

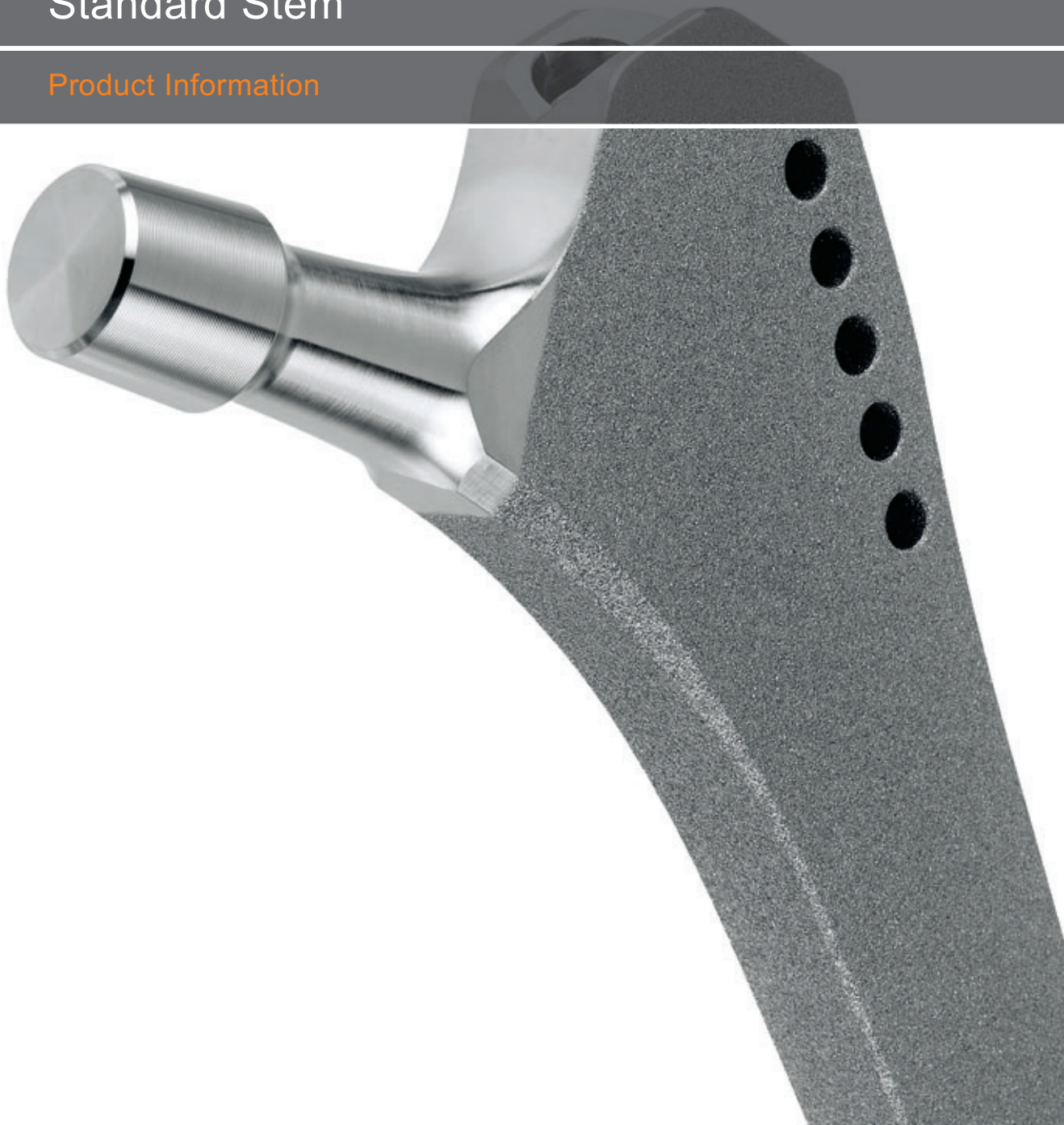
Know-how brings motion back to life.

SM

SL-PLUS[®]

Standard Stem

Product Information



First came the philosophy

To develop a universal hip system that could be used in almost every indication, immaterial to the patient's age.

Since its first implantation over 20 years ago, the cementless straight stem with its rectangular, double-tapered form has, according to Professor Karl Zweymüller, proved itself to be a reliable system over a hundred thousand times worldwide, with predictable and reproducible results.

Our many years of exclusive work with Professor Zweymüller led some 10 years ago to the further development of the SL-PLUS® stem that reflects the sum of clinical experience with his revolutionary, biomechanically-based anchoring concept.

Thanks to the consistent application of Professor Zweymüller's experience over 20 years and its clinical use throughout the world, the SL-PLUS® stem now sets the international standard.

It has therefore earned the name GOLD STANDARD.

SL-PLUS®



- **Outstanding primary and secondary stability**
 - Unique double-taper straight stem
 - Optimal anchorage due to taper geometry
- **Optimal transmission and distribution of force**

Force transmitted over a large cortical area in both projection planes (cortical multicontact anchorage)
- **Outstanding rotational stability**
 - Rectangular cross-section
 - Characteristic proximal-lateral trochanteric wing
- **Proximal press-fit**

Anatomically matched calcar arch and prominent trochanteric wing
- **Greatest possible anatomical fit**

Anatomically matched range of sizes
- **Sparing the endosteal blood vessel supply**

Rectangular stem shape not completely filling the medullary cavity
- **Excellent osteointegration**

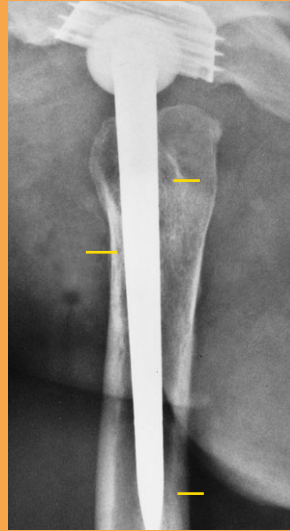
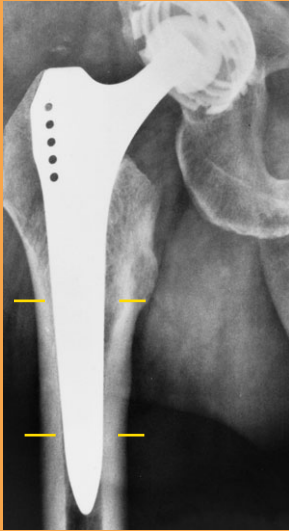
Optimally designed surface roughness of 4–6 μm
- **Biomechanically ideal rigidity**

Biocompatible, very strong forged titanium alloy, rectangular design
- **Greatest possible R.O.M.**

Proximally tapering neck

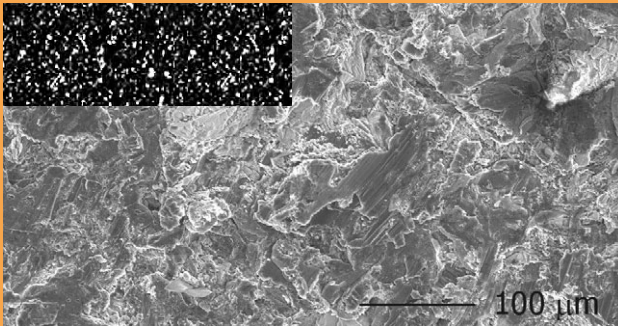
SL-PLUS®

Stem System



Cortical multicontact anchorage

Due to the precisely defined taper angle, cortical deposition distributed evenly over the entire stem length is achieved. This leads to the transmission of forces over a broad area in the metaphyseal and diaphyseal regions in both projection planes.



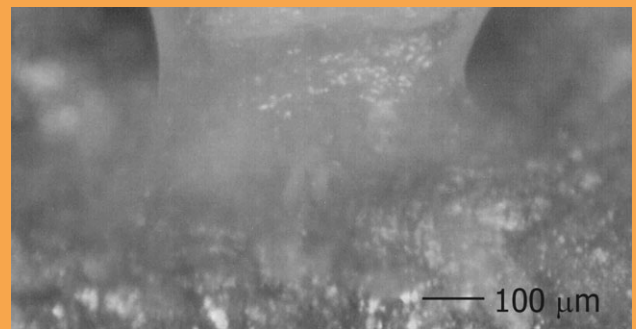
Mean roughness $R_a = 4-6 \mu\text{m}$

Excellent osteointegration

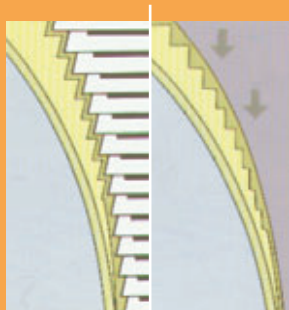
As a result of the special microstructuring of the biocompatible titanium alloy with a mean roughness of 4–6 μm, the surface of the SL-PLUS® stem ensures outstanding osteointegration.



Trabecular integration over a wide area, x 8 magnification

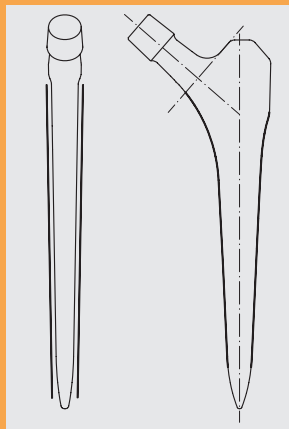


Bone trabeculae with direct titanium-bone binding, x 50 magnification



Precise preparation and bone compression

Proximally there is broad, close contact between the SL-PLUS stem and the cancellous bone compressed with the special SL-PLUS rasps. Distally, the stem edges penetrate into the prepared endosteal corticalis. This fixation is strengthened further by torsion and vertical forces.



Rectangular tapered shape of the SL-PLUS stem

The rectangular cross-section requires minimum excavation of the medullary cavity. The cortical support at the edges provides optimal primary anchorage. The calcar arch flows smoothly into the distal stem segment. This creates a continuously changing curvature over the entire stem length that approximates to wedge geometry in both the sagittal and frontal planes.



Outstanding endosteal blood supply

The unique design of the SL-PLUS® stem brings another biological advantage: it leaves enough room for nutritional supply of the bone from the medullary cavity; this is confirmed histologically by the complete secondary osteointegration of the stem.

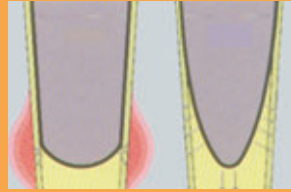


Anatomically matched stem sizes

A total of 14 stem sizes for primary interventions cover all anatomical requirements throughout the world. The specific size increments were developed by a computer-assisted series of measurements, so that the system can provide an optimal fit and the intraoperative choice of the correct size is made easier. These distinct advantages have been proved in hundreds of thousands of implants.

SL-PLUS®

Stem System

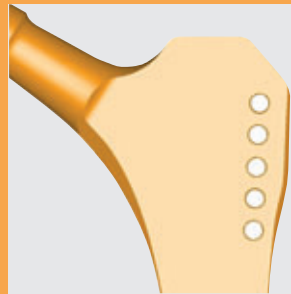


Physiological transmission of forces to the implant tip

The taper at the prosthesis tip is rounded and changes smoothly into a pyramidal tip. The result is no tension spots in the distal diaphyseal area.

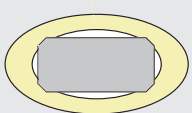
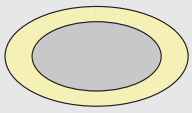
Proximal press-fit

The anatomically matched calcar arch and the prominent trochanteric wing enlarge the proximal anchoring surface and support the accentuated proximal press-fit. This guarantees optimal metaphyseal anchorage.



Rotational stability

The specially formed trochanteric wing, with its enlarged surface, supports the initial anchorage and, together with the rectangular base profile of the SL-PLUS® stem, provides enhanced rotational stability.

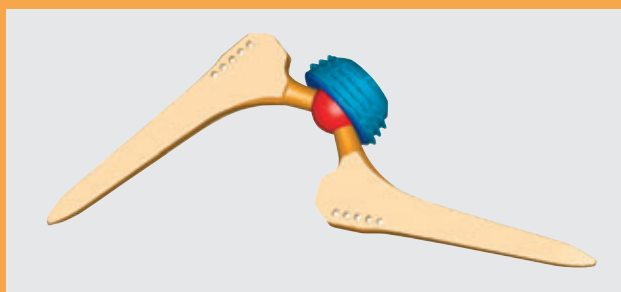
	Biomechanically ideal rigidity SL-PLUS	
	Ti 100%	CoCr 200%
	Elliptical fit & fill cross-section	
	Ti 160%	CoCr 320%

Biomechanically ideal rigidity

By using very strong cast titanium alloy, the rigidity of the stem is reduced by 50% compared to a cobalt-chrome stem of the same geometry.

With the same medullary cavity size, the rectangular titanium stem has about one-third the rigidity of a cobalt-chrome stem filling the medullary cavity.

The material properties of the titanium alloy plus the rectangular stem design form an optimal combination of high strength and biomechanically ideal rigidity.



High degree of freedom of movement

On average, the SL-PLUS® stem with a 28-mm ball head provides a head-neck diameter ratio of 2.51, which corresponds to a high R.O.M. of 125°. This minimises the risk of impingement.

Survival rate 98.1%*

* The Kaplan-Meier survivorship curve showing a 98.1% rate of implant survival at ten years with revision of the stem for any reason as the end point (upper CI: 0.995; lower CI: 0.925)

Zweymüller KA, Schwarzinger UM, Steindl M. Acta Orthop. 2006; In press.



2 1

The impactor (1) is positioned along the long axis of the stem. Due to the precise coaxial direction of the broaching, the quality of the primary fit is increased since tilting moments are inhibited during impaction.

The extractor with screw thread, (2) also axially orientated, which avoids tilting moment during withdrawal of the implant.

Greatest possible R.O.M.

The proximally tapering neck allows a large range of movement for the patient. In the lateral transition to the stem, the neck expands gradually. Medially it merges into the anatomically matched calcar arch and thus provides maximal safety under continuous loading.



MATERIAL

Forged titanium alloy,
Ti6Al7Nb

SURFACE ROUGHNESS

$R_a = 4 - 6 \mu\text{m}$

RANGE

14 stems varying in length from 128 – 188 mm
with proportionally increasing offset

CCD ANGLE

131°

CONE

12/14

Manufacturer
Smith & Nephew Orthopaedics AG
Erlenstrasse 4a
6343 Rotkreuz
Switzerland

For further information please
contact our local sales office.
www.smith-nephew.com



AURA Medical s.r.o.
K Verneráku 4
148 00 Praha 4
Tel.: 244910200
aura@auragroup.cz
www.auragroup.cz