Cementless Tapered Femoral Stem
Product overview
Designed for patient fit

Proximally coated tapered wedge designs have been shown to be an effective treatment for end-stage osteoarthritis\(^1,2,3\), and have demonstrated excellent long-term clinical results both in published literature and global registry data\(^4,5,6,7\).

The TriFit TS™ stem system has been designed by a global surgeon development team to build on the successful clinical heritage of the TriFit™ tapered stem, and to address modern day clinical problems to provide a patient matched solution.
Conformity | Stability | Versatility
Challenging demographics

Patient demographics are changing. Whilst we are seeing an ageing population overall, those seeking surgical interventions are often younger, more active and more demanding than ever before\(^8\). In addition, increasing levels of obesity seen in many sectors of society also mean that patients are placing ever more demand on their hip prostheses\(^9\). A consequence of this evolving landscape is the increasing potential for patients to require a revision surgery in the second to fourth decade following a total hip replacement.

Key considerations for contemporary hip replacement therefore include:

- Preservation of anatomy
- Optimal reconstruction of biomechanics
- Less invasive devices and surgical techniques
- Soft tissue sparing devices and surgical techniques

TriFit TS™ cementless tapered femoral stem has been designed to meet these challenges.
Conformity
Optimal implant geometry defined by global CT data^{10} for a patient matched solution

Stability
Optimised proximal-to-distal ratio and proximal flare designed for immediate and effective stability

Versatility
Suitable for minimally invasive surgical approaches for anatomy preservation and compatible with Trinity™ advanced bearing acetabular system
Conformity

The TriFit TS™ stem is based on a clinically proven bi-planar wedge\textsuperscript{4,5,6,7}. However, many tapered wedge designs simply shorten an existing stem, which are not anatomically designed, have an inadequate CCD and distal fit and have been shown to migrate early\textsuperscript{11,12}.

**Anatomical design**

Extensive global CT data has been used in the development of TriFit TS™ to define the geometry including stem length, size range, offsets and optimal CCD angle, designed to enhance patient fit.

A state of the art statistical shape model was generated from over 250 CT scans, representing patient cohorts from the US, Europe, Japan and Australia. This model was used to assess key anatomical features and dimensions from the CT dataset. This in-depth analysis demonstrated that there was no correlation between neck length and femur size, even as the offset increased\textsuperscript{13}.

The TriFit TS™ stem therefore has a fixed neck length which, combined with the anatomical CCD angle of 127°, allows it to conform to patient anatomy to accurately reconstruct patient biomechanics.
Progressive size increments with direct lateralisation to optimise soft tissue tension

Size range

Restoration of the centre of rotation and biomechanics of differing patient anatomies is facilitated via a comprehensive suite of sizes, whilst small increments and two offset options (standard and lateralised) ensure a seamless range.

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<th>neck length (mm)</th>
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Stability

The proximal-to-distal ratio, distal sweep and proximal flare are designed to promote proximal loading and prevent distal hang-up, which may reduce the risk of subsidence as seen with other stems of this philosophy. TriFit TS™ is manufactured from forged titanium alloy for strength and biocompatibility. Distally the stem is polished to help prevent osteointegration by transferring load proximally. Pure titanium is vacuum plasma sprayed over the proximal portion, which is then overlaid with a 20µm Biomimetic Cementless Technology coating.

Primary stability

Axial stability

- Anterior-posterior dual taper proximal flare and proximal press-fit for immediate axial stability
- Vacuum plasma sprayed pure titanium with Biomimetic Cementless Technology provide scratch/press-fit of between 0.2-0.3mm and may facilitate secondary stability
- Slim distal portion for ease of insertion

Rotational stability

- The stem can be sized to fill the largest medial-lateral dimension of the femoral canal
- The slim anterior-posterior/medial-lateral width distally aids easy insertion
- The medial-lateral width being larger than anterior-posterior width results in inherent rotational stability
Secondary stability

Advanced Biomimetic Cementless Technology

- Advanced biomimetic cementless coating technology with more than 20 years of clinical heritage\textsuperscript{13,14,15}
- Calcium phosphate (CaP) coating with a microcrystalline structure
- Maintains substrate surface roughness, providing a large area for osseointegration\textsuperscript{16,17}
- Biphasic composition
- Room temperature electrolytic deposition process results in formation of a 20\textmu m thin, needle-like, microcrystalline coating (brushite) similar in morphology to natural bone tissue
**Preserving anatomy**

TriFit TS™ is designed to preserve the natural anatomy. A reduced lateral proximal shoulder helps preserve as much of the greater trochanter as possible, whilst the distal portion similarly helps to minimise the amount of cancellous bone removed from the femur. A 50° neck cut preserves bone in the calcar region and increases proximal support for the implant medially. An optimised anterior-posterior width also helps minimise the amount of cancellous bone removed from the metaphysis. The optimised design and minimal disruption to the natural anatomy are intended to promote physiological loading of the femur, potentially maintaining good bone stock into the future.

**Advanced instrumentation**

TriFit TS™ stem is a ‘rasp only’ stem philosophy that does not require distal reaming. It has been designed to work with the surgeon’s preferred approach, with lightweight compact and modular instrumentation that offers the surgeon a range of approach-specific options. TriFit TS™ is compatible with minimally invasive surgical approaches, such as the Minimally Invasive Anterior Approach (MIAA™), helping to promote faster rehabilitation and quicker return to daily activity.

**Bearing options**

TriFit TS™ is compatible with the Trinity™ advanced bearing acetabular system from Corin. Trinity™ offers surgeons a wide range of high performance bearings within a versatile system utilising the clinically proven fixation of Biomimetic Cementless Technology:

- ECiMa™ vitamin E highly cross-linked polyethylene
- BIOLOX® delta ceramic-on-ceramic
- Highly cross-linked polyethylene
TriFit TS™ is part of Corin’s hip continuum of care, providing solutions for a wide range of patient indications.
References:


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