RS and Standard)	3 cm	5 cm

7 cm RS 7 cm

Elliptical Segmental Distal Femur

- For complete replacement of the distal femur
- Elliptical collar designed to contact the remaining flared metaphyseal portion of the distal femoral shaft
- Accepts any OSS stem option

Available Sizing (RS and Standard)	7 cm	8.5 cm

8.5 cm RS 8.5 cm

Segmental Distal Femoral

- For complete replacement of the distal femur when more than 7 cm of reconstruction is required
- Designed for use with any of the diaphyseal segments or total femur couplers
- When used in conjunction with a diaphyseal segment, accepts any OSS stem option

Available Sizing (RS and Standard)	7 cm	8.5 cm

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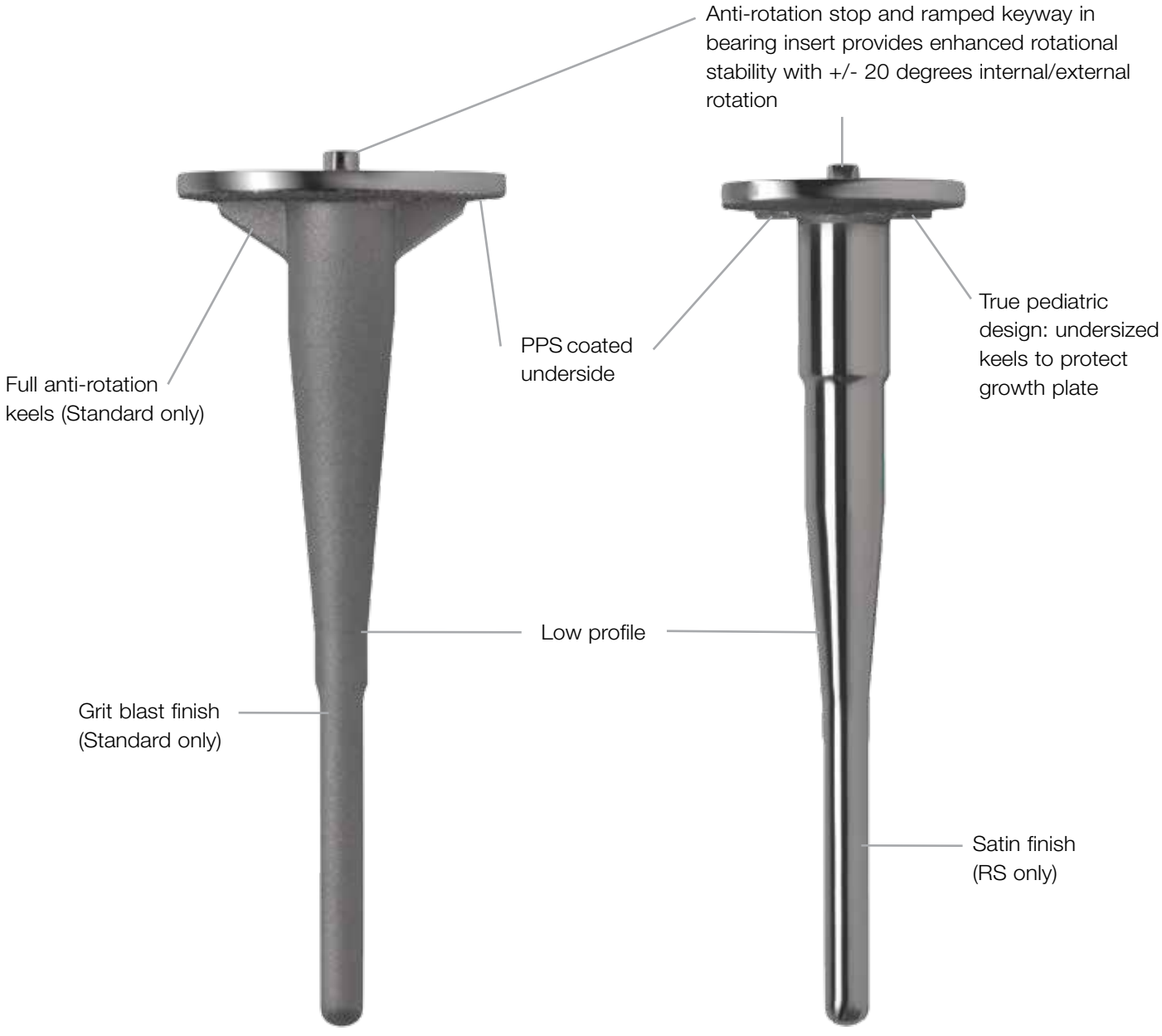
Tibial Trays

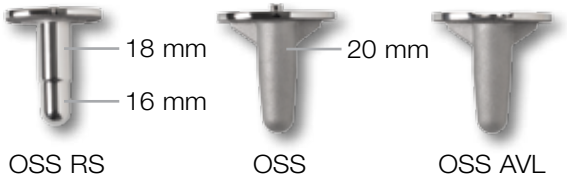
The OSS tibial trays are available in a number of sizes and styles (non-modular short, non-modular long, modular). The RS offering contains pediatric-sized tibial implants that are available in a non-modular short and non-modular long design and are compatible with all OSS Distal Femoral Components.



OSS Tibial Tray

OSS RS Tibial Tray

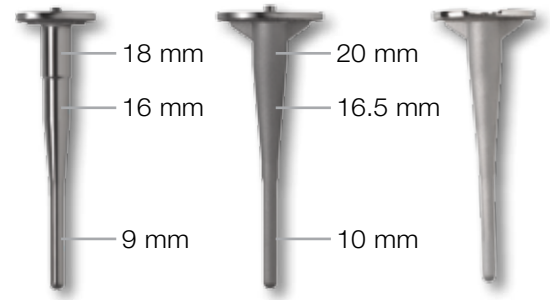
Tibial Tray Offerings



Non-Modular Short

- Used for tibial reconstructions where a distal stem is not required
- 56 mm RS Boss
- 65 mm Standard Boss
- AVL anti-luxation option mechanically locks the femur to the tibial component limiting movement in all but the sagittal plane

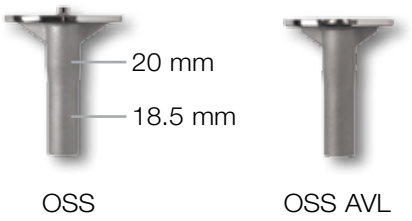
OSS RS	47 mm	51 mm	55 mm	59 mm	63 mm	67 mm	71 mm	–
OSS	–	–	–	–	63 mm	67 mm	71 mm	75 mm
OSS AVL	–	–	–	–	63 mm	67 mm	71 mm	–



Non-Modular Long

- Used for tibial reconstructions where a tibial canal prohibits use of a modular baseplate and stem
- 160 mm RS and Standard Boss

OSS RS	47 mm	51 mm	55 mm	59 mm	63 mm	67 mm	71 mm	–
OSS	–	–	–	–	63 mm	67 mm	71 mm	75 mm
OSS AVL	–	–	–	–	63 mm	67 mm	–	–



Modular

- Used when a modular tibial stem may or may not be required
- 79 mm Boss

OSS	63 mm	67 mm	71 mm	75 mm	79 mm	83 mm
OSS AVL	63 mm	67 mm	71 mm	75 mm	79 mm	83 mm

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Proximal Tibial Bodies

The OSS Proximal Tibial replacements are available in non-modular and modular standard size designs along with a modular RS body.

All versions are compatible with the complete line of OSS Distal Femurs. All proximal tibial implants feature an anterior PPS coating as well as suture holes in the M/L and A/P planes for reattachment of the extensor mechanism.

Proximal Tibial Sleeves

The OSS and OSS RS Proximal Tibial Sleeves are designed to replace between 3 cm and 9 cm of proximal tibia, using either the long non-modular tibial baseplates (OSS/OSS RS) or the modular tibial baseplate (OSS).

Both sets of these tibial sleeves feature the same design geometry as the proximal tibial bodies.

Regenerex Cone Augments

The Regenerex Cone Augments provide for biologic fixation [4, 5] to address multiple bone voids. Created from Regenerex Porous Titanium Construct which unites the proven clinical history of titanium[6] with an enhanced interconnecting pore structure, these buildable components provide additional options for tibial reconstruction.

Proximal Tibial Offerings

3 cm 5 cm 7 cm

Non-Modular

- 3 cm tibia features a 240 mm non-modular stem
- 5 cm and 7 cm tibia features a 150 mm non-modular stem

Available Sizing	3 cm	5 cm	7 cm

RS Body | Elliptical Body | Modular Body

Non-Modular and Modular Bodies

- Elliptical body designed to replace 9 cm of proximal tibia
- Modular body designed for use with any of the diaphyseal segments or collared stems to reconstruct the proximal tibia

Available Sizing	RS	Standard
	9 cm Modular	9 cm Modular
	–	9 cm Elliptical

Modular Proximal Tibial Sleeve Offerings

5 cm RS | 5 cm Standard

Modular Proximal Tibial Sleeve

- RS sleeves cement onto RS long non-modular tibial baseplates
- Standard works with long non-modular or modular tibial baseplates

Available Sizing (RS and Standard)	3 cm	5 cm	7 cm	9 cm Elliptical

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Proximal Femoral Components

The OSS offering provides three options when proximal femoral bone loss is so severe that a minimum replacement of 7 cm is indicated. Reattachment modes are available in the medial and lateral planes, as well as a trochanteric bolt and claw option.

Elliptical Proximal Femoral Option

Proximal Femur Offerings

Finn-Style Elliptical Proximal Femoral Component

- Elliptical collar utilizes OSS stems to create a 7 cm proximal femoral construct
- Three lateral and two medial reattachment holes
- Medial slot
- 15 degrees of anteversion
- Left and right options
- Lateral soft tissue claw with trochanteric bolt to assist in soft-tissue reattachment
- Low-profile design

Available Sizing	7 cm

Finn-Style Modular Proximal Femoral Component

- A non-elliptical design that accepts a collared stem or a diaphyseal segment/stem combination for proximal femoral replacements greater than 7 cm
- Combined with a total femur coupler to create a total femoral construct
- Same design characteristics as the Elliptical Proximal Femur

Available Sizing	7 cm

Letson Modular Proximal Femoral Component

- A non-elliptical design that accepts a collared stem or a diaphyseal segment/stem combination for proximal femoral replacements greater than 7 cm
- Combined with a total femur coupler to create a total femoral construct
- Five lateral and two medial reattachment holes
- Medial slot
- 15 degrees of anteversion
- Left and right options
- Lateral soft tissue claw with trochanteric bolt to assist in soft-tissue reattachment
- Raised lateral flange design

Available Sizing	7 cm

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Segmental Adapters

The OSS Segmental Adapters provide a 1 cm or 1.5 cm external build-up to any segmental replacement. The female boss adds an additional 40 mm to any non-collared OSS stem.

Segmental adapter shown with 7 cm segmental distal femur and 90 mm porous stem option

Diaphyseal Segments

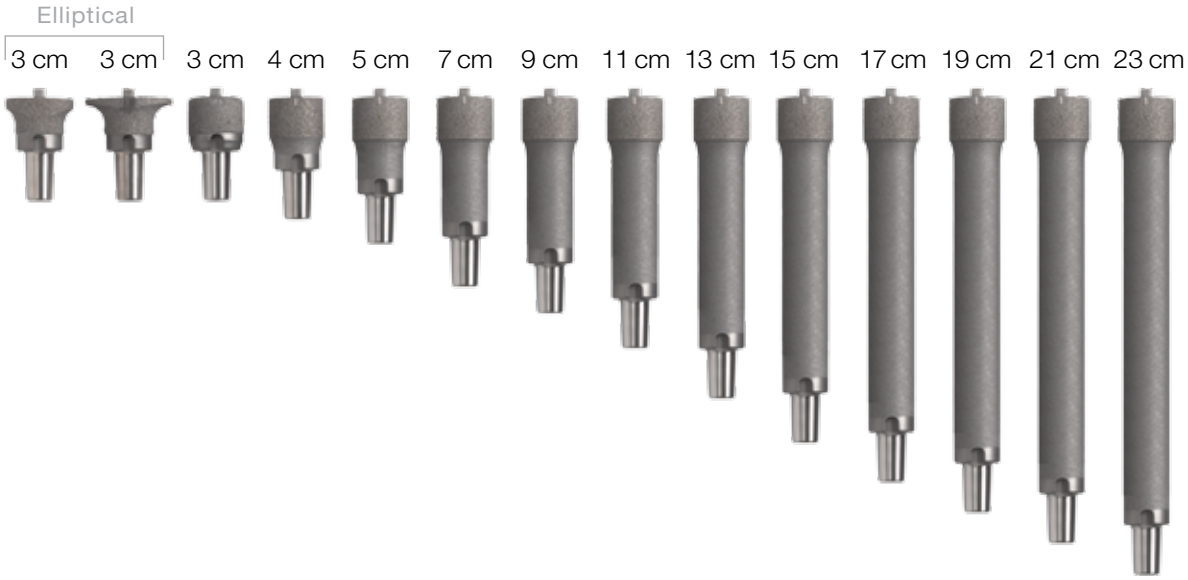
The OSS Diaphyseal Segments are designed to add extramedullary length in either distal femoral, proximal tibial, proximal femoral or total femoral applications.

Segmental Adapter Offerings

Segmental Adapters

Available Sizing	1 cm collar	1.5 cm collar

Diaphyseal Segment Offerings



Elliptical Diaphyseal Segments

- Used to achieve extramedullary cortical seating at a flared resection

Available Sizing	Standard Elliptical	Large Elliptical
	35 mm x 27 mm	45 mm x 32 mm

Diaphyseal Segments

- 2 cm increments
- 4 cm segment is available to provide 1 cm incremental buildups when coupled with another diaphyseal segment
- 2 cm PPS band
- Grit blast finish

Available Sizing	3 cm	4 cm	5 cm	7 cm	9 cm	11 cm	13 cm	15 cm	17 cm	19 cm	21 cm	23 cm

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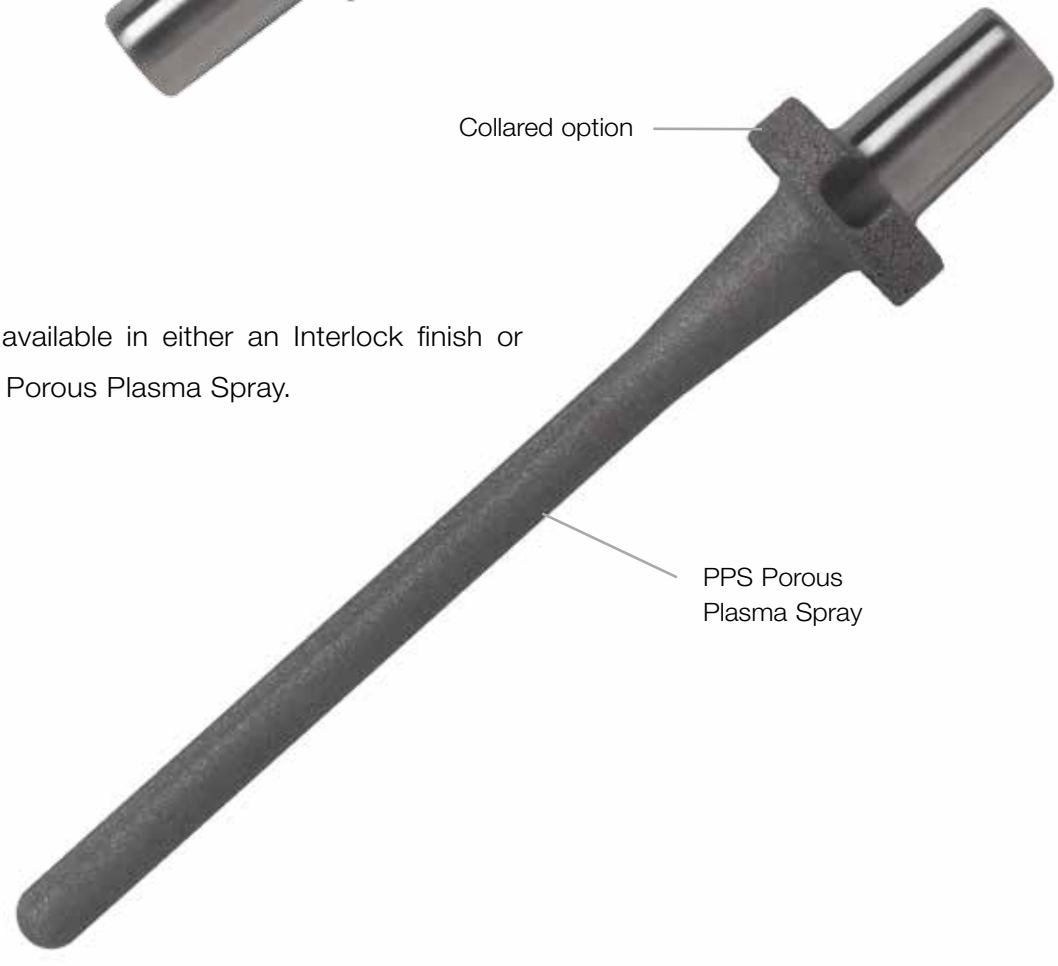
Total Femoral Couplers

The OSS Total Femur Couplers are used with a modular proximal femoral component and a segmental distal femoral component. Available in 10 and 30 cm lengths, these implants are typically added to a single diaphyseal segment to achieve proper total femoral length replacement.



Stems

The OSS stems are available in either an Interlock finish or a circumferential PPS Porous Plasma Spray.

Total Femoral Coupler Offerings

Total Femoral Couplers

Available Sizing	10 cm	30 cm

Straight Stems

interlock

porous

collared

Non-Collared

	Length	Diameter
Interlock	90 mm	9, 10, 11, 12, 13, 15, 17 mm
	150 mm	9, 11, 13, 15 mm
	225 mm	11, 13, 15 mm
Porous	90 mm	11.5, 12.5, 13.5, 14.5, 15.5, 16.5, 17.5, 18.5, 19.5 mm
	150 mm	10.5, 12.5, 14.5, 16.5 mm

Collared

Interlock	150 mm	9, 11 mm

Bowed Stems

interlock

porous

collared

Non-Collared

	Length	Diameter
Interlock	150 mm	11, 12, 13, 14, 15, 16, 17, 18 mm
	225 mm	11, 13, 15, 17 mm
	300 mm	11, 13, 15, 17 mm
Porous	150 mm	12.5, 13.5, 14.5, 15.5, 16.5, 17.5, 18.5, 19.5, 20.5, 21.5, 22.5 mm
	225 mm	12.5, 14.5, 16.5, 18.5 mm
	300 mm	12.5, 14.5, 16.5, 18.5 mm

Collared

Interlock	150 mm	11 mm
	225 mm	11 mm
	300 mm	11 mm

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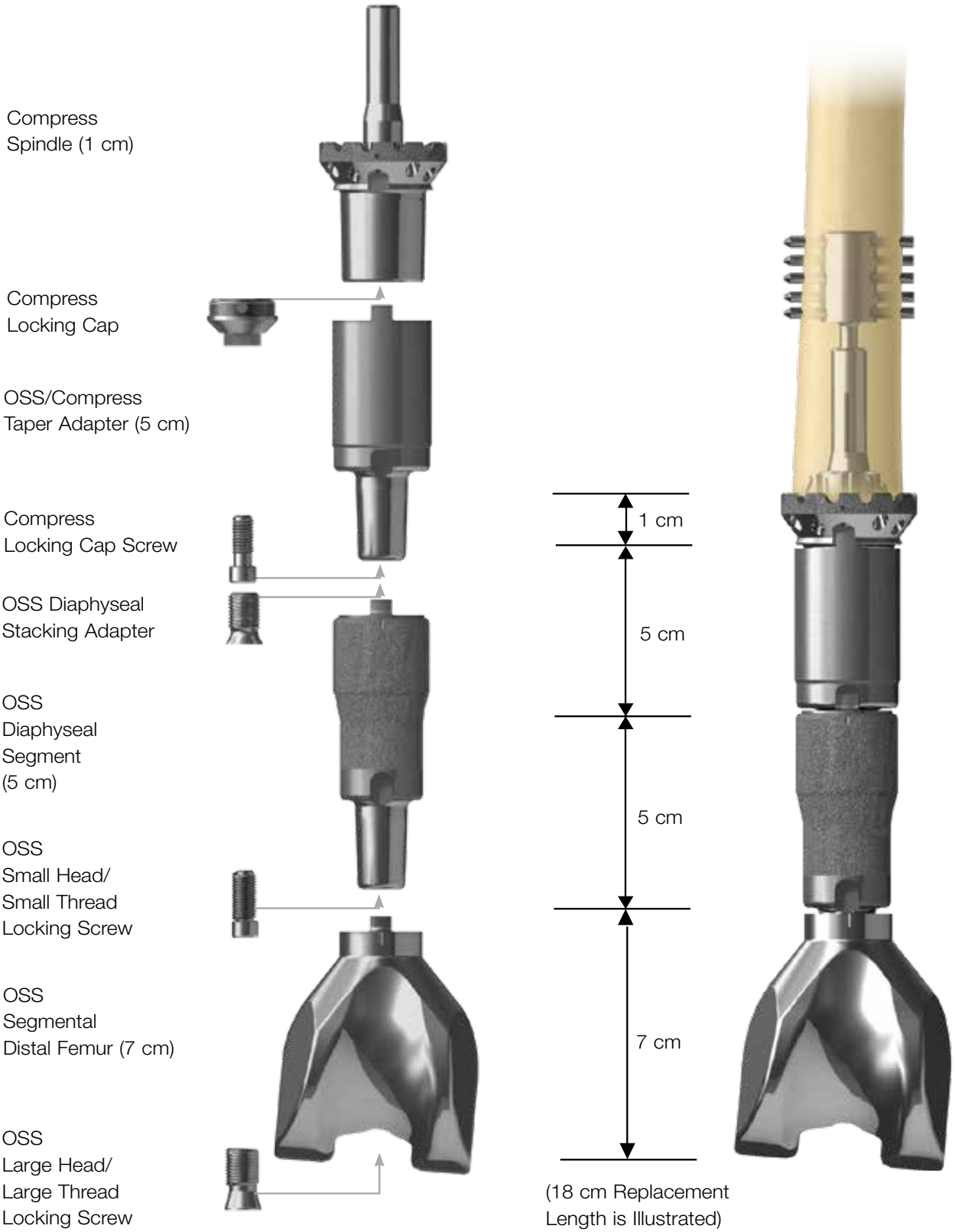
Use with Compress Device

Example Utilizing Diaphyseal Segment and Taper Adapter



(18 cm Replacement
Length is Illustrated)

The below X-rays demonstrate the Compress Compliant Pre-Stress Device immediate postoperative and at twelve years postoperative signifying bone remodeling at the implant/ bone interface.

Immediate Postoperative*

12 Years Postoperative*

*X-rays compliments of: James O. Johnston, M.D. Kaiser Permanente Medical Center Department of Orthopaedic Surgery, South San Francisco, CA.

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UHMWPE Lock Pin

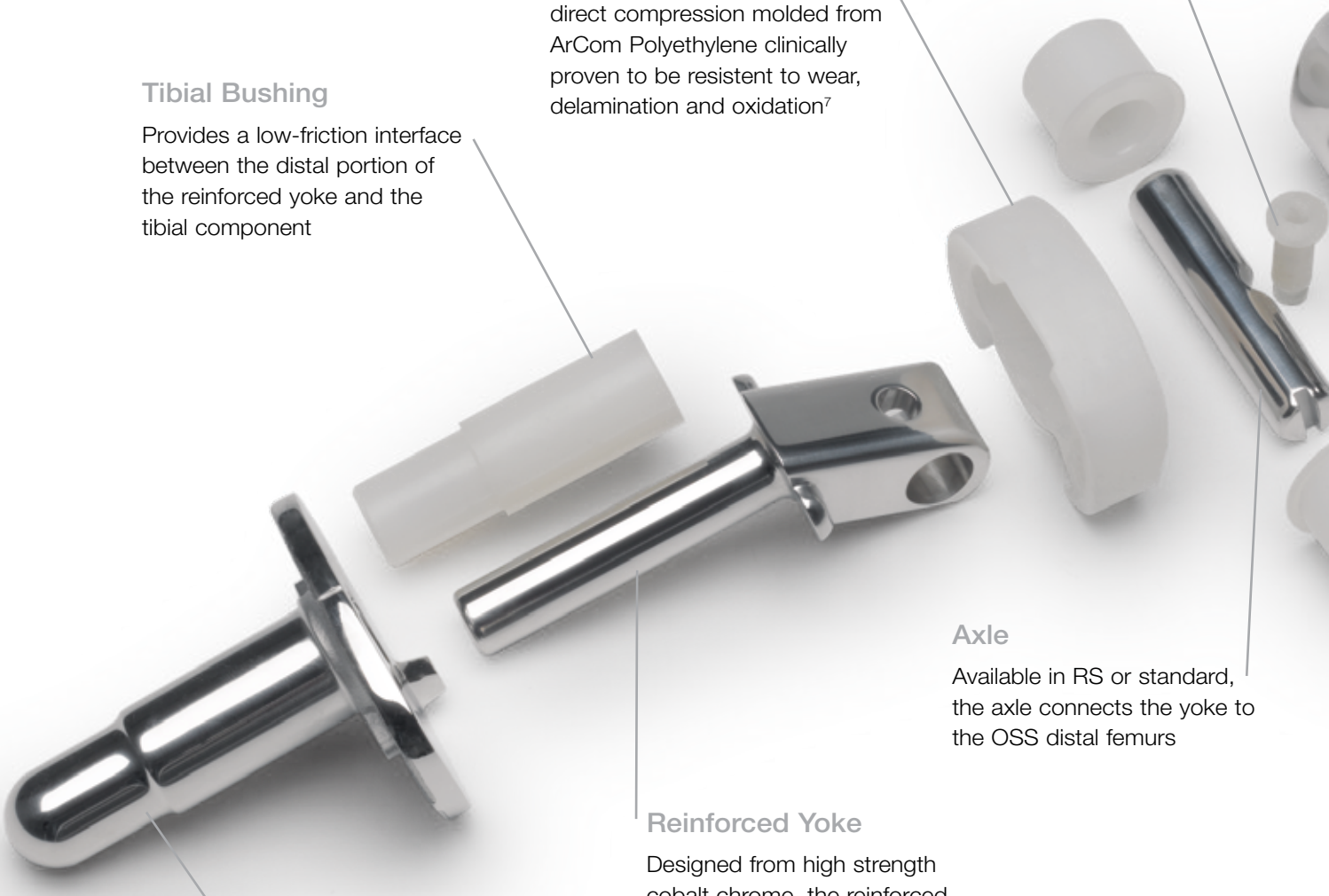
The UHMWPE lock pin is inserted into the anterior opening of the reinforced yoke, engaging both the yoke and axle

ArCom Tibial Bearing

Available in six thicknesses and direct compression molded from ArCom Polyethylene clinically proven to be resistent to wear, delamination and oxidation[7]

Tibial Bushing

Provides a low-friction interface between the distal portion of the reinforced yoke and the tibial component



Axle

Available in RS or standard, the axle connects the yoke to the OSS distal femurs

Reinforced Yoke

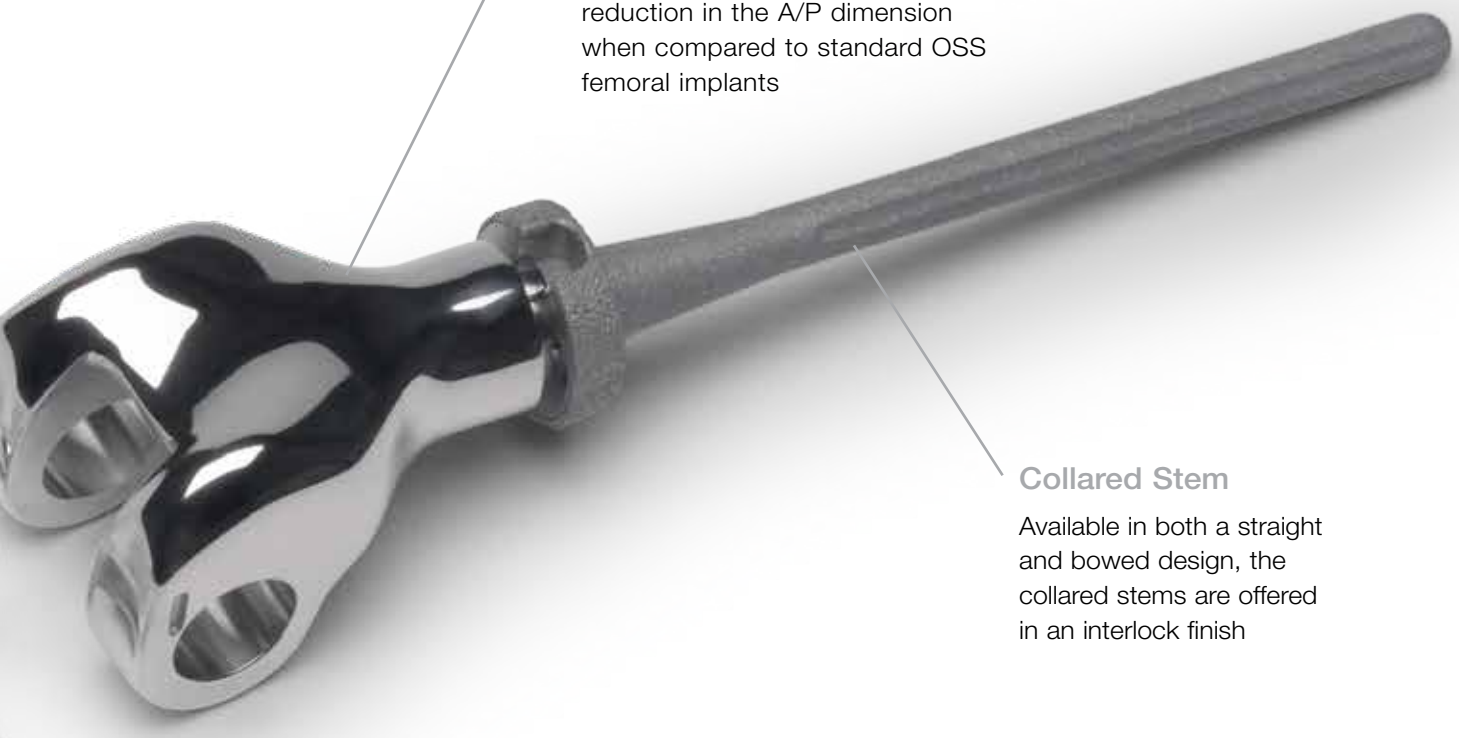
Designed from high strength cobalt chrome, the reinforced yoke is used in conjunction with the axle to provide a stable articulation between the femur and tibia

RS Non-Modular Tibia

True pediatric design features minimized anti-rotation keels, satin finish and a reduced size distal boss

RS Segmental Distal Femur

All of the OSS RS distal femoral options feature a pediatric sizing rationale with a 15 percent reduction in the M/L dimension and a 20 percent reduction in the A/P dimension when compared to standard OSS femoral implants



Collared Stem

Available in both a straight and bowed design, the collared stems are offered in an interlock finish

ArCom Femoral Bushings

Provides a low-friction interface between the axle and distal femoral device

References

1. Avedian, R., *et al*. Effect of Chemotherapy on Initial Compressive Osseointegration of Tumor Endoprostheses. Clinical Orthopaedics and Related Research. 459: 48-53, 2007.
2. Bini, S., *et al*. Compliant Prestress Fixation in Tumor Prostheses: Interface Retrieval Data. Orthopedics. 23(7): 707-12, 2000.
3. Martin, D., *et al*. Spring Pre-stress Fixation for Segmental Bone Replacement. 39th Annual Meeting, Orthopaedic Research Society, Feb. 15-18, 1993. San Francisco, CA.
4. Data on file at Biomet. Bench test results not necessarily indicative of clinical performance.
5. Testing done on animal models. Not necessarily indicative of clinical performance.
6. Hahn, H., *et al*. Preliminary Evaluation of Porous Metal Surfaced Titanium for Orthopedic Implants. Journal of Biomedical Materials Research. 4(4): 571–77, 1970.
7. Ritter, M. The Anatomical Graduated Component Total Knee Replacement: A Long-Term Evaluation with 20-year Survival Analysis. *The Journal of Bone and Joint Surgery.* 91-B(6): 745-49, 2009.

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