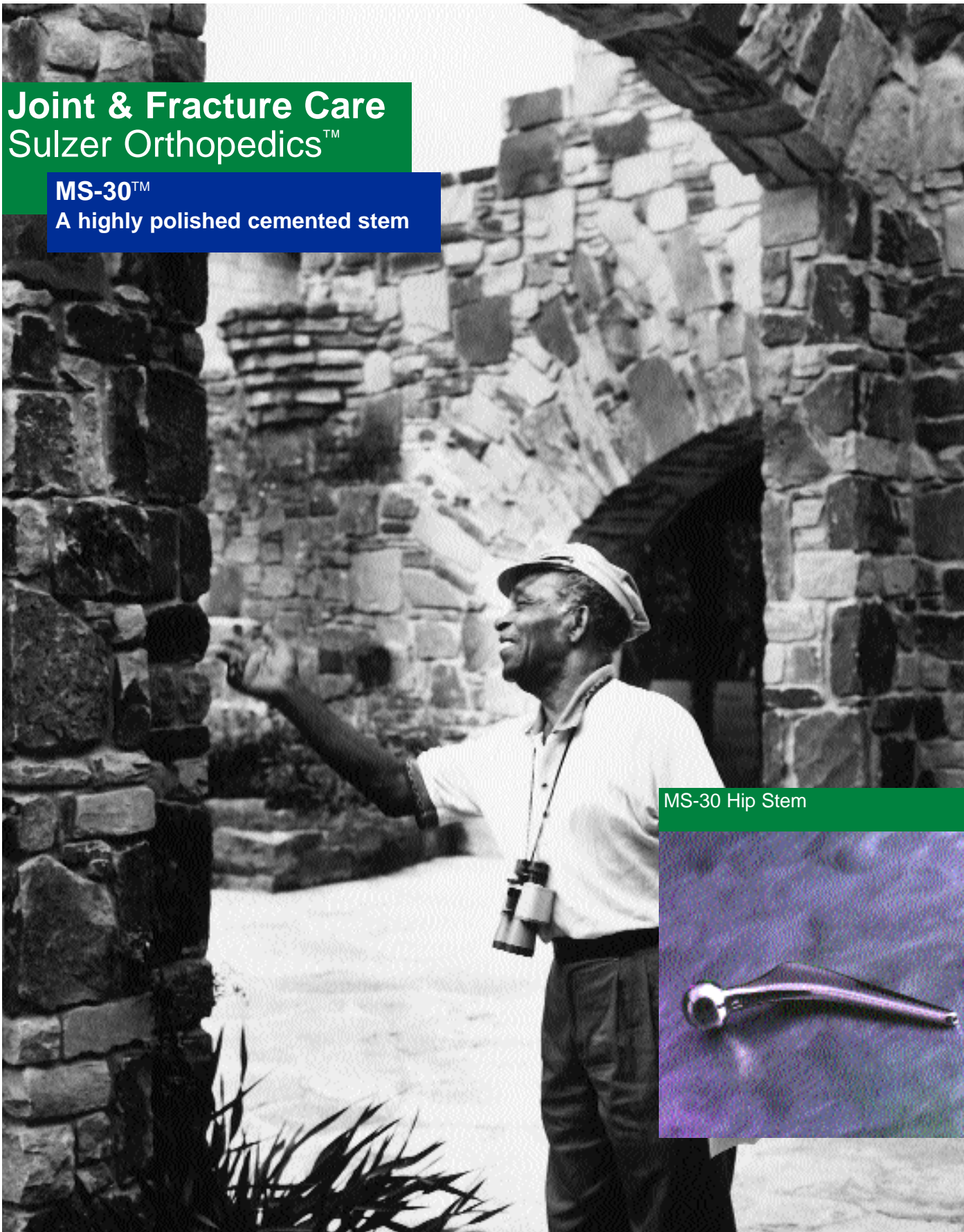


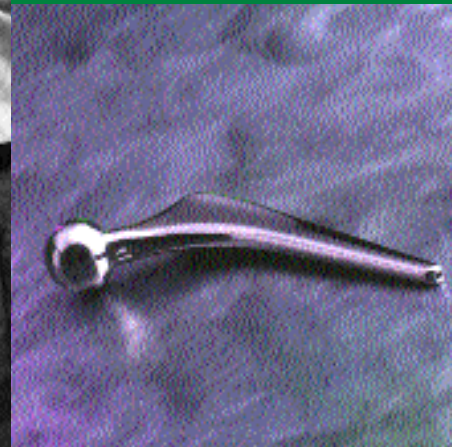
**Joint & Fracture Care**  
**Sulzer Orthopedics™**

**MS-30™**

**A highly polished cemented stem**



**MS-30 Hip Stem**



# MS-30 Hip

## A highly polished cemented stem.

Over 25 years of experience with hip prostheses have shown that very good long-term results can be achieved with cemented femoral stems. Clinical and radiographical analyses have shown the importance of a homogeneous, uninterrupted and adequately thick cement mantle. The MS-30 stem offers a hybrid solution - an uncemented cup combined with a cemented stem.<sup>1,2,3</sup>

### Stem Design

The conical wedge form with rounded edges in the proximal section corresponds with the necessary anatomical and biomechanical requirements:

- Retention and utilization of the morphology of the intertrochanteric region with resultant rotatory stability (self-centering a favorable zone for cementing).
- The main body of the cement mantle is subject to compressive forces. Tensile forces are restricted to the lateral shoulder where the cement merely has the function of a filling material.<sup>4</sup>
- The implant does not have any sharp edges, which eliminates stress concentrations and the resultant cement cracks.
- The MS-30 system consists of an appropriate number of stem sizes which allows for the appropriate filling of the medullary canal. Furthermore, an optimal thickness of the cement mantle can also be achieved.
- The form and length of the implant, together with the distal centralizer, help to ensure self centering.

### Material

The MS-30 stem is manufactured from the alloy PROTASUL -S30 (FeCrNiMnMo - ISO 5832-9). This material is compatible with PROTASUL -S30 and with Zirconia Ceramic heads.



# MS<sup>1</sup>

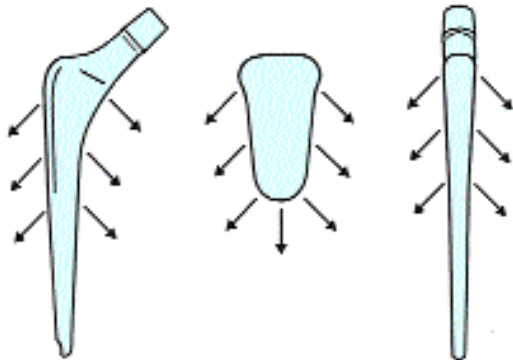
1) E. Morscher: "Endoprosthetic Surgery in 1988", Annales Chirurgiae et Gynaecologiae 78:242-253, 1989  
2) E. Morscher et al: "Cementless Press-Fit Cup", Clinical Orthopaedics and Related Research, 1989  
3) L. Spotorno et al: "Sei anni di esperienza di protesi non cementate", Min. Ort. 1986; 37 (4) 181-92  
4) L. Spotorno et al: "Problemi dello stelo protesico", Lezioni-Edizioni Minerva Medica 1991

### Biomechanical Concept

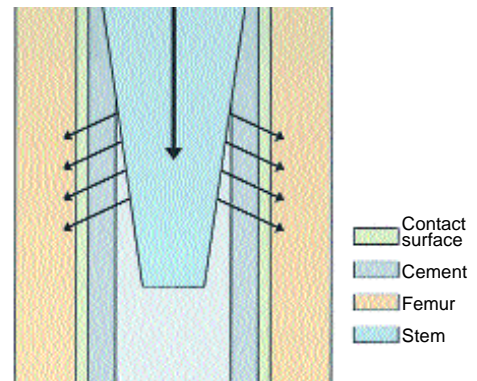
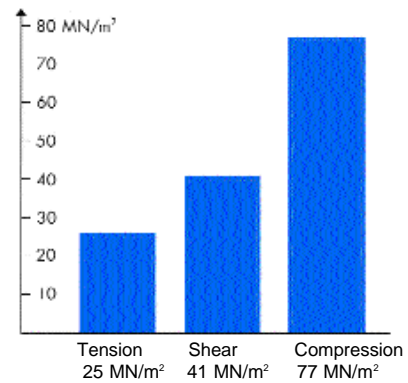
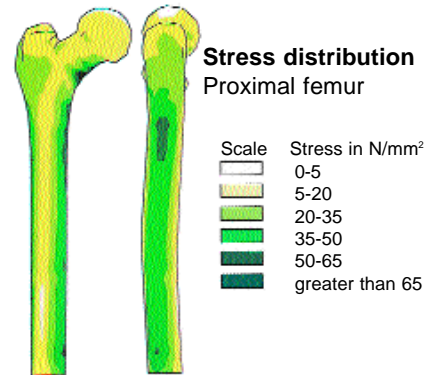
In the intact femur, the forces acting on the head are distributed between the cancellous trabeculae and the cortical layer and are transmitted from the proximal femur to the diaphysis.

The philosophy of the MS-30 stem is based on the allocation of these specific biomechanical forces to the three components: prosthesis/cement/bone.

The cement should not act as a passive filling material, but as an integral component of the interlocking prosthetic structure. The MS-30 is designed to evenly distribute medial compressive forces while minimizing lateral tensile forces within the cement mantle.

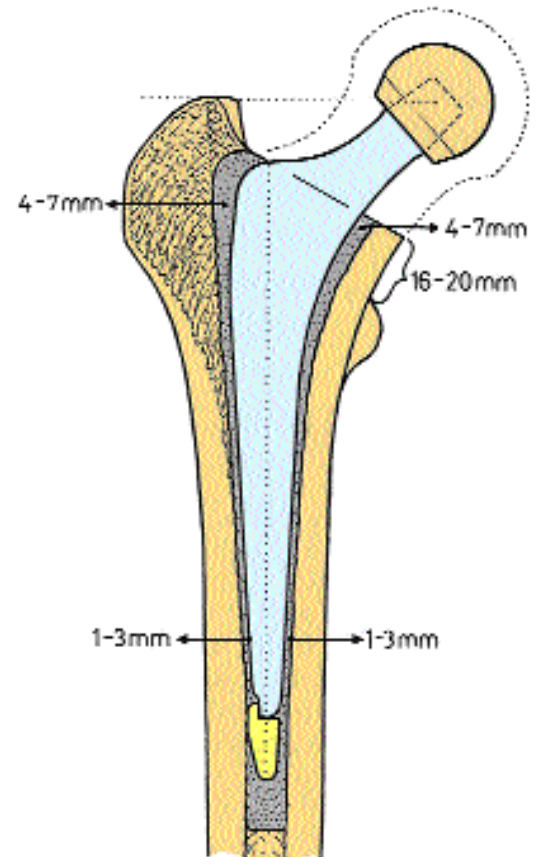
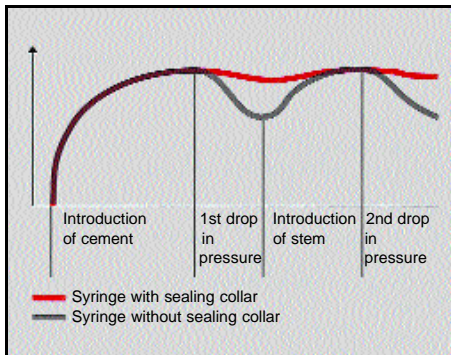


Three-dimensional conical shape

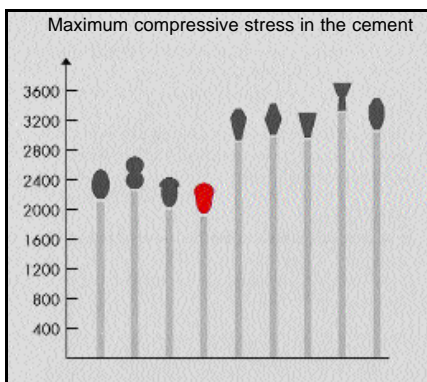


## The Cement

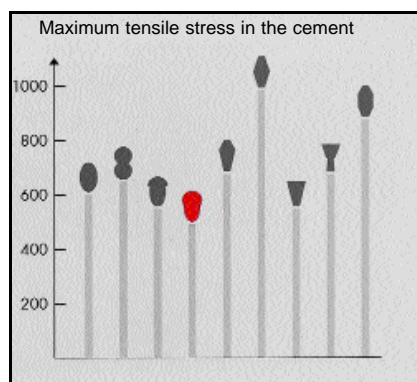
The cement is the most sensitive element of the stem/cement/femur system and can therefore restrict the life of the implant. A proximal cement thickness of 4-7mm in the calcar area and a distal cement thickness of 1-3mm around the prosthesis is recommended for optimal implant performance.



The cement pressure during the insertion of a cemented stem into a femoral canal can be represented by a curve graph. With the MS-30, a consistent cement pressure can be achieved through the use of a cement sealing collar during stem insertion and final polymerization. This consistent pressure will allow for the formation of a homogeneous and uninterrupted cement mantle which interdigitates with cancellous bone.<sup>5,6</sup>



(Crowninshield et al)<sup>7</sup> Maximum compressive stress in the cement for different cross-sections subjected to a load of 1 N.



(Crowninshield et al)<sup>7</sup> Maximum tensile stress in the cement for different cross-sections subjected to a load of 1 N.

## Applications

The application depends on each surgeon's own philosophy.<sup>8</sup> The MS-30 stem is generally used in treatment of:

- All cases of primary implants
- All cases in which use of an uncemented stem is not warranted

## Contraindications

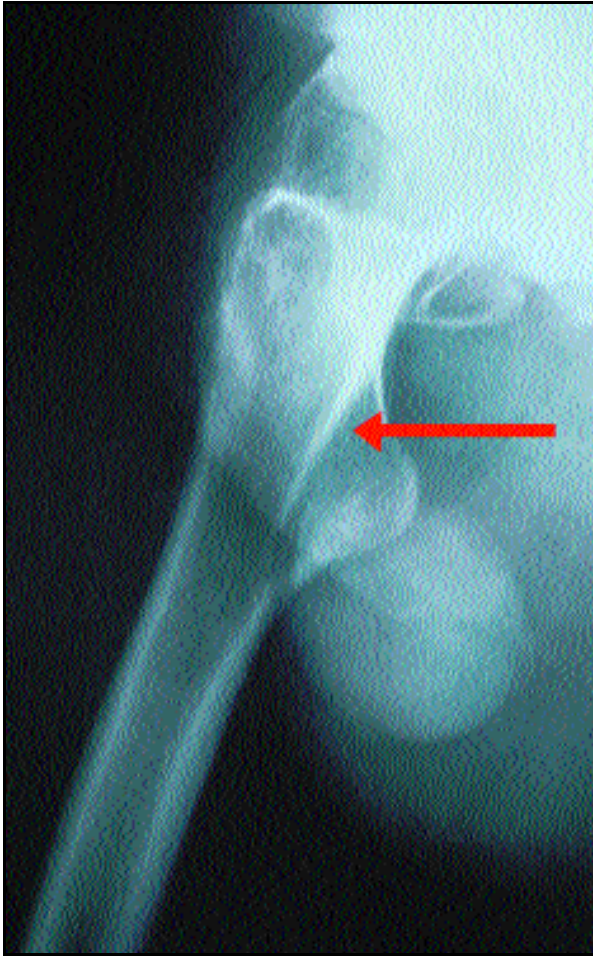
Revision cases with an extreme proximal osseous defect.

5) L. Spotorno, S. Romagnoli: "Le caratteristiche meccaniche del cemento", Estratto dal Volume "Il punto su la cementazione degli impianti protesici", O. I. C. Medical Press, Firenze, 1987

6) Saha S., Pal S.: "Mechanical properties of bone cement: A review", Journal of Biomedical Materials Research, Vol.18, 435-462 (1984)

7) Crowninshield et al: "The Effect of Femoral Stem Cross-Sectional Geometry on Cement Stresses in Total Hip Reconstruction", Clinical Orthopaedics and Related Research (1980).

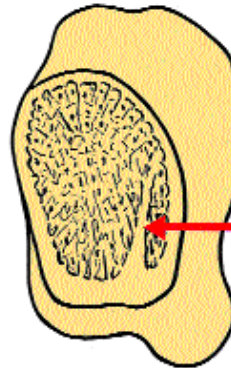
8) J. Sestano et al: "L'atletismo non cementato. Gli studi di analisi dei risultati a 6 anni", Atti del 28° Congresso nazionale AO-CAO, 1999



Axial view of the femur with presentation of the calcar femoralis (cortico-cancellous structure extending between the proximal femur and the linea aspera).

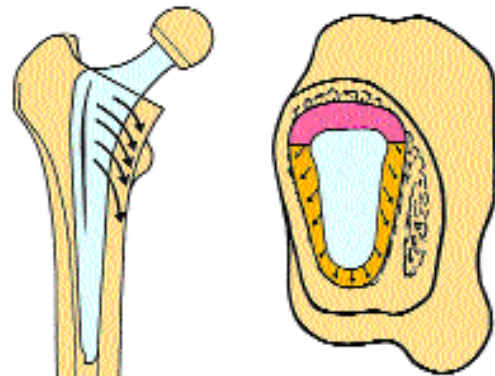
### Anatomy of the Intertrochanteric Region

The intertrochanteric region is the most important zone for stabilizing the contact surface between the cement and bone. The mechanical properties of cancellous bone structure are varied depending on their location. At the center of the intertrochanteric region is haemopoietic cancellous bone which is unsuitable for anchoring the cement, while the cancellous bone adjoining the cortex layer has better mechanical properties.



Calcar femoralis after osteotomy of the neck of the femur.

If this structure can be retained, it is extremely advantageous for the mechanical anchoring of the cement, the proximal rotatory stability and a good centering of the stem.



Compressive forces  
 Tensile forces

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