Brunswick Cup

Product Information/
Surgical Technique

Solution for Individual Cases

zimmer

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Brochure/ Surgical Technique Brunswick Cup

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Product Information

Prosthesis Design

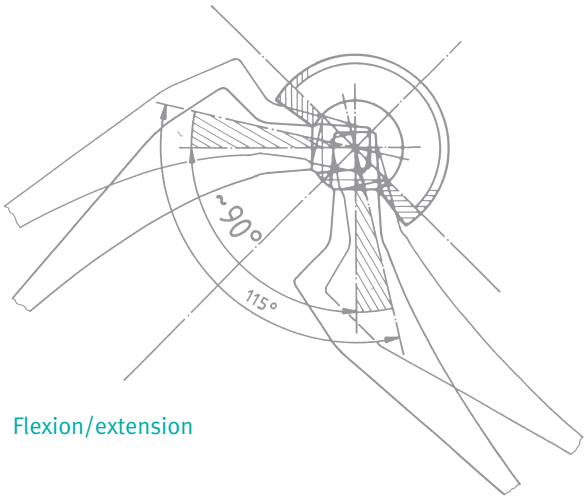
The cemented Brunswick Retention Cup, which is simple to implant, is reserved for treating recurrent hip dislocations in bedridden patients. The Brunswick Cup was developed from the *Original M.E. Müller*™ Low Profile Cup. In the case of the smallest diameter (44 mm), the centers of the inside and outside hemispheres coincide with each other, while the center of the inner hemisphere shifts as the cup diameter increases.

The Brunswick Cup is made of externally structured polyethylene for best possible anchoring in the cement. The inner ball protrudes from the hemisphere so that retention is achieved by means of a snap-in effect. This significantly lowers the risk of luxation; however, additional movement is transferred to the cup and therefore to the cup anchoring.

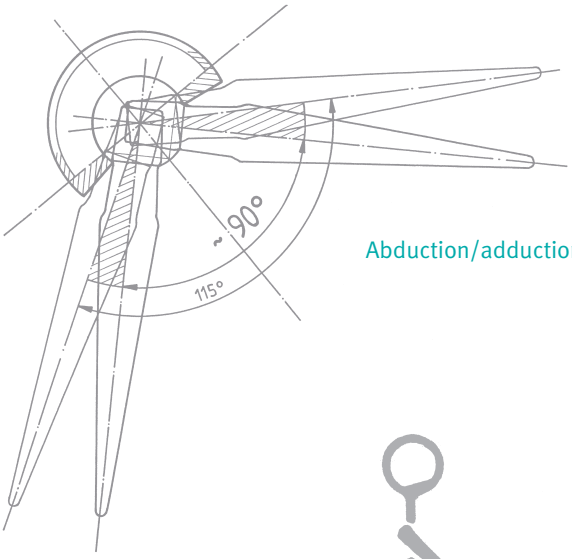
This Results in: Restriction of the Range of Motion

Since the Brunswick Cup surrounds the head of the prosthesis over the center-point of the ball, the degree of range of motion is reduced. As compared with the *Original M.E. Müller* Low Profile Cup, the limitation of the range of motion amounts on the average to 23° for the S, M, L and XL ball heads for abduction/adduction and flexion/extension as well as internal/external rotation.

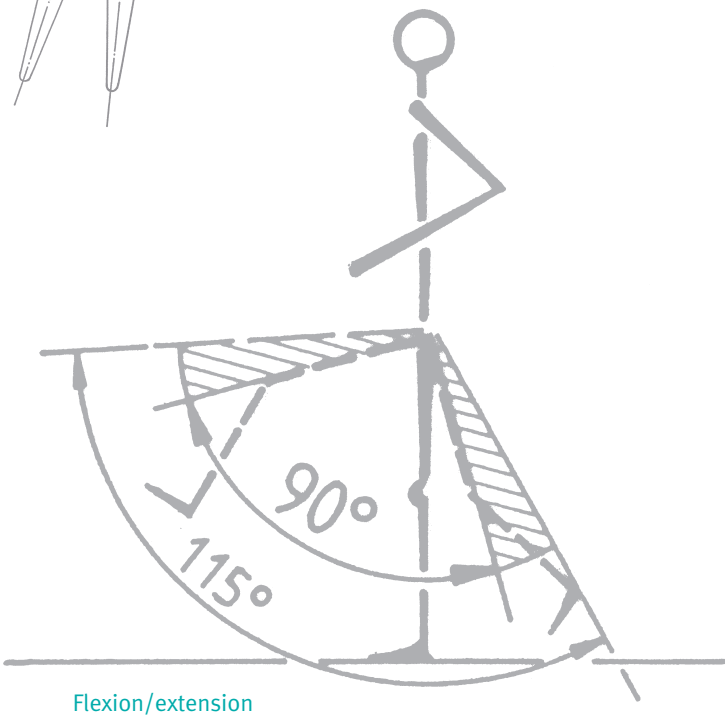
Extremely precise positioning of the Brunswick Cup is imperative in order to prevent impingement between the rim of the Brunswick Cup and the neck of the stem when high amplitude movements are carried out.



Flexion/extension



Abduction/adduction



Flexion/extension

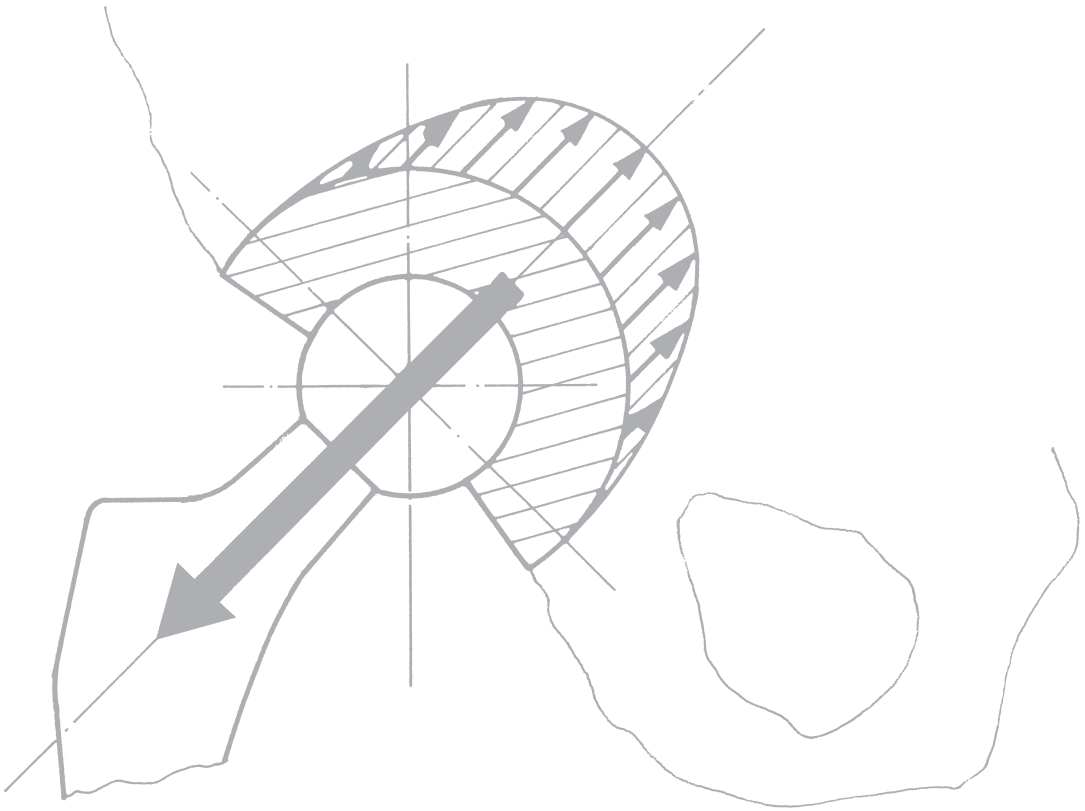
Subluxation Load

The snap-in mechanism may lead to subluxation loads. The tensile load must be borne over the anchorage of the Brunswick Cup. The force required to overcome the dislocation resistance is somewhere in the range between 50 and 150 N, depending on the temperature and the cup size. The resulting force corresponds to the integral of the distribution achieved on the interface.

Good bedding in the bone of the acetabulum is required to anchor the Brunswick Cup. If the bony seat is poor, a combination with a cup reinforcement is recommended (Acetabular Roof Reinforcement Ring or *Burch-Schneider™* Reinforcement Cage).

Indication

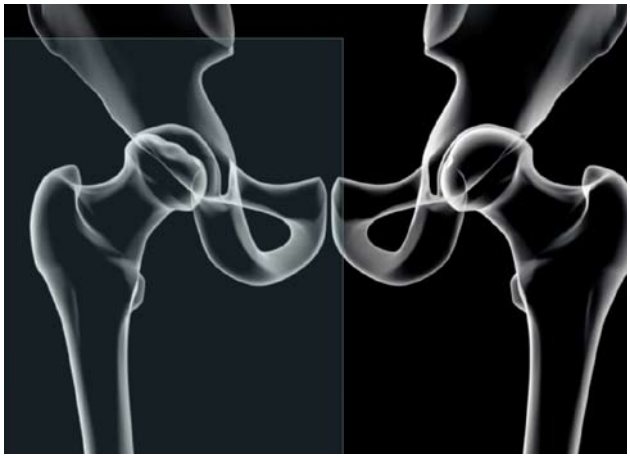
The Brunswick Cup is indicated solely for the treatment of recurrent hip dislocation due to lack of retention or muscular insufficiency in bedridden patients with low ligament tension. In addition, satisfactory bedding in the bone of the acetabulum is a necessary prerequisite for reliable anchoring. If this is not possible, an Acetabular Roof Reinforcement Ring is preferred.

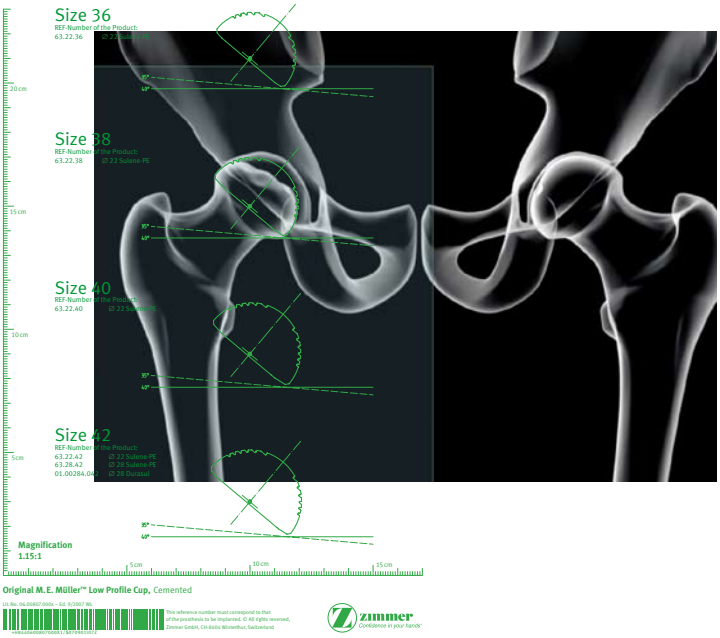


Preoperative Planning

Preoperative planning is key to a good surgical outcome. Planning allows to anticipate possible surgical complications while determining size and position of the implant intending to be used. In cases of acetabular dysplasia, planning is essential in deciding whether to consider the help of grafts, rings, or cages.*

The basis for the preoperative planning is provided by X-ray images and product-specific templates. To find the correct center of rotation, and thus to ensure correct leg length, the anatomy of the healthy pelvis is first mirrored to the affected side. The template is then placed onto the patient's radiograph to determine the correct size and position of the acetabular component. The cup should be placed at an inclination of approximately 35–40° with reference to the pelvic line, and at approximately 15° ± 5° of anteversion. It should be noted that correct placement of the cup may also depend on positioning of the femoral component. The antetorsion of the femoral component should be in the range of 10°–15°.





* For correct use of rings and cages, please refer to the respective surgical technique brochure.

Surgical Technique

Surgical Approach

The Brunswick Cup can be implanted using a variety of surgical approaches. The specific approach depends on the surgeon's preference and therefore may differ from the procedure shown below.

Exposure of the Acetabulum

A clean exposure of the acetabulum is necessary to successfully implant the cup. Fibrous, cartilaginous bone structures and osteophytes must be removed from the area, as they prevent the preparation of the acetabulum.

Reaming the Acetabulum

A hemispherical acetabular cavity is prepared using hemispherical reamers. Bear in mind that the sizes of reamers do not include the cement cladding, i.e. for the use of a 52 mm cup, a reamer with size 54 mm is required.

Starting with the smallest reamer the acetabulum is reamed in medial direction until the preplanned center of rotation is achieved (Fig. 1).

Warning: Depending on the type of reamer used, the design of cutting holes and thus the cutting behaviour can differ.

Surgeons must then adapt the orientation of the reamer. Then, the reamer with the size of the preselected cup is chosen to attain the zone of vascular bleeding and to form the cavity (Fig. 2).

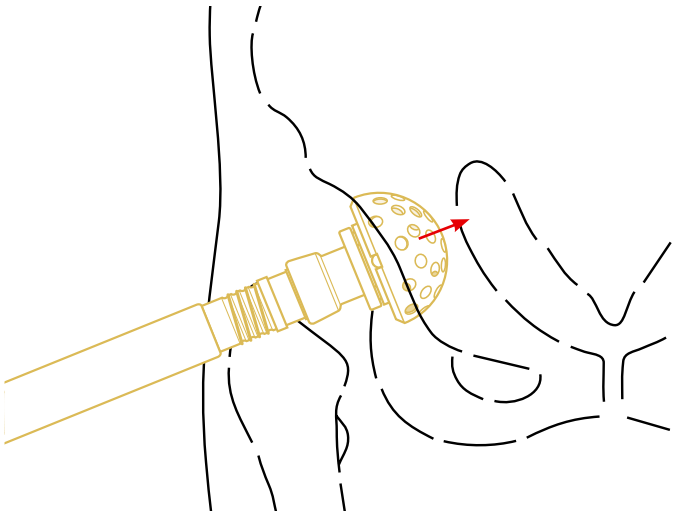


Fig. 1

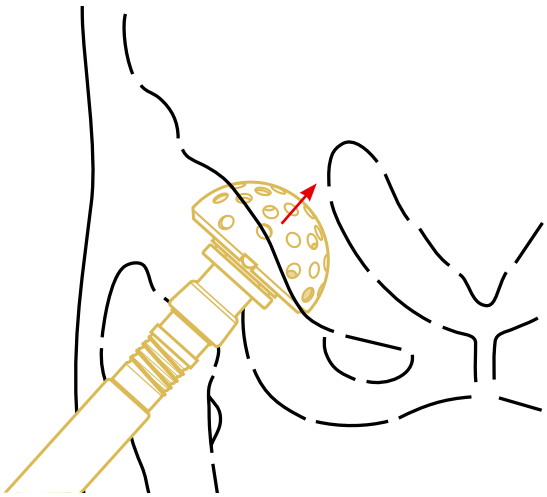


Fig. 2

Drilling Holes into the Acetabulum

Depending on the size of the acetabulum, a number of anchorage holes are drilled along the border of the acetabulum (Fig. 3). These holes should be around 5 mm in diameter and have a depth of around 0,5–1 cm.

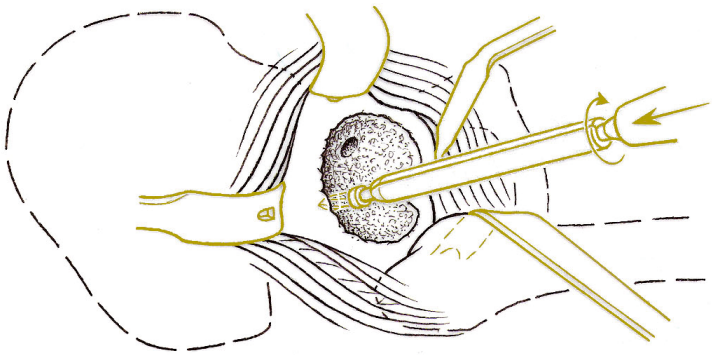


Fig. 3

Cleaning the Acetabulum

Bone debris from reaming and drilling is washed out. The acetabulum is then compressed with a gauze to minimize bleeding.

Insertion of the Bone Cement

The gauze is removed from the acetabulum and the required amount of cement is packed into the area. With the use of injection or the finger-packing method, cement is first placed into the anchoring holes, followed by the acetabular area (Fig. 4). Please refer to the product usage brochures of the specific bone cement for more details on their usage.

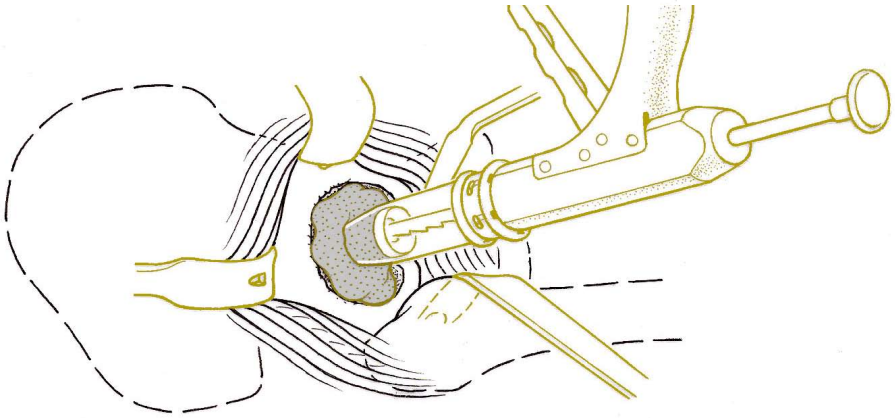


Fig. 4

Precompression of the Cement

Surgical techniques for use of cement can vary by product; please refer to the product material for the specific cement used for more detailed information on the use of this product.

Insertion and Orientation Of the Cup

The predetermined cup is positioned by hand on the semiviscous cement bed. It has to be pushed in first horizontally and then as far in a medial direction as possible (Fig. 5).

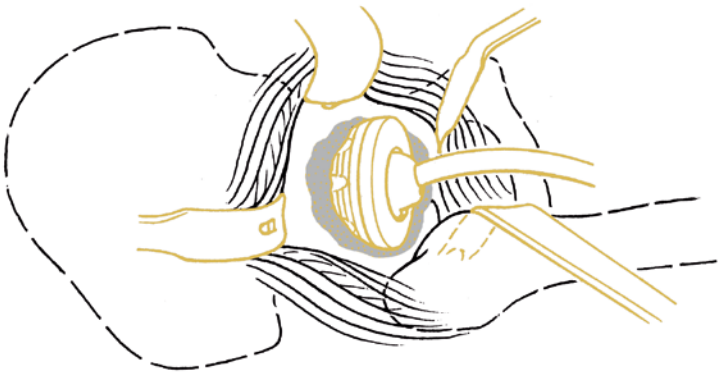


Fig. 5

Excess cement is removed with the narrow curette (Fig. 6). With the help of a cup-positioning instrument with ring, the cup is then aligned at an angle of 35–40° and with an anteversion of 10°–15° (Fig. 7). Continuous pressure is used to move the cup until it is seated evenly into the reamed acetabulum. The positioning top is then removed to avoid further changes of cup positioning.

Fig. 6

The top for impactors without rim is then used to apply pressure to the area, and excess cement is trimmed from the acetabulum (Fig. 6). Continuous pressure should be applied to the cup until cement polymerization is complete. A trial reduction is then preformed with the implanted stem and trial heads.

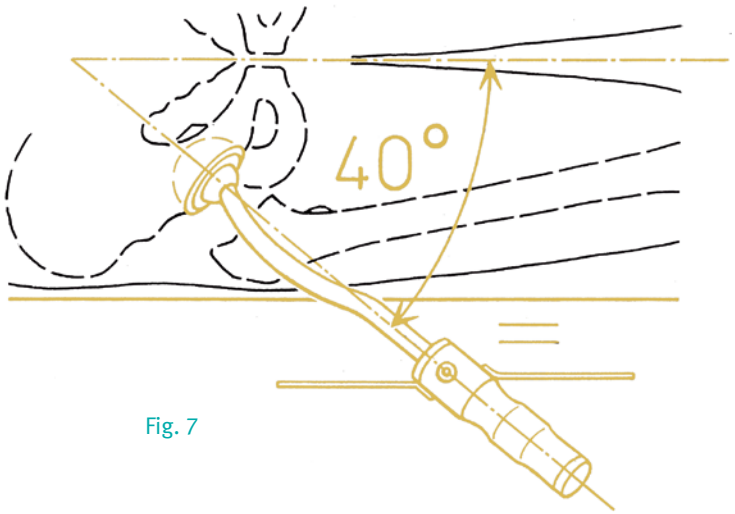
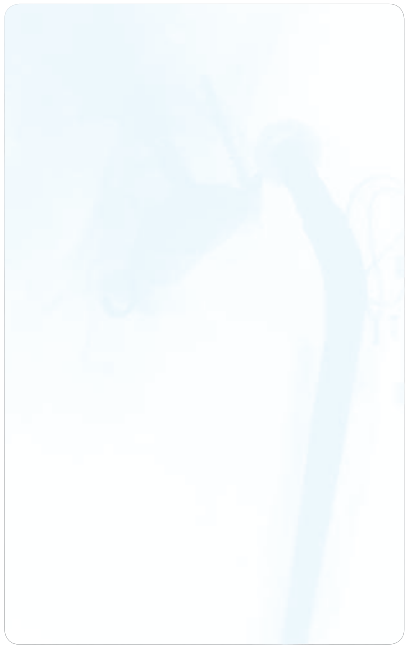


Fig. 7

Case Studies

Case 1

71-year-old pensioner.
Implanted as a revision.

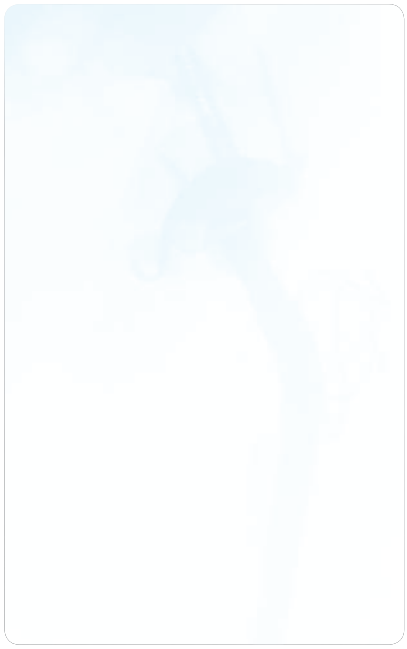


Brunswick Cup

No pain. Able to walk for one hour without the help of a cane. The patient found this result outstanding.

Case 2

92-year-old pensioner. Operation due to recurrent luxation after revision.



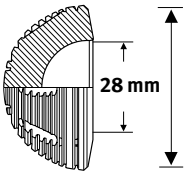
Brunswick Cup

Finding after 4 years. No pain.
Able to walk for one hour with the help of a cane.

Implant

Brunswick Cup
cemented

Details
UHMW Polyethylene
(Sulene® PE)
Radiological mark
CP Titanium
(Protasul® Ti)



STERILE R

Size (mm)	REF
44	01.00134.101
46	01.00134.102
48	01.00134.103
50	01.00134.104
52	01.00134.105
54	01.00134.106
56	01.00134.107
58	01.00134.108

Instruments

For Brunswick Cup

Tray instruments for Brunswick cup (complete)
ZS01.00245.626

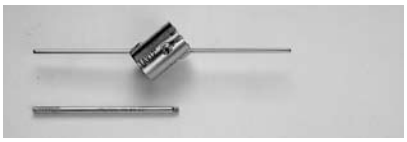
Tray instruments for Brunswick cup (empty)
01.00245.627

Insert for tray instruments for
Brunswick cup (empty)
01.00245.628

Standard tray cover
01.00029.031

Cup impactor, curved
75.00.39

Cup impactor, straight
75.00.49



Positioning guide 40°
75.85.19

Positioning bar
75.85.00

Top for impactor
blue
∅ 28 mm 78.28.51

Positioning top for Brunswick cups
blue
∅ 28 mm 75.28.94

Hi-Fatigue™* Bone Cement
Function and Sense of Hi-Fatigue Bone Cement

Bone cement, in general, is a synthetic plastic material which is based on resin and related to acrylic glass. It is used:

- For fixation of artificial joints[1]
- For the transfer load from the implant to bone
- As a shock absorber

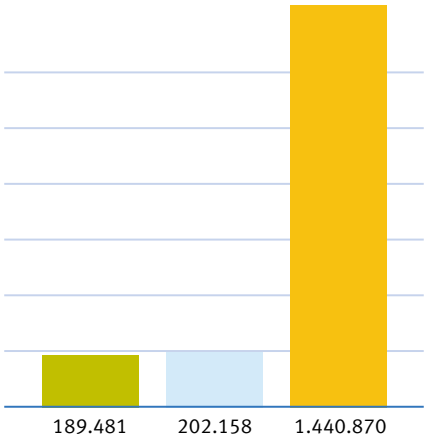
Apart from anchoring the prosthesis, bone cement fulfils the function of transmitting the operating forces onto a bigger surface. Furthermore it acts as drug carrier (*Hi-Fatigue* G Bone Cement) and helps keeping the bone in a vital condition. The handling of bone cement is described mainly in four phases: mixing phase, waiting phase, application phase and setting phase. Zimmer brings in an additional, very important phase: the transport and storage phase. All of these phases are influenced by temperature and humidity.

Fatigue Testing

Due to its unique formulation, *Hi-Fatigue* Bone Cement exhibits outstanding improvement in dynamic mechanical properties. This optimal characteristic results in greater reliability under long-term cyclical loading.

- Cement 1
  high-viscosity cement
  EO sterilization
- Cement 2
  medium-viscosity cement
  Gamma irradiation sterilization
- *Hi-Fatigue* Bone Cement
  EO sterilization

Mechanical Properties of Hi-Fatigue Bone Cement

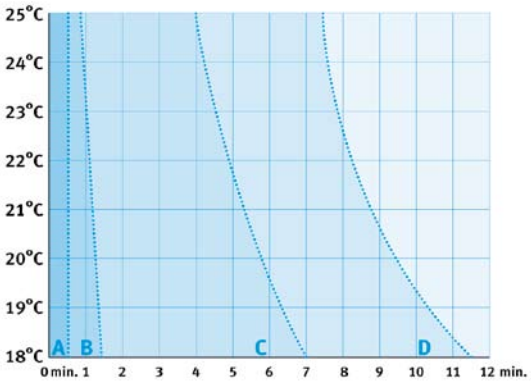


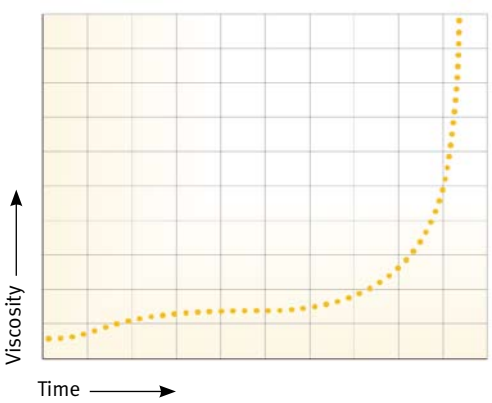
Mean number of cycles to failure (12.5 MPa)
Queen Mary University of London, Department of Materials, UK

Viscosity

The special viscosity properties of *Hi-Fatigue* Bone Cement provide optimal handling without pre-chilling. The comfortable mixing phase of the cement with low-viscosity properties is followed by a short waiting time to "dough up." The effective handling time results in an improved workability of the *Hi-Fatigue* Bone Cement.

Desirable Handling Characteristics





A Mixing phase
B Waiting phase
C Working phase
D Hardening phase

* Hi-Fatigue™ is a trademark of aap Biomaterials GmbH & Co. KG

1 Ascherl Rudolf. Science of Bone Cement, Ortho Supersite

Broad Spectrum of Kill

Hi-Fatigue G Bone Cement contains Gentamicin, which has a broad spectrum of kill covering gram-positive and gram-negative bacteria.[2] As a premixed formulation, *Hi-Fatigue* G provides a homogenous cement/antibiotic mixture and saves valuable OR time.

Outstanding Release Characteristics

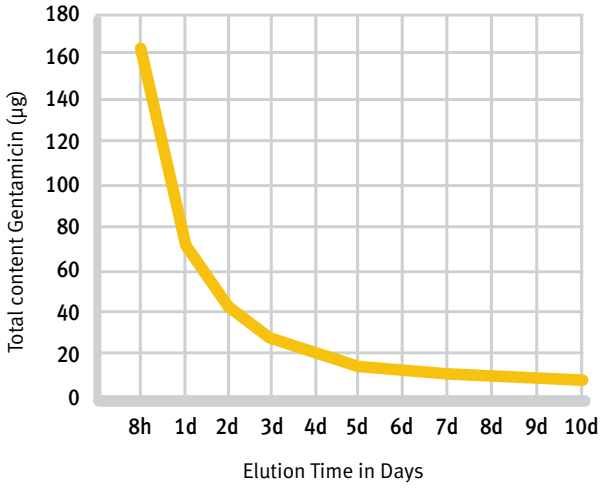
Hi-Fatigue G Bone Cement provides high local concentration of Gentamicin. With 0.55 grams of Gentamicin, *Hi-Fatigue* G releases antibiotic over several days to reduce the risk of infection.[3]

Hi-Fatigue Bone Cement – Ideal Formula for Success

Hi-Fatigue Bone Cement can be applied universally in the orthopedic world and offers a multiplicity of advantages:

- Improved dynamic mechanical properties
- Optimal handling characteristics
- Short mixing and waiting phase
- Long working phase
- Processing without precooling
- Ideal for minimally invasive surgery

Release of Gentamicin from *Hi-Fatigue* G



Ordering Information

Article	Quantity	REF
Hi-Fatigue	1 x 40	00-1120-140-01
Hi-Fatigue	2 x 40	00-1120-240-01
Hi-Fatigue G	1 x 20	00-1121-120-01
Hi-Fatigue G	2 x 20	00-1121-220-01
Hi-Fatigue G	1 x 40	00-1121-140-01
Hi-Fatigue G	2 x 40	00-1121-240-01

Available with Gentamicin

- Consistent antibiotics distribution and release
- Reduces risk of infection
- Homogeneous cement/antibiotics mixture
- The premixed formulation saves valuable OR time

2 Foerster, G. v., Buchholz, H. W., Heinert, K.: Die infizierte Hüftendoprothese-Spätinfektion nach der 6. postoperativen Woche. In: Cotta, H., Braun, A. (Hrgs.), 124–135, 1988.

3 Data on file (aap Biomaterials GmbH & Co. KG)

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