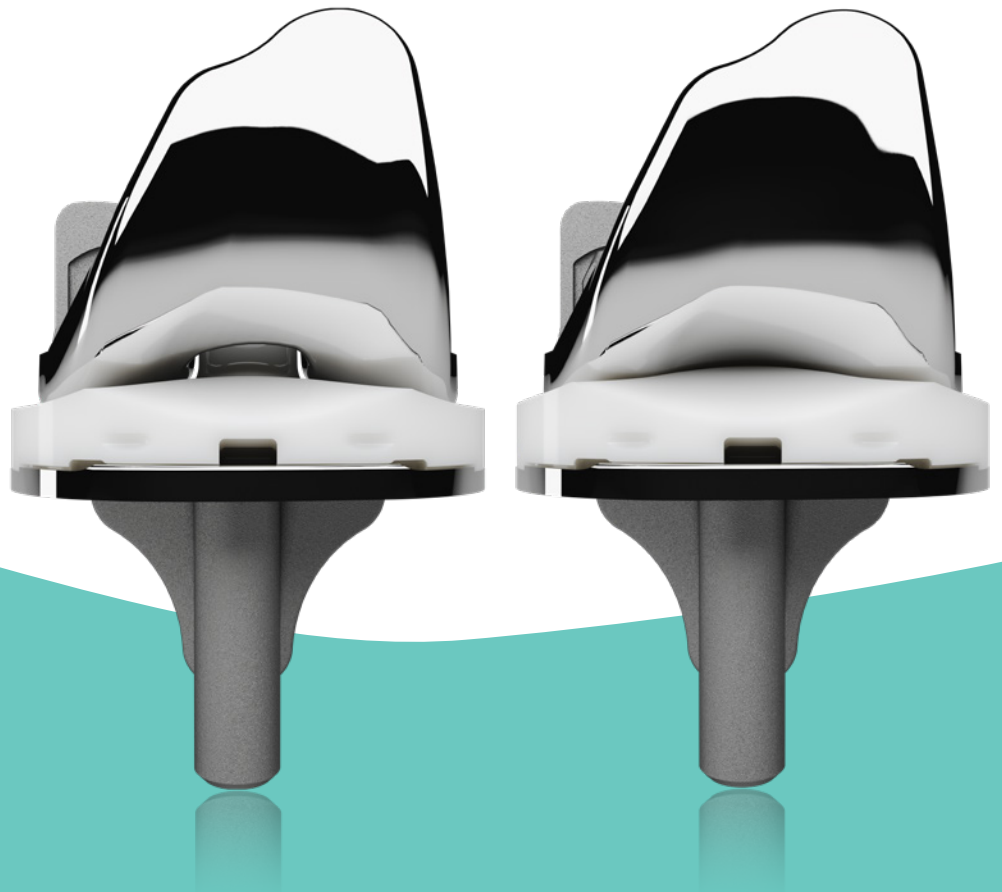


Smith+Nephew

ANTHEM[◇]
Total Knee System

Messaging Brochure



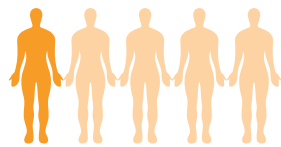
Compromised fit is associated with decreased patient satisfaction



The number of total knee arthroplasties (TKAs) performed globally is expected to **surge over the coming years** due to the increasing prevalence of obesity and increased life expectancies¹



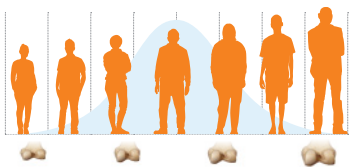
It is widely recognised that TKAs are associated with high survivorship, with global registries collectively reporting **survivorship of 93% at 15 years**.² Whilst survivorship data are important to analyse device longevity and performance, they fail to account for improvements in function that can lead to improved patient satisfaction.



Up to one in five patients are left feeling unsatisfied following their TKA procedure.³ The primary determinant of patient satisfaction is the fulfillment of patient expectations, of which pain relief and improved knee function are the most common.⁴



There are a number of factors which affect TKA outcomes, but implant choice is a factor that surgeons can control and there is a **growing body of evidence showing that implant design can impact on patient outcomes**.⁵⁻⁷



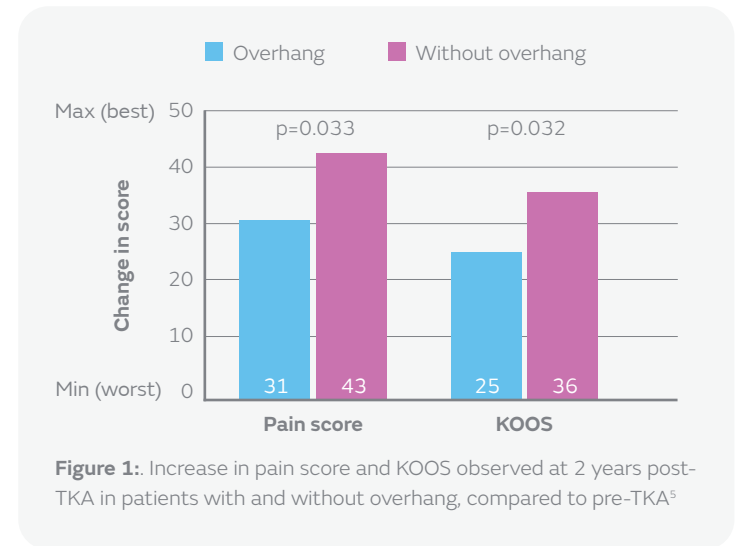
Almost all TKA implants are designed around male, western, Caucasian patients; yet, a systematic literature review has revealed patterns in the differences in both size and shape observed between knees from different ethnicities.⁸

The clinical impact of implant overhang

The issue of femoral overhang (where the component is wider than the distal part of the femur) has been reported in several studies.⁵⁻⁷

Femoral **overhang is associated with reduced functional and patient-reported outcomes** compared to those without overhang:

- **Overhang is associated with an almost two-fold increase in risk of knee pain** more severe than occasional or mild at 2 years post-TKA⁶
- Pain score and Knee Injury and Osteoarthritis Outcomes Score (KOOS) showed that **overhang is associated with worse clinical outcomes**, when compared to TKAs without overhang⁵
- An overhang of $\geq 4\text{mm}$ resulted in **significantly reduced flexion compared to no overhang** (121° vs 133° ; $p < 0.001$)⁷ in a study of 1,025 TKAs in Korean patients



2x Increased risk of knee pain with TKA overhang⁶



* Survivorship analysis from Australian and Finnish registries

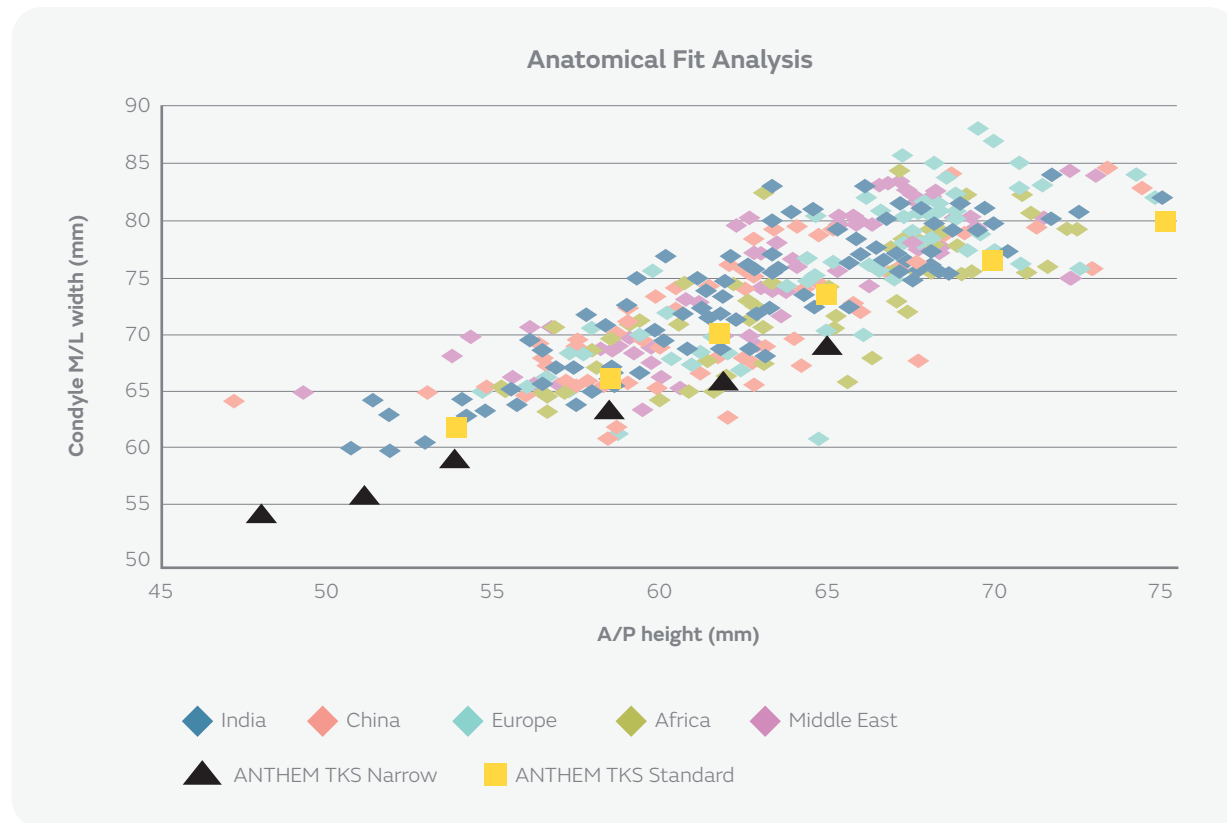
Designed based on anatomical analysis

By providing improved fit for a diverse population, it may be possible to reduce femoral overhang, which in turn may improve patient satisfaction following TKA.⁵⁻⁷

It is reported that a lack of optimized design or size options may lead to clinical compromise at the condyle and trochlear regions.⁵⁻⁷

To facilitate optimal implant fit, the ANTHEM[®] total knee system (TKS) was designed based on the anatomical measurements of hundreds of patients encompassing all major geographic regions (figure).⁹

The critical dimensions of the femur, trochlear and condyle were evaluated and analysed to provide an optimal size range and geometry for a diverse patient population.



Low profile of the anterior flange

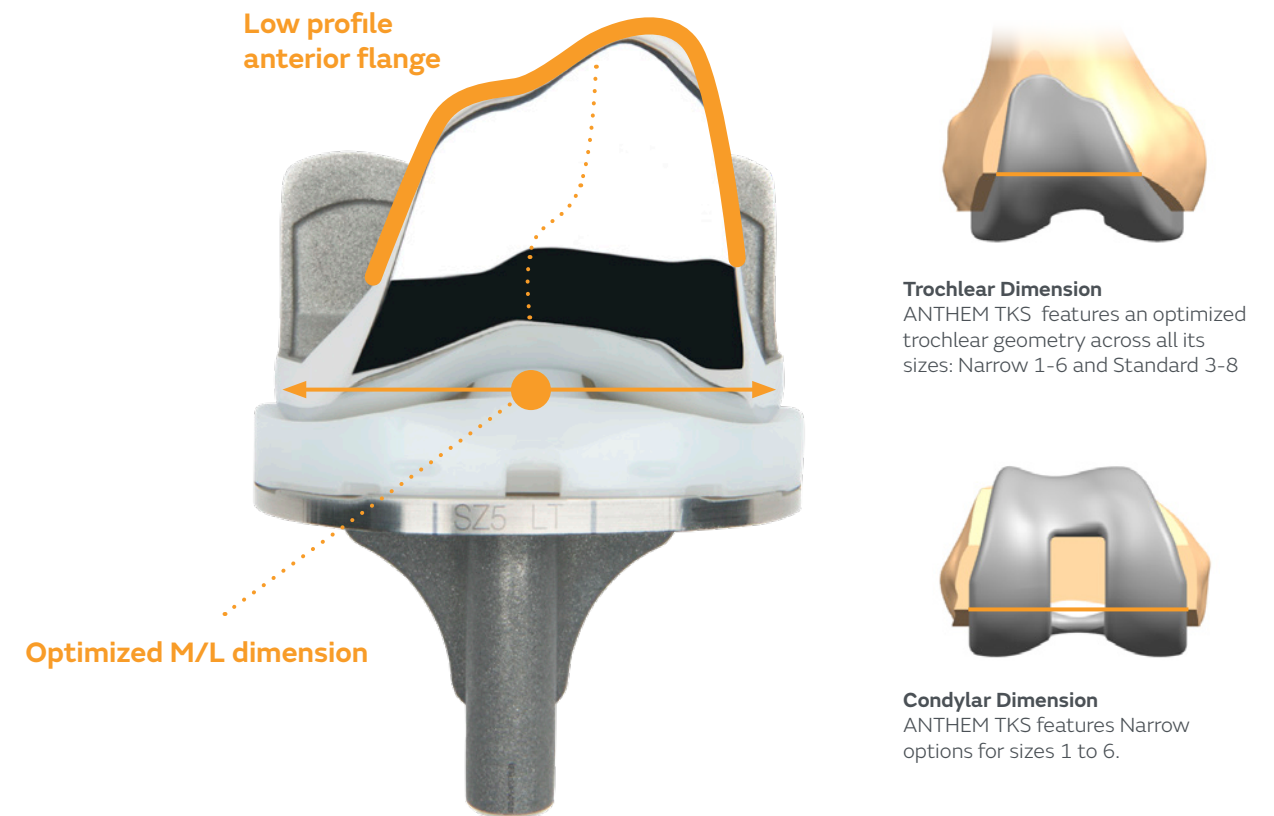
ANTHEM[®] TKS is developed to provide an anthropometrically optimized low profile femoral anterior flange to minimize incidence of overhang⁹⁻¹¹

Anatomic femoral ML dimension

ANTHEM TKS is designed to provide optimal size options for a wide range of patients globally, by offering Standard and Narrow dimensions at the condylar areas of the femoral component to provide an optimal fit.⁹

CR and PS options

ANTHEM TKS is available in Cruciate Retaining and Posterior Stabilized options. Thanks to its versatility the ANTHEM TKS femoral components can be combined with the LEGION[®] XLPE inserts and GENESIS[®] II Tibia.



Innovation based upon trusted design

To test the ANTHEM^o TKS component fit in patients, intraoperative measurements were taken from 967 TKA patients from five regions (see below).¹⁰ The ANTHEM TKS narrow and a standard femoral trial component were compared on the prepared bone to confirm fit.

The results demonstrated that with the addition of ANTHEM TKS narrow:

- **Overhang (≥3mm) was significantly reduced** for women from all five countries¹⁰ (Figure 1)
- **Perfect fit rate was significantly improved** for Australian, Indian and Korean women, compared to when only a conventional implant was available, with slight improvements for men from Australia, China and India¹⁰ (Figure 2)

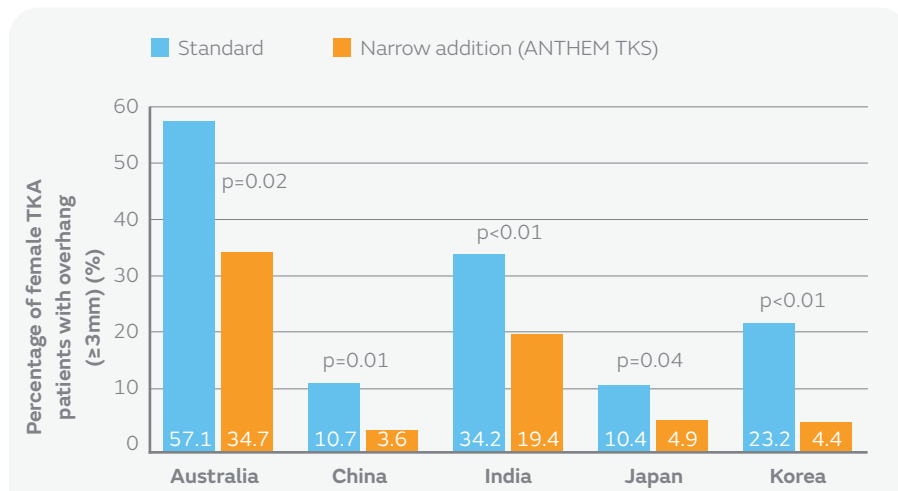


Figure 1: Comparison of the percentage of female TKA patients with ≥3mm of overhang with and without a narrow implant option (ANTHEM TKS)

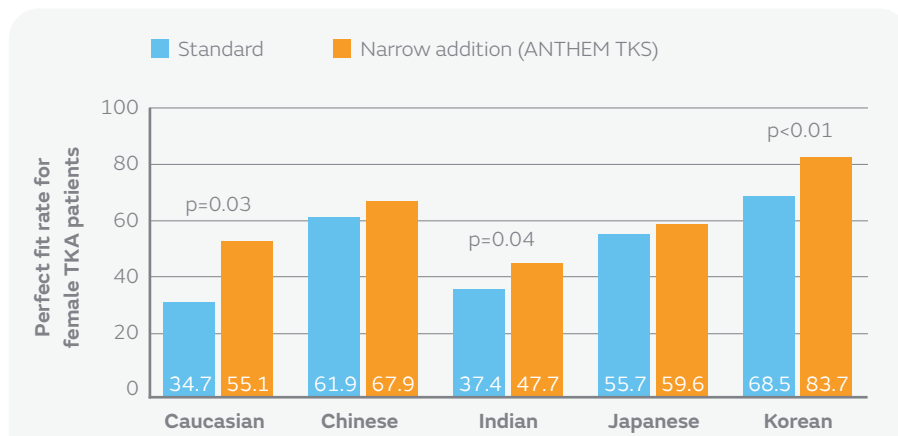


Figure 2: Perfect-fit rate of female patients with and without a narrow implant option (ANTHEM TKS)

“The additional availability of a femoral component with a reduced mediolateral dimension for the same anteroposterior size [ANTHEM TKS] has the potential to reduce overhang and improve component fit across ethnicities.”¹⁰

ANTHEM^o TKS features the tibio-femoral articulation and patello-femoral function equivalent to the GENESIS^o II Total Knee System, which exhibits excellent survivorship at 15 years.¹²⁻¹⁴

The ANTHEM TKS baseplate incorporates the GENESIS II design features which have over **20 years of clinical history.¹⁵**

Over 2 million anatomic baseplates implanted since 1988



Registry Data

GENESIS II: 81,899 implantations

- Cumulative % revision of GENESIS II is **3.80 (3.28, 4.36) at 15 years**, compared to the class average of 4.8 (4.70, 4.90)¹³
- Cumulative % revision of GENESIS II with patella is **2.92 (2.46, 3.47)* at 15 years**, compared to the class average of 4.28 (4.12, 4.44)¹³

GENESIS II CR: 15,642 implantations

- Cumulative % revision of cemented prostheses is **6.7 (5.9, 7.7) at 19 years**, compared to the class average of 7.9 (7.4, 8.4)¹⁴

GENESIS II PS: 18,485 implantations

- Cumulative % revision of cemented prostheses is **6.3 (5.7, 7.0) at 19 years**, compared to the class average of 6.4 (6.2, 6.6)¹⁴

* Fewer than 250 cases remained at risk at these time points

Peer Review

- Thicker CoCr tibial trays were associated with significantly more medial bone loss than thinner titanium designs (p=0.0001)¹⁵
- The mean migration of the tibial component was less than 0.1mm and 0.1 deg in all planes relative to the post-operative RSA exam^{16*}

*N=15

Promoting efficiency

ANTHEM[®] TKS and ORTHOMATCH[®] Universal Instrumentation platform have been designed to reduce inefficiencies by:

Improving implant fit by offering an optimized design and portfolio of sizes which with the minimum number of implants can cover a wide range of anatomical sizes

Maximize productivity by simplifying procedure flow

Optimise asset utilization by reducing tray weight and by reducing number of trays per procedure without sacrificing functionality



Provide value and access

Optimize Asset Utilization

Maximize Productivity

Simplify Surgical Flow

It starts with CORI[◇] Surgical System: the core of Real Intelligence

CORI Surgical System features precision milling technology, an ATRACSYS[◇] camera and has a smaller robotic footprint in orthopedics*^{^18}

- **5x faster**^{x18} camera designed specifically for robotic surgery
- **2x more** cutting volume^{x18} with new design
- **29% faster** resection^{x18}

The RI.KNEE ROBOTICS software includes image-free smart mapping and gap assessment to help optimize implant alignment and balance

- Image-free point collection that automatically rotates to mimic where you are on the patient's anatomy (No CT/MRI)
- Uses soft tissue laxity and planned resections to help optimize implant placement prior to making any cuts



CORI[◇] Surgical System



* Compared to MAKO[™] and ROSA[™]
^ Compared to NAVIO[®] Surgical System
^ Smith+Nephew 2020. Comparison of operating room footprint for robotic-assisted knee arthroplasty systems. Internal Report. EO.REC.PCS015.002.v1.

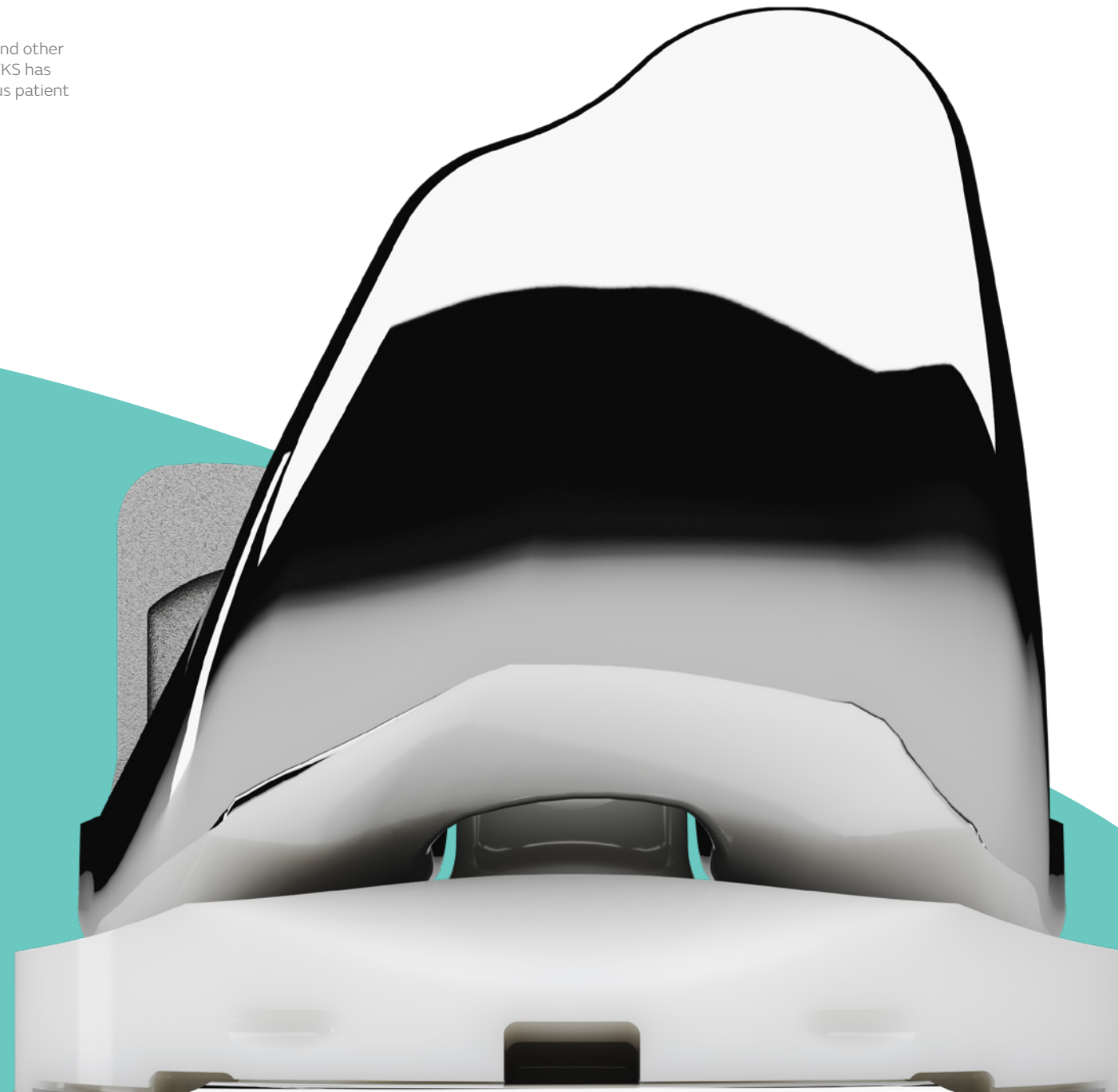
Designed to be fit for all*

ANTHEM[®] TKS is a total knee prosthesis developed with the intention to provide femoral and tibial anatomic implant fit for all patients.*⁹

ANTHEM TKS is based upon trusted design pedigree incorporating clinically proven technology, such as the tibio-femoral articulation and patello-femoral function equivalent to the GENESIS[®] II Total Knee System, which exhibits excellent survivorship at 15 years.¹²⁻¹⁴

The ORTHOMATCH[®] Universal Instrumentation is designed to be used with ANTHEM TKS, to provide an easy to use system that may help facilitate reproducible surgical outcomes.

*Subject to the indications, contraindications, risk factors, intraoperative, postoperative and other guidance provided in the instructions for use and surgical technique brochure. ANTHEM TKS has been designed with data from several different ethnicities to provide implant fit for various patient population types.



“With the ANTHEM[®] TKS Femur I don’t worry about overhang”
- Dr. Ali Belooshi

“Thanks to its flange shape and narrow options I can avoid overhang and use ideal AP size giving my patients more flexion”
- Dr. Rob McLennan-Smith

“ANTHEM TKS: The Friend, you can always trust.”
- Prof TK Kim

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References

1. Hamilton DF, Howie CR, Burnett R, Simpson AHRW, Patton JT. Dealing with the predicted increase in demand for revision total knee arthroplasty. *Bone Joint J.* 2015;97-B:723-728. **2.** Evans JT, Walker RW, Evans JP, Blom AW, Sayers A, Whitehouse MR. How long does a knee replacement last? A systematic review and meta-analysis of case series and national registry reports with more than 15 years of follow-up. *Lancet.* 2019;363:655-63. **3.** Scott CEH, Howie CR, MacDonald D, Biant LC. Predicting dissatisfaction following total knee replacement. *J Bone Joint Surg Br.* 2010;92-B:1253-1258. **4.** Husain A, Lee GC. Establishing realistic patient expectations following total knee arthroplasty. *J Am Acad Orthop Surg.* 2015;23:707-713. **5.** Bonnin MP, Schmidt A, Basigliani L, Bossard N, Dantony E. Mediolateral oversizing influences pain, function, and flexion after TKA. *Knee Surg Sports Traumatol Arthrosc.* 2013;21:2314-2324. **6.** Mahoney OM, Kinsey T. Overhang of the femoral component in total knee arthroplasty: risk factors and clinical consequences. *J Bone Joint Surg Am.* 2010;92:1115-1121. **7.** Chung BJ, Kang JY, Kang YG, Kim SJ, Kim TK. Clinical implications of femoral anthropometrical features for total knee arthroplasty in Koreans. *J Arthroplasty.* 2015;30:1220-1227. **8.** Kim TK, Phillips M, Bhandari M, Watson J, Malhotra R. What differences in morphologic features of the knee exist among patients of various races? A systematic review. *Clin Orthop Relat Res.* 2017;475:170-182. **9.** Smith and Nephew 2020. IndoGen (ANTHEM) Femoral Anatomical Analysis Summary. Internal report. **10.** Sharma G, Liu D, Malhotra R, Zhou YX, Akagi M, Kim TK. Availability of additional mediolateral implant option during total knee arthroplasty improves femoral component fit across ethnicities: results of a multicentre study. *JBJS Open Access.* 2017;2(2):e0014. **11.** Shervin D, Pratt K, Healey T, et al. Anterior knee pain following primary total knee arthroplasty. *World J Orthop.* 2015;6(10):795-803. **12.** Victor J, Ghijssels S, Tajdar F, et al. Total knee arthroplasty at 15-17 years: Does implant design affect outcome? *Int Orthop.* 2014;38(2):235-241. **13.** National Joint Registry for England, Wales, Northern Ireland and the Isle of Man, 17th Annual Report 2020. Table 3.K7. **14.** Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). Hip, Knee & Shoulder Arthroplasty: 2020 Annual Report. Adelaide: AOA, 2020. Table KT7. **15.** Martin, JR, et al. "Tibial tray thickness significantly increases medial tibial bone resorption in cobalt-chromium total knee arthroplasty implants" *The Journal of Arthroplasty* 32 (2017): 79-82. **16.** Teeter, M G, et al. "Migration of a cemented fixed-bearing, polished titanium tibial baseplate (Genesis II) at ten years" *The Bone & Joint Journal* 2016;98-B:616-21. **17.** Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). Hip, Knee & Shoulder Arthroplasty: 2017 Annual Report. Adelaide: AOA, 2017. Tables KT7, KT9 & KT22. **18.** Smith+Nephew 2020. CORI and NAVIO Technical Specification Comparison. Internal Report. ERO488 REV.B.