EnduRo™ Hinge Knee System

Featuring Advanced Surface Technology

Aesculap Orthopaedics

AESCULAP
Implant Systems
Knee revision and complex primary arthroplasty cases can be particularly problematic. Ensure your treatment plan for long-term success and high patient satisfaction with the EnduRo Hinge Knee System. Designed for patients that present with severe ligament instability and/or bone deficiency, the EnduRo System addresses the issues plaguing conventional hinge designs. With a rotating platform, the system features an innovative hinge mechanism for subluxation stability while minimizing bone resections.

- Accommodates 12° of internal/external rotation
- Accommodates 140° of flexion

**Achieve Stability**

When soft tissues are compromised, adequate stability is needed in cases of mild to moderate distraction to avoid dislocation. The EnduRo Hinge Knee System employs a morse-taper junction which combines with a locking nut affixed within the hinge ring. This secure connection of the femur and tibia provides security against subluxation and enables stable distraction.

**Kinematic Loading**

The EnduRo Hinge Knee System utilizes condylar loading, positioning the rotation center close to the hinge axis. This design removes stresses from the hinge pin, reduces stress at the cement/bone interface and produces a more natural kinematic motion. Conventional systems, however, position the hinge posteriorly, which can cause stress loads at both the hinge pin and the cement/bone interface.

**Highly-Congruent Condylar Loading***

*1 MPa = 1 N/mm² = 145 psi*
Technology for Endurance

The EnduRo Hinge Knee System employs flanges and an axle bushing made of carbon fiber reinforced poly-ether-ether-ketone (CFR-PEEK) for its favorable mechanical properties such as high creep and wear resistance. This system, featuring Advanced Surface Technology and CFR-PEEK, demonstrated a significant reduction in wear compared to a traditional CoCrMo system. Conventional systems, however, exhibited increased wear on the polyethylene bushing axle.

EnduRo Hinge Knee System Wear Testing*

![Graph showing cumulative volumetric wear comparison between CoCrMo and Advanced Surface Technology]

- **88% Reduction in Wear**
- **1.3 ± 0.21 mm³**
- **12.9 ± 3.95 mm³**
- **9.9 times reduced wear (p=0.007)**

Advanced Surface Technology

The EnduRo knee features the patented seven-layer Advanced Surface Technology, offering enhanced protection against the top prostheses-related reasons for implant failure and revision: metal ion release and wear.*

Minimal Bone Resections

The EnduRo Hinge Knee System accommodates a minimal box resection due to its narrow femoral box width. Conventional systems, on the other hand, contain a bulky hinge that requires a substantial amount of bone resection.

- **23 mm box width comparable to PS implants**

*The results of in vitro wear simulation testing have not been proven to quantitatively predict clinical performance.

References

**DESIGN ELEMENTS**

**TIBIA**
- Symmetric design
- Cement pockets
  - 1 mm deep
- M/L Offset ± 6 mm
  - (T1 accommodates ±4 mm)

<table>
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<th>Size</th>
<th>ML</th>
<th>AP</th>
<th>AP/ML</th>
<th>B</th>
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<tbody>
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**TIBIAL STEM**
- Cemented
  - Cemented: no angle
  - Length: 52, 92 mm
  - Diameter: 12, 15, 18 mm
  - Cylindrical and polished
  - Three fluted grooves to reduce the risk of embolism
  - Asymmetric "collar" for increased stability

**Pressfit**
- Pressfit: no angle
- Length: 92, 172 mm
- Diameter: 11-20 mm (1 mm increments)
- Slightly tapered
- 10 fluted grooves (Wagner Profile)
- Asymmetric "collar" for increased stability

**TIBIAL AUGMENTS**
- Cemented pockets 1 mm deep
- Fixated with a screw on the underside of the tibia
- Tibial augment heights: 4, 8, 12, 16 mm
- Anatomical medial or lateral design

**POLYETHYLENE INSERT**
- Size is based on femur size
- Heights: 10-18 (2 mm increments)

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**Femur/Tibia Compatibility Chart**

<table>
<thead>
<tr>
<th>Sizes</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
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<tr>
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<td>Not compatible</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>Ideal combination for optimal performance</td>
<td>Not compatible</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>Ideal combination for optimal performance</td>
<td>Not compatible</td>
<td></td>
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</tbody>
</table>

**FEMUR**
- Single-radius design
- Cement pockets
  - 1 mm deep
- Hyperextension stops
  - at 3° for all sizes
- A/P Offset ± 2mm

<table>
<thead>
<tr>
<th>Size</th>
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<th>Trochlear depth</th>
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<td>31.5</td>
<td>5.5</td>
<td>10.0</td>
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</table>

**FEMORAL STEMS**
- Cemented
  - Cemented: 6° angle
  - Length: 77, 157 mm
  - Diameter: 12, 15, 18 mm
  - Cylindrical and polished
  - Four fluted grooves to reduce the risk of embolism

**Pressfit**
- Pressfit: 5°, 7° angle
- Length: 117, 177 mm
- Diameter: 12-20 mm (1 mm increments)
- Slightly tapered
- 10 fluted grooves
  - (Wagner Profile)

**FEMORAL AUGMENTS**
- Cemented pockets 1 mm deep
- Fixated with a distal screw on the backside of the femur
- Distal augment heights: 4, 8, 12 mm
- Posterior/distal augment heights: 4, 8, 12 mm