



Zimmer®  
Segmental  
System



Simple solutions for solving complex salvage cases





## A Step Forward

The *Zimmer*® Segmental System is designed to address patients with severe bone loss associated with disease, trauma or revision. Cross-system capabilities with the *NexGen*® Rotating Hinge Knee and *MOST Options*® System provide the flexibility necessary for challenging reconstructions.

No other salvage system has *Trabecular Metal*™ Technology at key fixation interfaces, enabling bone and soft tissue ingrowth. Building on the design of the *NexGen* Rotating Hinge Knee, this system features a modular hinge mechanism that results in 95% of the load being carried by the tibial condyles.<sup>1</sup>



### Cross-System Capabilities

The ability to interchange select components with the *NexGen* Rotating Hinge Knee and *MOST Options* System offers significant flexibility for reconstructions.

#### *NexGen* Compatibility Options:

- Rotating Hinge Knee Distal Femoral
- Rotating Hinge Knee Cement Shield Polyethylene Insert Components
- Patellar Components
- Rotating Hinge Knee Tibial Baseplate Components
- Stem Components

#### *MOST*™ Compatibility Options:

- Proximal Femoral Components

### Anteversión Alignment Mechanism

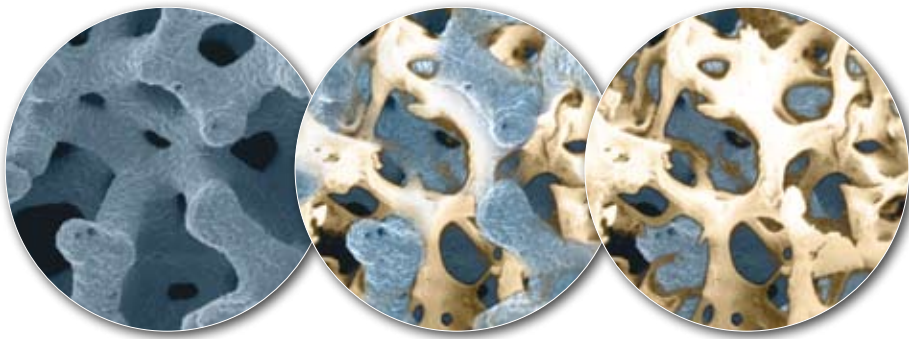
An incremental alignment mechanism features tab and pocket adjustment for optimal alignment.

- Enables reconstructions to more closely match patient anatomy
- Allows for controllable adjustment in 20-degree increments

### Unique Trabecular Metal Technology

The only salvage system to offer advanced *Trabecular Metal* Technology – *The Best Thing Next To Bone*.™

- Maximal Bone Contact – the modular collars are provided in several diameters for patient matching and maximal bone contact
- Porosity – 75% - 80% porosity allows two to three times greater bone ingrowth<sup>2,3</sup>
- Flexibility – The 3-D structure provides flexibility, reducing the potential for stress shielding<sup>4,5</sup>
- Friction/Stability – Produces more friction than sintered coatings on cancellous bone<sup>6,7</sup>



*Trabecular Metal* Material simulates bone like no other prosthetic material. That's because it is designed to replicate the shape, the cellular structure, the elasticity, and the weight-bearing characteristics of bone. It's a unique, highly porous, three-dimensional biomaterial, not a coating. Thus, it allows significant bone and soft-tissue ingrowth. With over 200,000 worldwide surgeries performed since 1997 using *Trabecular Metal* Implants, the results are in: *Trabecular Metal* Material is indeed *The Best Thing Next to Bone*.



#### Transitional Articular Surface

A tapered articular surface allows for increased intraoperative options.

- Permits the use of a smaller tibial component for a given distal femur size, which is especially advantageous in oncology cases, where skin closure can be challenging



**95%**  
Condylar  
Loading

#### 95% Condylar Loading

Utilizes the same kinematics as the Rotating Hinge Knee – 95% of the load passes through the condyles, similar to the loading pattern of a primary implant.<sup>1</sup>

- The femoral component and articular surface are designed to maintain centralized contact throughout the range of motion
- Reproducing *NexGen* Knee System kinematics,<sup>8</sup> femoral condyle centering and the shape of the patella groove allow stable patellar tracking



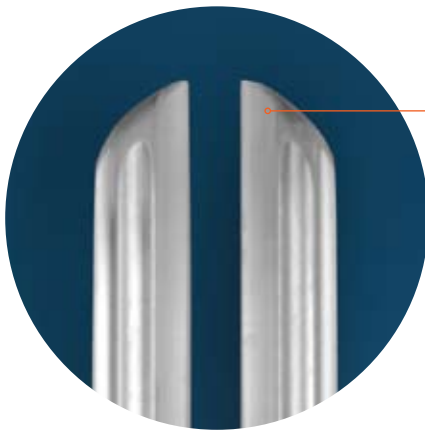
#### Strong, One-Piece Hinge-Post

The Segmental One-Piece Hinge-Post is designed to provide strong, reliable hinge stability.

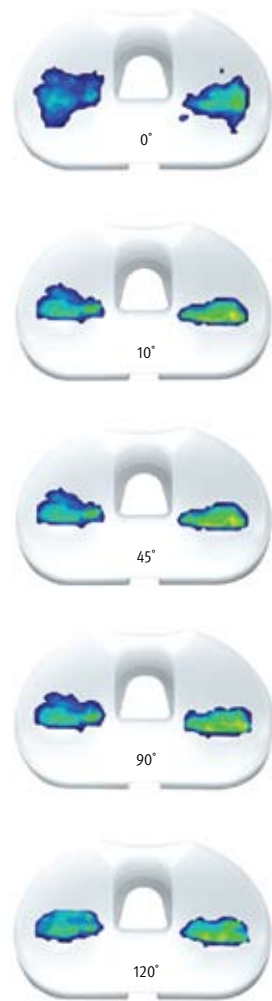
- The one-piece hinge-post can also be used with the existing *NexGen* Rotating Hinge Knee femur
- To resist subluxation, the mechanism design offers a constant “jump height” of at least 40mm<sup>8</sup>

### Multiple Unique Stem Options

Stems are available in fluted and splined styles. The fluted styles are available in 130mm and 190mm straight stems and 250mm bowed. The splined press fit VS stems are available in 130mm straight and 190mm bowed. Press-fit stems are splined for secure initial press fit with a variable stiffness (VS) tip.



*Stems are available with variable stiffness tips designed to reduce tip stress inside the bone*



### Torsional Fatigue Test

Testing representing 10 years of stair-climb activity was completed. All segment pairs completed testing without fracture, deformation or relative rotation between segments.<sup>1</sup>

### Segmental System Stem Test

Segmental stems and cemented *Trabecular Metal* Technology collars were paired with a *MOST Options* proximal femur and cyclically tested at 7.5 times body-weight. The components survived testing without fracture and with no evidence of loosening at the stem/collar interface.<sup>1</sup>

### Combined Load Test

The distal femur was tested to simulate increased hyperextension forces typical of salvage knee cases. After 5 million cycles no fracture or hinge component loosening had occurred.<sup>1</sup>

### Rotary Overhang Fatigue Test

Testing was performed to ensure that the tapered articular surfaces display adequate strength and durability. Simulating approximately 20 years of squatting activity, all components survived the testing without fracture, delamination or excessive deformation.<sup>1</sup>

### Rotating Hinge Contact Area Analysis

The condylar geometry for the Segmental Distal Femur matches that of the *NexGen* Rotating Hinge Knee.<sup>1</sup> Contact area analysis results showed that there is a high contact area and the load stayed toward the central portion of the tibial articular surface throughout range-of-motion.

# Flexibility. Fixation. Bearing Options.

The Segmental System utilizes many Zimmer technologies to address severe bone loss from disease, trauma or revision. No system is more versatile, flexible or adaptable for salvage cases.

The patented Rotating Hinge design passes 95% of the load through the tibial condyles

Anteversion tab and pockets alignment helps to match patient anatomy



Trabecular Metal Technology collar enhances fixation

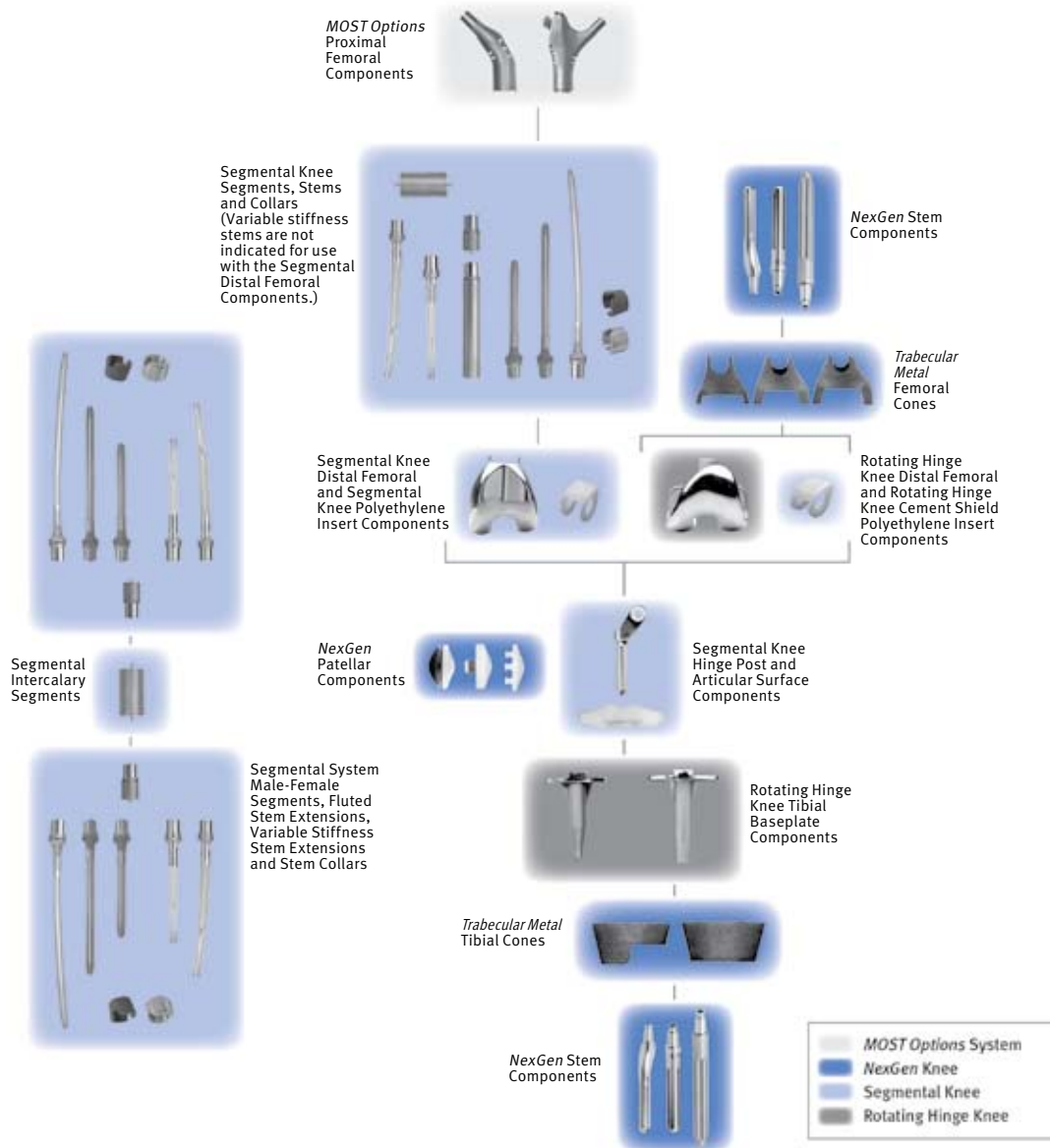
A choice of collar diameters allows precise match to bone diameter

Tapered articular surface allows pairing of a larger size distal femur with a smaller size tibia

Strong one-piece hinge can be used with the Segmental Distal Femur or the Rotating Hinge Knee



# Zimmer Segmental Cross-System Compatibility



## REFERENCES

1. Data on file at Zimmer. The results of this testing have not been shown to correlate with clinical mechanisms.
2. Bobyn JD, Stackpool GJ, Hacking SA, Tanzer M, Krygier JJ. Characteristic of bone in-growth and interface mechanics of a new porous tantalum biomaterial. *J Bone Joint Surg.* September 1999;81-B(5):907-914.
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