



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*® RH Knee provide the flexibility necessary for challenging reconstructions.

No other salvage system has *Trabecular Metal*™ Technology at key fixation interfaces, enabling biologic fixation. Building on the design of the *NexGen* RH Knee, this system features a modular hinge mechanism that results in 95% of the load being carried by the tibial condyles.¹

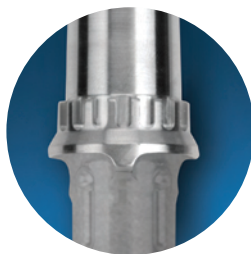


Cross-System Capabilities

The ability to interchange select components with the *NexGen* RH Knee offers significant flexibility for reconstructions.

NexGen System Compatibility Options:

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



Anteversion 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



Proximal Femur - *NEW!*

Optimized tab allows direct attachment to stems, reducing the required resection length.

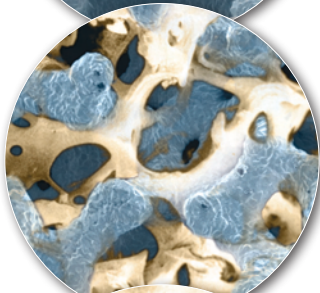
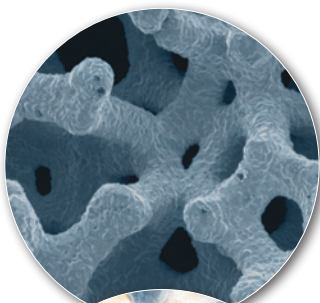
- Offers 38mm femoral neck offset
- Allows for controllable adjustment in 20-degree increments
- Compatible with both pressfit and cemented stems
- Compatible with all *VerSys*® System heads
- Offers an economical option for patients not requiring tissue attachment



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^{2,3}
- Flexibility – The 3-D structure provides flexibility, reducing the potential for stress shielding^{4,5}
- Friction/Stability – Produces more friction than sintered coatings on cancellous bone^{6,7}



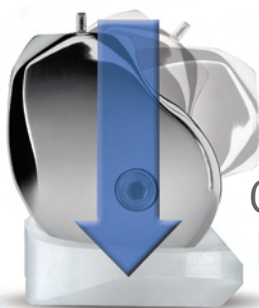
Trabecular Metal Material simulates bone like no other prosthetic material. That's because it is designed to replicate the shape, the cellular structure, the elasticity, and the weight-bearing characteristics of bone. It's a unique, highly porous, three-dimensional biomaterial, not a coating. Thus, it 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 RH Knee – 95% of the load passes through the condyles, similar to the loading pattern of a primary implant.¹

- The femoral component and articular surface are designed to maintain centralized contact throughout the range of motion
- Reproducing *NexGen* Knee System kinematics,⁸ 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* RH Knee femur
- To resist subluxation, the mechanism design offers a constant “jump height” of at least 40mm⁸

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.¹

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.

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.¹

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.¹

Rotating Hinge Contact Area Analysis

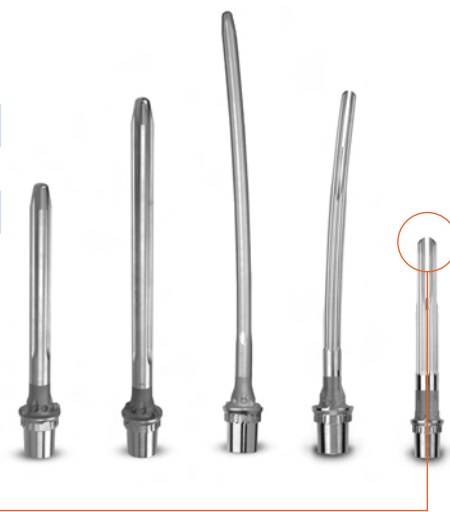
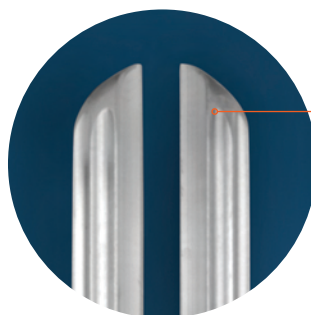
The condylar geometry for the Segmental Distal Femur matches that of the *NexGen RH Knee*.¹ Contact area analysis results showed that there is a high contact area and the load stayed toward the central portion of the tibial articular surface throughout range-of-motion.

Multiple Unique Stem Options

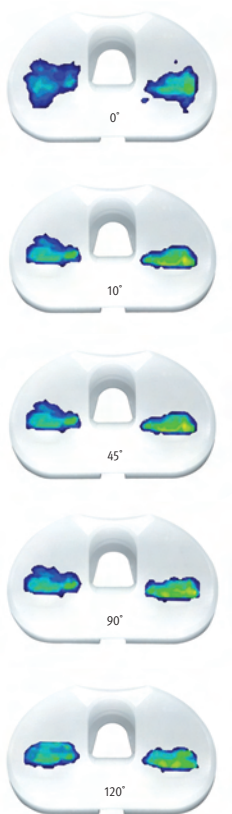
Stems are available in fluted and splined styles.

Length	Description	Diameter (1mm increments)
130mm	Fluted straight and VS straight	9-19mm
190mm	Fluted straight and VS bowed	9-19mm
250mm	Fluted bowed	12-19mm

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



REFERENCES

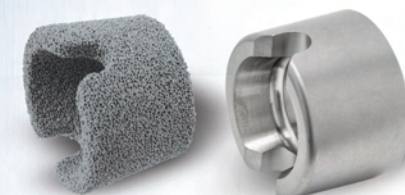
1. Data on file at Zimmer. The results of this testing have not been shown to correlate with clinical mechanisms.
2. Bobyn JD, Stackpool GJ, Hacking SA, Tanzer M, Krygier JJ. Characteristic of bone in-growth and interface mechanics of a new porous tantalum biomaterial. *J Bone Joint Surg.* September 1999;81-B(5):907-914.
3. Bobyn JD, Hacking SA, Krygier JJ, Chan SP, Toh KK, Tanzer M. Characterization of a new porous tantalum biomaterial for reconstructive surgery. Scientific exhibition: 66th Annual Meeting of the American Academy of Orthopaedic Surgeons; February 4-8, 1999; Anaheim, CA.
4. Bobyn JD, Toh KK, Hacking SA, Tanzer M, Krygier JJ. Tissue response to porous tantalum acetabular cups – a canine model. *J Arthroplasty.* 1999;14(3):347-354.
5. Shimko DA, Shimko VF, Sander EA, Dickson KF, Nauman EA. Effect of porosity on the fluid flow characteristics and mechanical properties of tantalum scaffolds. Published on-line February 2005 in Wiley Interscience (www.interscience.wiley.com).
6. Zhang Y, Ahn PB, Fitzpatrick DC, Heiner AD, Poggie RA, Brown TD. Interfacial frictional behavior: cancellous bone, cortical bone, and a nobel porous tantalum biomaterial. *Journal of Musculoskeletal Research.* 1999;3(4):245-251.
7. Shrazi-Adi Adammak M, Paiement G. Experimental determination of friction characteristics at the trabecular bone/porous-coated metal interface in cementless implants. *J Biomed Mat Res.* 1993;27:167-175.
8. Ward W.G, Haight D, Ritchie P, Gordon S, Eckardt J. Dislocation of rotating hinge total knee prosthesis. *J Bone Joint Surg.* March 2003; 81A(3):448-453.

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 proprietary RH 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

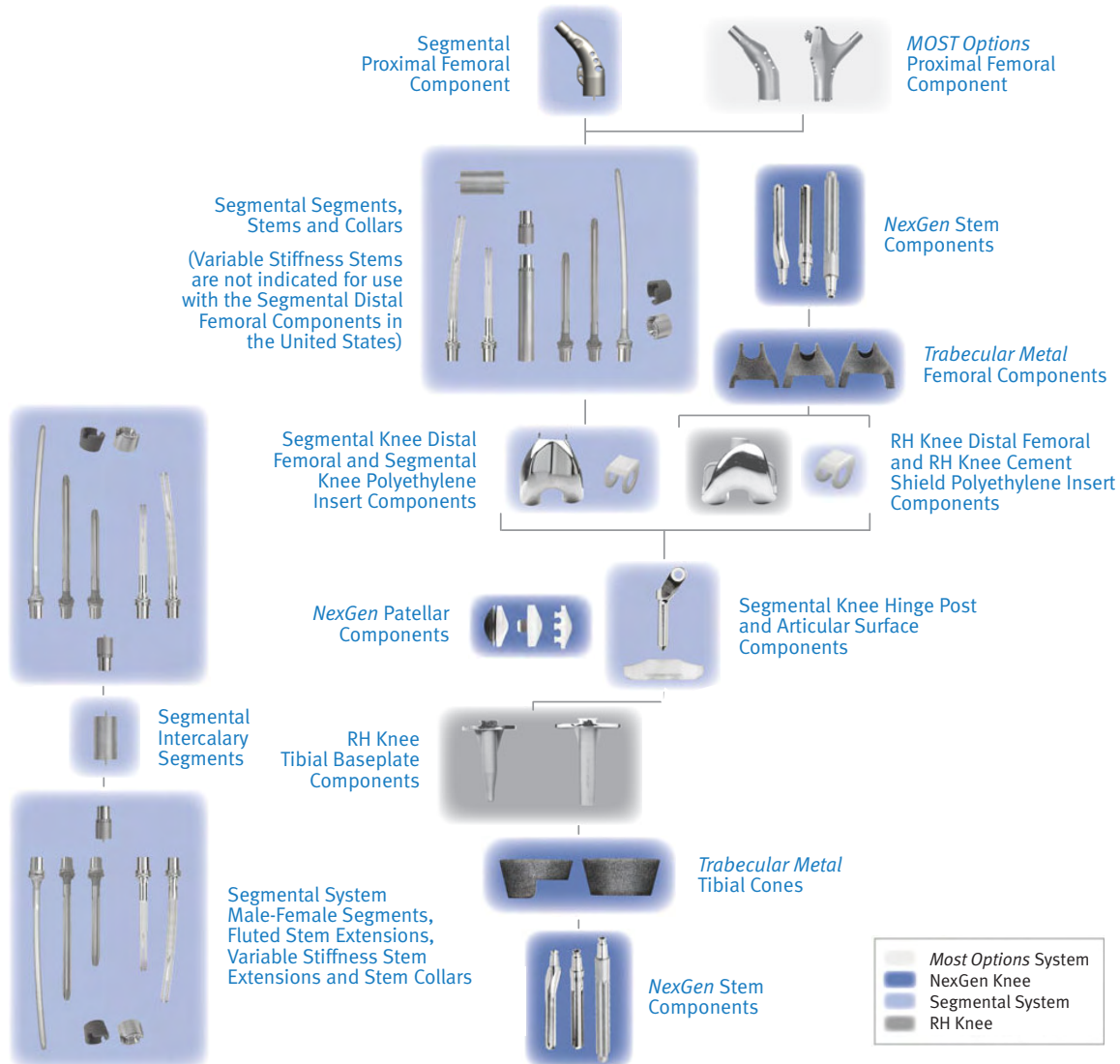
A choice of collar diameters allows precise match to bone diameter

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 RH Knee



Segmental System Scope/Compatibility Chart



This documentation is intended exclusively for physicians and is not intended for laypersons. Information on the products and procedures contained in this document is of a general nature and does not represent and does not constitute medical advice or recommendations. Because this information does not purport to constitute any diagnostic or therapeutic statement with regard to any individual medical case, each patient must be examined and advised individually, and this document does not replace the need for such examination and/or advice in whole or in part. Please refer to the package inserts for important product information, including, but not limited to, contraindications, warnings, precautions, and adverse effects.

Contact your Zimmer representative or visit us at www.zimmer.com



+H124975850001001/\$100727R2L10X