Product Information

Cementless Threaded Cup System

BICON-PLUS®

Smith & Nephew

With Verilast Technology
Clinically Proven for over 20 Years

For over 20 years the BICON-PLUS™ cup has proven to be an excellent biconical screw cup in more than 400,000 implantations all over the world.

Stable anchoring
The principle of biconical cup anchoring provides the best conditions for maximum stability and the best protection against cup migration. The unique action of the biconical design is easy on the bone and the self-tapping thread ensures excellent primary stability.

Individualized management
The STANDARD and POROUS variants of the BICON-PLUS cup allow optimum management in primary and revision interventions in hard and porotic bones as well as in dysplastic hips.

Perfect system
The BICON-PLUS cup forms a unique, precision-adjusted hip prosthetic system in combination with the cementless SL-PLUS™ stem.
Double cone principle
The anatomical approximation to the acetabulum requires less bone resection, increases the bone contact and ensures extremely high tilt stability.

Optimum thread and tooth profile
The thread and tooth profile is anatomically adapted for all cup sizes.

Suitable for any bone quality
Choice of STANDARD or POROUS cup. The tooth form of the STANDARD cup type is designed for normal and sclerotic bone, while the design of the POROUS cup type makes it ideal for soft and porotic bone.

Articulation bearings
Depending on the situation the surgeon can select either hard-soft (OXINIUM-PE, ceramic-PE or metal-PE) or hard-hard bearings (ceramic-ceramic), whereby the comprehensive range includes XLPE, PE and BIOLOX delta inserts. Most XLPE and PE inserts are also available in an antiluxation version. Different ball head diameters are also available, ranging up to 36mm, depending on the cup size. This produces an optimum range of motion (ROM) and a high level of joint stability with a reduced risk of impingement and luxation.

Surgical instrumentation
The instruments in the EasyTray® system are user friendly, clearly presented and safe.
Proven Features

The double cone
- Anatomic approximation to the spherical form of the acetabulum
- Less bone resection in the area of the cup floor while ensuring optimal primary and tilt stability
- Broad seating in the acetabulum, especially at the front end of the cup
- Possibility to fully screw into the previously reamed bony bed, thanks to the optimal tooth and thread form

The tooth form
- Tooth size, tooth thickness and tooth height matched to cup size
- Thread and tooth size increase with increasing cup size:
  - smaller cup – smaller thread and tooth form
  - larger cup – larger thread and tooth form

The surface roughness
- The average roughness of the titanium shells is 4 to 8 µm
- The dual-taper design, together with the macrostructure of the thread teeth, ensures reliable primary stability and, in combination with the surface microstructure, promotes long-term osteointegration.

The closed rim
- Direct PE-bone contact can be fully avoided (even in the rim area)
- Implantation is easy on soft tissue and bone
**The sector closure**
- Open sectors allow full view during the implantation procedure
- Spongiosaplasty can be performed through these openings, if necessary
- After screwing in the cup shell, the sectors are closed with an instrument to avoid any polyethylene-bone contact

**The articulation bearings**
- XLPE (highly crosslinked PE) standard version for ball heads 22, 28, 32 and 36 mm, and antilux version for ball heads 22, 28 and 32 mm
- PE standard and antiluxation version for ball heads 22, 28 and 32 mm
- BIOLOX delta Ceramic/PE-insert standard version for ball heads 32 and 36 mm
- PE retention insert for ball heads 28 and 32 mm

**VERILAST™**
The combination of the XLPE inserts with the OXINIUM ball heads results in the successful VERILAST articulation bearing, which combines the following advantages:
- very low abrasion levels on a par with ceramic/XLPE bearings
- very wide range of size and design options, contributing to excellent clinical results
- OXINIUM ball heads cannot break
- OXINIUM can be revised with OXINIUM

VERILAST (ceramicised metal/modified polyethylene) has the lowest revision rate in the Australian Hip Register (AOA NJRR), and has done since 2010.

**The cup duo**
Two versions with different thread tooth profiles are available for various qualities of bone:
- BICON-PLUS STANDARD – for hard and sclerotic bone
- BICON-PLUS POROUS – for soft and porotic bone
BICON-PLUS° System

The range of seven standard and four special sizes optimally covers all size requirements.

**Shells**

<table>
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<tr>
<th>Size/Ø mm</th>
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*SPECIAL SIZES

**Inserts**

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<td>2-7</td>
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<tr>
<td>PE insert Antilux</td>
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<td>PE retention insert</td>
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<td>XLPE insert Antilux</td>
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<tr>
<td>BIOLOX® delta/PE insert standard</td>
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<td>5-9</td>
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</tr>
</tbody>
</table>

**Materials**

**BICON-PLUS cup shell**
High-grade-forged pure titanium according to ISO standard 5832-2

**PE inserts**
UHMW polyethylene according to ISO standard 5834-2

**XLPE inserts**
Highly cross-linked polyethylene made of form-pressed GUR-1050
UHMW-PE according to ISO standard 5834-2

**Ceramic/PE inserts BIOLOX delta**
High quality aluminum (Al2O3)/zirconium oxide (ZrO2)
Composite ceramic BIOLOX® delta according to ISO standard 6474-2.2

BIOLOX® forte, BIOLOX® delta and BIOLOX® OPTION are registered trademarks of Ceramtec AG, Germany.
Clinical Results

Zweymüller et al.\(^1\) report an implant survival rate of 99.3\% after 10 years. The endpoint was revision for any reason. They also observed that even in problematic cases there was an increase in bone substance around the cranial margin of the cup and the socket floor, indicating secondary osteointegration. On examination the standard UHMW polyethylene cup inserts demonstrated low abrasion rates (0.13 mm/year). Stable anchorage of the polyethylene insert in the cup is essential to ensure reduced polyethylene abrasion\(^2\). The authors of the study concluded: „These intermediate results compare favorably with survivorship and periacetabular bone reaction data observed with the best cementless acetabular implant designs“. Milosev et al.\(^3\) report an implant survival rate of 99.5\% after 10 years, with aseptic revision as the endpoint in the metal-polyethylene articulation bearings. Similar results were observed in other studies.

Conclusions: To date results published in the literature reviewed by experts on the BICON-PLUS screw cup design have been consistently positive. Countless studies have proven their excellent survival rates in a range of situations.

Summary of publication ‘Good Stability and Minimal Osteolysis with a Biconical Threaded Cup at 10 Years.’ by Karl A. Zweymüller et al\(^1\):

Between January 1993 and June 1994, 376 BICON-PLUS cups were implanted in combination with a ceramic-on-PE articulation. 232 hips were reviewed after 10.0 to 13.1 (mean 10.3) years. The mean Harris hip score was 93.1 at 10 years and more. The 10-year Kaplan-Meier survivor curve with revision for any reason as an event of interest was 99.3\% (95\% CI: 96.9 – 99.8\%). There were two implant revisions. One revision was attributable to an infection and one was for cup fracture. No liner was exchanged because of wear problems or instability. Mean liner head penetration was 1.33 mm with a standard deviation of 0.66 mm, equalling a mean linear wear rate of 0.13 mm per year. Gaps between the cup floor and the bone tended to be spontaneously obliterated by newly formed bone.

References
1 Karl A. Zweymüller, Martin Steindl, Ulrike Schwarzinger. Good Stability and Minimal Osteolysis with a Biconical Threaded Cup at 10 Years. CORR 2007, No. 463, pp. 128-137.