Alloclassic® Zweymüller® Stem

A Proven Concept

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Confidence in your hands®

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Since 1979, over 420,000 hips have been replaced using the original Alloclassic Zweymüller Stem, making this prosthesis the most implanted uncemented stem in Europe.

There are over 200 clinical publications proving the success of the various design features attributed to this implant, including its biocompatible material resulting in excellent primary and secondary fixation.

The easy surgical technique and the broad product range provide the best conditions for enabling the surgeon to provide optimum care for his patients.

The Alloclassic Zweymüller SL Stem is the only original product of this specific design on the market and many will agree it represents a milestone in the treatment of total joint replacement.

Alloclassic Zweymüller SL Stem Product Portfolio

SL Stem, Step Less

Sizes	14 sizes ranging from 01 to 12
Material	*Protasul*®-100 (Ti6Al7Nb)
CCD Angle	131°

SL O Stem, Step Less Offset

Sizes	14 sizes ranging from 01 to 12
Material	*Protasul*-100 (Ti6Al7Nb)
CCD Angle	121°

SLL Stem, Step Less Long

Sizes	9 sizes ranging from 3 to 11
Material	*Protasul*-100 (Ti6Al7Nb)
CCD Angle	131°

SL HAC Stem, Step Less HA Coated[1]

Sizes	12 sizes ranging from 01 to 12
Material	*Protasul*-100 (Ti6Al7Nb)
CCD Angle	131°

SLA Stem, Step Less Asia[2]

Sizes	6 sizes ranging from 01 to 4
Material	*Protasul*-64 WF (Ti6Al4V)
CCD Angle	135°

[1] available only in certain countries
[2] available only in Japan

The Evolution of the Original Alloclassic Zweymüller SL Stem

1979
The Concept Was Born

- The Original *Alloclassic Zweymüller SL* Stem was manufactured by Sulzer Medizinaltechnik and first implanted by Prof. Zweymüller in Vienna on 5 October 1979.
- The stem was available in 4 sizes and was made from the Ti6Al4V forged alloy *Protasul*-64WF.
- The philosophy of this implant was that of an uncemented design together with a distal fixation concept.
- This stem was characterized by its tapered design and rectangular cross section.
- The design included proximal macrostructures and distal longitudinal grooves, proximal thinning as well as a collar.
- The surface was fine-blasted with an average roughness of 1 µm.

1983
The Idea Was Modified

- The decision was taken to omit the collar as it not only obstructed the view of the femoral shaft during the implantation of the prosthesis, it also hindered the filling of the medullary cavity with bone graft. In addition to this, the collar also caused proximal femoral contact of the prosthesis before adequate distal fixation could be achieved.
- The proximal region was thickened, so as to improve the proximal press-fit.
- The instrumentation used to implant this prosthesis was further developed and improved, thus simplifying the surgical technique.
- The product range for this prosthesis was increased to include 7 sizes.

1985
The Implant Was Improved

- A new material, *Protasul*-100, a Ti6Al7Nb forged alloy, was chosen as the new material for this implant due to its excellent osseointegration properties.
- The range of sizes for this prosthesis was further increased to include 8 standard sizes and an additional 6 sizes for special cases.
- The surface roughness was changed from 1 µm to 3–5 µm, resulting in excellent bony ongrowth.
- The diaphyseal/metaphyseal grooves were omitted and replaced with a thicker raised section, extending along the entire length of the stem to improve the press-fit effect. This implant was named “Hochgezogen”.

1986
The Design Was Finalized

- All sizes formed part of a continuous taper and were harmonized using better increments and the Step Less concept was developed. Thus, the name SL Stem was introduced.
- The hyperbolic curvature was patented based on the stem's excellent anatomical fit.
- The easily accessible extraction hole was developed and patented.
- The range of sizes for this prosthesis was again further increased to include 14 standard sizes from sizes 01 to 12.
- The SLA (Step Less Asia) was developed for the Asian market. This was soon followed with the introduction of the SLL revision stem.

2003
The Range of Motion Was Optimized

- The introduction of the slim neck and short taper permits to achieve the following range of motion values:

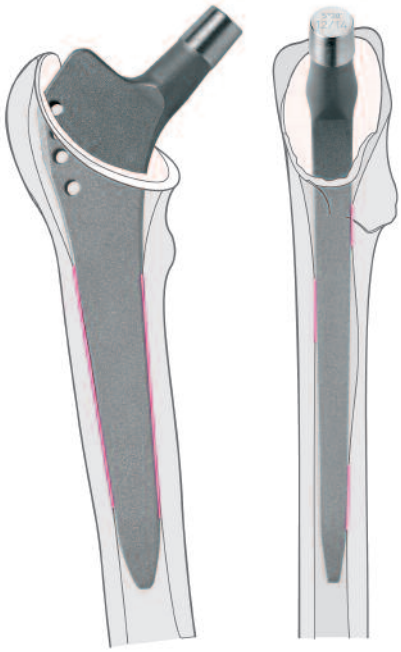
Range of Motion, M Head

Articulation	Standard Neck	Slim Neck
∅ 28	~115°	>120°
∅ 32	~122°	>125°
∅ 36	~127°	>130°

- The risk of impingement and ultimately dislocation is, thus, further reduced.
- The short taper slim neck philosophy was then integrated into the SLL, SLA and SL HAC.

2004
The Product Portfolio Was Extended

- The design for the *Alloclassic Zweymüller SL* Offset Stem was defined on the basis of an international clinical and radiographic study. This study was carried out in order to determine the ideal offset for each size and offset version of the *Alloclassic Zweymüller SL* Stem.
- This design incorporates a lateralization of the *Alloclassic SL* Stem without any compromise on the height of the center of rotation, thus enabling the surgeon to lateralize the hip reconstruction without compromising on the leg length.
- This design now gives the surgeon the ability to extend the indications that are currently offered by the *Alloclassic* portfolio.



Literature

A world-class implant requires evidence depicting its success. Since the inception of the concept of the *Alloclassic Zweymüller SL* Stem, over 200 publications have been dedicated towards proving the historical success of this implant. These publications instill further confidence as to the future expected for this proven concept of this highly successful implant. Below are some examples of the clinical papers published on this stem.

Clinical Results

Year	Author	Journal	Cases	Follow-up Years	Survival Rate (endpoint aseptic loosening)
2005	Vervest et al.	J. Arth. Vol. 20	142	11	100.0 %
2005	Knahr et al.	JBJS Br. Vol. 87	103	14.4	100.0 %
2004	Perka et al.	JBJS Am. Vo.l 86	121	9.3	100.0 %
2003	Pieringer et al.	J. Arth. Vol. 18	75	11	100.0 %
2003	Garcia-Cimbrelo et al.	JBJS Am. Vol. 85	104	11.3	100.0 %
2003	Grübl et al.	Z. Orthop. Vol. 141	817	6.7	100.0 %
2002	Grübl et al.	JBJS Am. Vol. 84	133	10	99.0 %
2001	Weissinger et al.	Z. Orthop. Vol. 139	133	10.6	100.0 %
2001	Traulsen et al.	Z. Orthop. Vol. 139	113	10	99.5 %

Osseointegration of the Alloclassic Zweymüller SL Stem in Elderly Patients

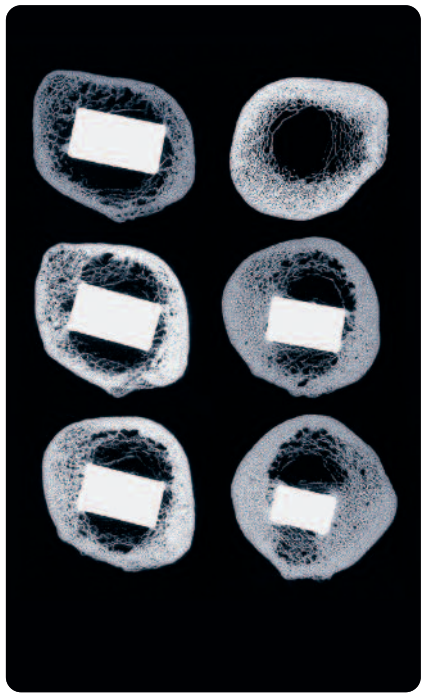
Results of 80-Year-Old Patients, and Older, with the Alloclassic Zweymüller SL Stem[1]

The use of cement is particularly worrisome in older patients, and can lead to an increased rate of death, fat embolism, confusion, deep vein thrombosis, pulmonary embolism, disseminated intravascular coagulation, bone damage, difficulty with revision, higher cost, longer hospital stays, and a higher rate of infection. The following case study evaluates the clinical results and bone adaptation changes in 56 consecutive patients (older than 80 years) that had a minimum two-year follow-up of clinical and radiographic data.
The clinical results were remarkably uniform. At six months, 98 % of the patients had no or ignorable pain, and at one year, all patients had a pain-free hip score using the Harris system.

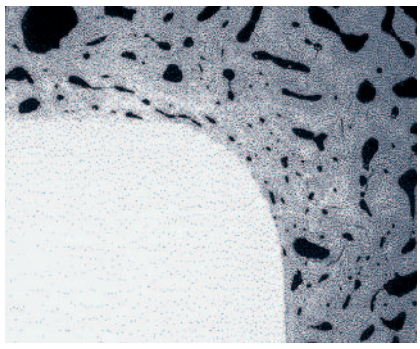
On the basis of this and other studies, we have no hesitation whatsoever in applying the *Alloclassic Zweymüller SL* Stem in elderly patients with severe osteoporosis. There have been no clinical complications. Bone adaptation is always notable, documenting osseointegration. Staff, family and patients appreciate the reduced recovery time, immediate weight bearing, brief hospital stay, and dependable rehabilitation without thigh pain.

Pieringer et al.[2] showed also excellent clinical results with the *Alloclassic Zweymüller* Stem implanted in patients older than 80 years. After a follow-up of 5.7 years the survival rate (endpoint aseptic loosening) was 100 %.

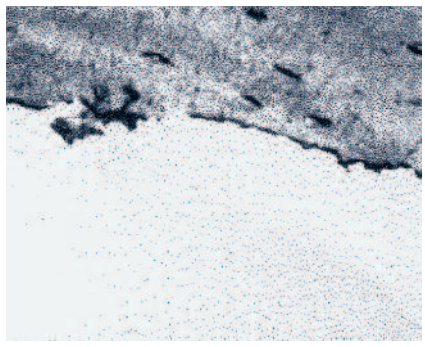
Anterior-posterior view of an implanted Alloclassic Zweymüller SL Stem



Cross-section radiographs of an implanted Alloclassic Zweymüller SL Stem retrieved at autopsy



Electron microscopy of an implanted Alloclassic Zweymüller SL Stem. More bone attaches at the corners of the implant



Electron microscopy of bone (grey) attached to the implant (white)

[1] Lester DK, Journal of Arthroplasty, 1997, 12(8): 930–7, [2] Pieringer H. et al., Z. Orthop, 2004, 142:322–7

Clinical Success Despite Difficult Preoperative and Postoperative Conditions

Case Study[3]
Results from a follow-up over a period of 12.8 years: Alloclassic Zweymüller SL Stem which was implanted in a varus position on account of a previously deployed implant.

Preoperative

Preoperative X ray of a right hip with post-traumatic femoral head, aseptic osteonecrosis in a 57 years old, healthy and active (Devane grade 4) female patient, 6 years after internal fixation of a Garden I femoral neck fracture.

Postoperative, 1 Year

Total hip arthroplasty in February 1989 with use of an *Alloclassic Zweymüller SL* Stem (size 4), an *Alloclassic CSF* Threaded Cup (52 mm) and an alumina-ceramic *Sulox*™ 28 mm Femoral Head articulating with a *Sulene*® PE Liner. Note the slight varus position of the stem and the femoral bone changes due to the previous internal fixation device.

Preoperative

Postoperative, 1 year

[3] Dr. Ch. Delaunay

Postoperative, 10 Years

Anterior-posterior X ray at 10 years, with signs of stable osseointegration of both components and positive bone remodeling with disappearance of the previous bone changes. The corresponding Harris Hip Score was 100 points.

Postoperative, 12.8 Years

(most recent X ray, 22 October 2001) AP X ray at 12.8 years, unchanged. Average linear PE wear estimated at 0.6 mm (about 0.05 mm per year). The lady was 70 years old, with very slight occasional pain in the right buttock (HHS, 96 points) and still an active life (Devane grade 3).

Postoperative, 10 years

Postoperative, 12.8 years

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