

Triathlon® Tritanium®

Cementless Total Knee System

Technology guide



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Why cementless TKA?

Patient demographics for TKA have become younger, more active and heavier,¹ and these patients have demonstrated higher failure rates in TKAs.² Cementless TKA showed encouraging outcomes in heavier patients and younger, male patients.^{3,4}

Over the last decade, our cementless Triathlon PA beaded femur demonstrated excellent outcomes with long-term follow-up.^{5,6} The coupling of the Triathlon design and the latest in highly porous biologic fixation technology led to the Triathlon Tritanium Total Knee System, which has demonstrated excellent clinical outcomes in multiple studies with five-year follow-up.^{7,8}

Triathlon Tritanium TKA clinical data

Triathlon Tritanium TKA survivorship with two- to five-year follow-up	Source
99.5% implant survivorship in 228 cementless TKAs using the Triathlon Tritanium Baseplate at minimum five-year follow-up ⁷	Journal of Knee Surgery
100% aseptic survivorship in 28 Triathlon Tritanium Baseplates with CR PA beaded femur at average five-year follow-up ⁸	Orthopaedic Research Society Annual Meeting
98% all-cause survivorship in 261 Triathlon Tritanium Metal-Backed Patellas at mean 4.5-year follow-up ⁹	Journal of Knee Surgery
99.5% all-cause survivorship in 1024 Triathlon PS cementless TKAs at four-year follow-up. ¹⁰ Both Tritanium and PA beaded versions of the tibial baseplate and metal-backed patella were included	Journal of Arthroplasty
99% all-cause survivorship in 708 Triathlon Tritanium TKAs at two- to four-year follow-up. ¹¹ Tritanium Baseplates, Tritanium Metal-Backed Patellas and PS PA Beaded Femurs were used	World Arthroplasty Congress
100% all-cause survivorship in 72 Triathlon Tritanium TKAs at mean three-year follow-up. Tritanium Baseplates, Tritanium Metal-Backed Patellas and CR PA Beaded Femurs were used ¹²	Orthopedics
No revision due to aseptic or septic loosening of Triathlon Tritanium Baseplate at two-year follow-up ¹³	American Academy of Orthopaedic Surgeons Annual Meeting
Triathlon PA Beaded Femur survivorship with long-term follow-up	Source
96.8% all-cause survivorship for CR and 95.3% all-cause survivorship for PS at 10-year follow-up ⁵	Australian Joint Registry
98% all-cause survivorship at mean eight-year follow-up for the Triathlon PS PA Beaded Femur ⁶	Journal of Arthroplasty

Cemented vs. cementless Triathlon

A prospective, randomized controlled study of 76 Triathlon Tritanium TKAs vs. 65 Triathlon cemented TKAs demonstrated no differences in clinical results with no aseptic loosening in either cohort at mean two-year follow-up.¹⁴

Results showed:



Similar blood loss



Similar pain reduction



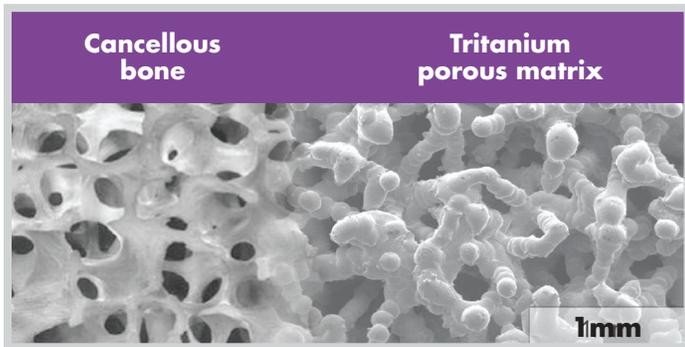
Similar early PROM



Shorter OR time in cementless TKA

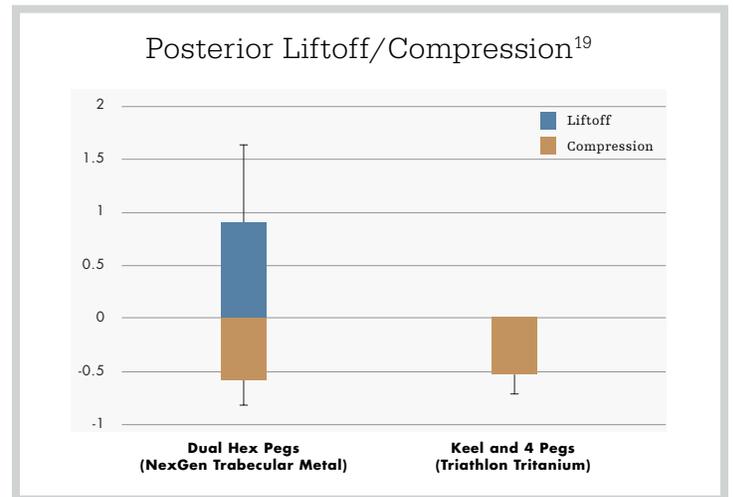
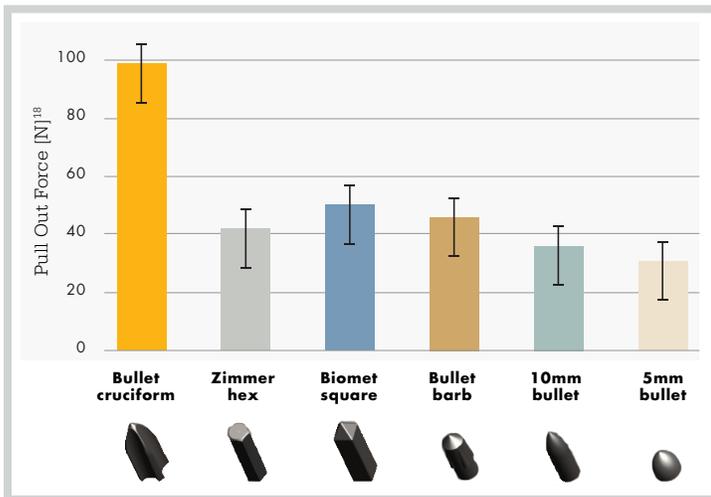
Additive manufacturing technology

Components for the Triathlon Tritanium Baseplate and Metal-Backed Patella are additively manufactured using a focused laser beam to sinter numerous layers of titanium powder, which grows the implant structure layer by layer. With additive manufacturing technology, we can strategically position porous structures in the desired zones of the Triathlon Tritanium Baseplate. Avoiding porous metal in the distal areas may reduce risks of stress shielding.



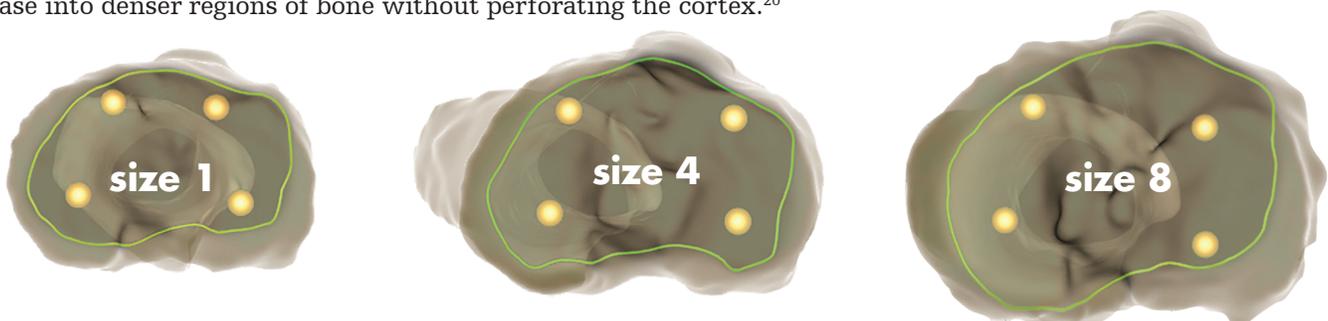
Initial stability

Given the importance of stable primary fixation,¹⁷ the keel and four-bullet cruciform pegs on the Tritanium Baseplate were designed to reduce micromotion and liftoff.^{18,19}



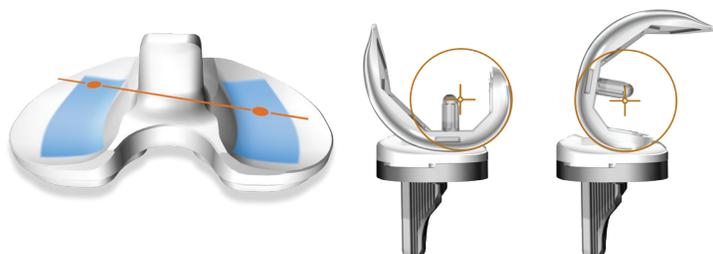
SOMA designed

Stryker Orthopaedics Modeling and Analytics (SOMA) is a global database of bone morphology – size, shape, density, stiffness, and inner and outer cortical diameters – drawn from diverse populations.²⁰ SOMA was used to optimize the depth and placement of the Tritanium pegs. The Triathlon Tritanium Baseplate's size-specific peg design allows for purchase into denser regions of bone without perforating the cortex.²⁰



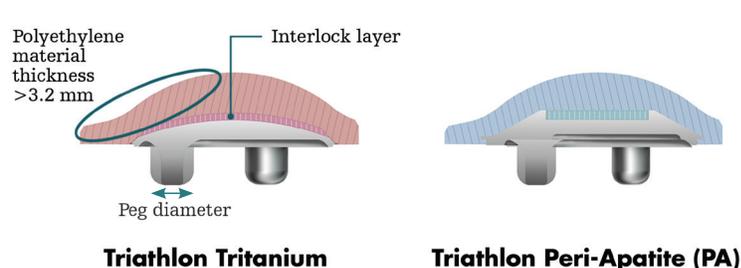
Triathlon design

Stable primary fixation of the implant is necessary for biologic fixation.¹⁷ The less constrained the design, the less potential there is for stresses generated at the articulating surface to be transferred to the bone-implant interface.²¹ Triathlon is designed to minimize dynamic stress transfer to the tibial fixation interface by providing minimal resistance to internal and external motion and by locating the bearing sulcus directly over the tibial keel to help reduce sagittal rocking during ambulation.²²



Tritanium Metal-Backed Patella

The architecture on the back side of the Triathlon Tritanium Metal-Backed Patella, combined with a direct compression molding process, is designed to minimize the potential for dissociation.²³ Additive manufacturing makes it possible to build a solid barrier layer between the porous surfaces, which allows for a smaller metal backing and greater polyethylene thickness.



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