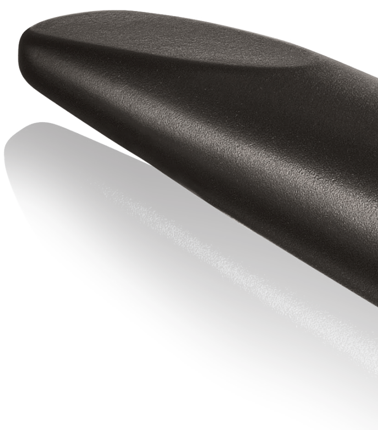
SPS® System

Naturally anatomic

symbios
custom-made for you

The SPS® stem,
which was first produced in 1993,
is based on a globally unique
concept directly derived from the 3D
Custom technology developed by
Symbios.



Since then, highly encouraging clinical experience with Custom stems, in the interim confirmed by results at 15 years [1][2] on young patients, suggested a potential for significantly improving the standard for cementless stems : this gave rise to the SPS®, which remains to this day the only standard stem entirely designed on the basis of the Custom algorithm applied to the average femoral anatomy of patients.

Since that time, following more than 75'000 implantations and 20 years of clinical experience [3], the published results for SPS® confirm the validity of its design, with results identical to the cementless stems used for reference [4].

In 2012, Symbios applied an innovative ultimate version of the concept. After 20 years of developing our technological expertise in 3D pre-operative planning, the revised extra-medullary design of the SPS® Evolution now allows surgeons to perform optimal reconstruction using prosthetic centers of rotation while benefiting from the anatomic intramedullary design of the SPS® HA. The SPS® Evolution allows surgeons to effectively restore function in the majority of patients, while preserving the simplicity of a standard stem.

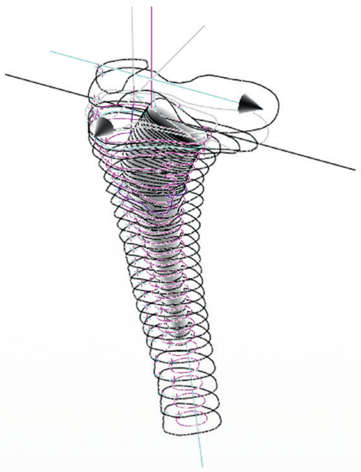
20 years

Clinical experience of the original SPS® concept [3]

100%

Survival after 10 years
for aseptic stem loosening as the endpoint [4]

An original design derived from Custom



1989
The visionary concept of Custom

The design algorithm of the Custom stem was perfected in 1989, resulting from collaboration between surgeon and engineer, by combining the surgical skills of Prof. J-M Aubaniac* with the 3D technology developed by Symbios : the first Custom stem was successfully implanted in January 1990, thus opening up for orthopaedics a whole new field of technological possibilities.

* Sainte-Marguerite University Hospital, Marseille

1993
Genesis of the original SPS®

Capitalising on Custom technology, the SPS® HA was designed by our engineers according to the same principles, by establishing an average intramedullary anatomy from scrutiny of 300 CT scans of normal femurs.

Since its introduction in 1993, the SPS® remains to this day the only commercially available standard prosthesis to have been designed entirely on the basis of a three-dimensional software algorithm.

2003
Launch of SPS® Modular

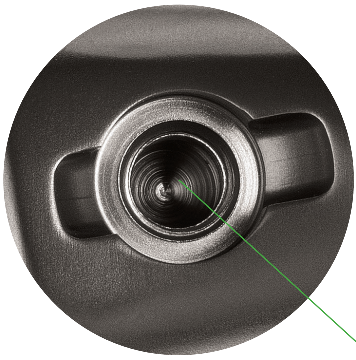
With its 12 modular necks, the SPS® Modular gives the surgeon a greater number of extramedullary options to restore femoral offset and leg length with a standard stem.

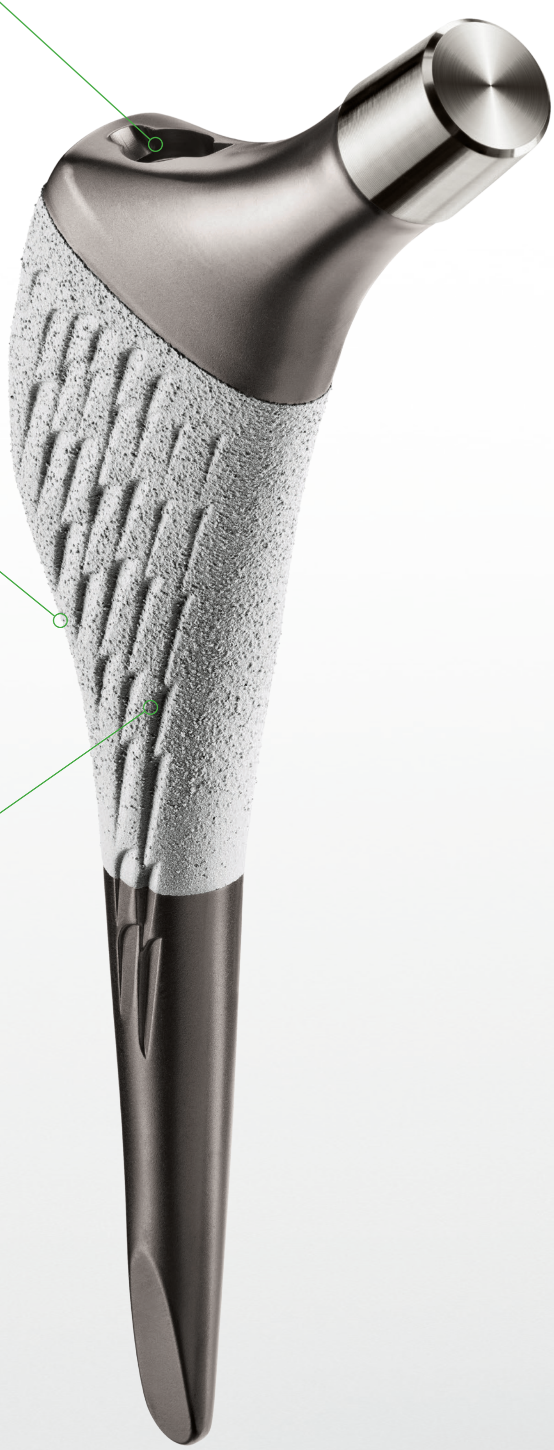
2007
Launch of HIP-PLAN®

Symbios introduces the first 3D pre-operative planning software: the surgeon can now plan the Symbios standard implants with greater precision and reproducibility than with the conventional 2D technique[5][6][7]. HIP-PLAN® thus enables the most appropriate implants to be determined for each patient prior to surgery.

2012
SPS® Evolution: perfecting the standard reconstruction

Based on 3D retrospective analysis of more than 600 SPS® Modular implants, the innovative extramedullary design of the SPS® Evolution optimises the standard reconstruction for the average prosthetic centre of rotation. Thus, the SPS® Evolution allows the surgeon to perform the most effective standard reconstruction possible.



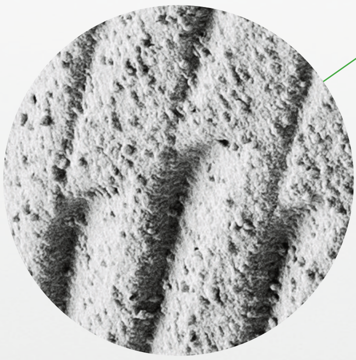


CONTROL OF ROTATION

Impaction threaded recess with a slotted guide to control rotation during impaction

EXTERNAL LATERAL FLARE

For direct abutment on the external cortical bone



METAPHYSEAL FIXATION

- Coating of porous titanium and hydroxyapatite in the metaphyseal zone
- Roughened grooves for anchoring and stability in the cancellous bone

PERFECTING OF THE RECONSTRUCTION

SPS® Evolution
- Neck-shaft angle of 129°
- Neck retroversion of 5°
- Standard 12/14 5°40’ taper

SPS® HA
- Neck-shaft angle of 134°
- Zero neck retroversion
- Standard 12/14 5°40’ taper

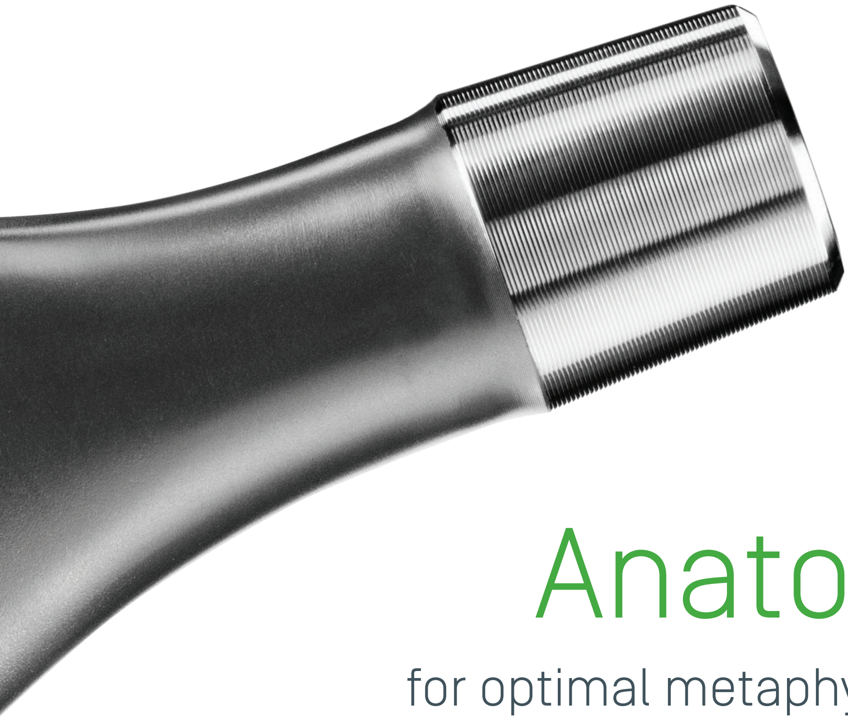
3D ANATOMIC CURVATURE

- Natural adaptation to the medullary canal
- 15° axial helitorsion within the metaphyseal zone
- Anterior sagittal curvature

SHORT, REFINED DISTAL PART

To prevent all pain associated with distal cortical contact

SPS® System

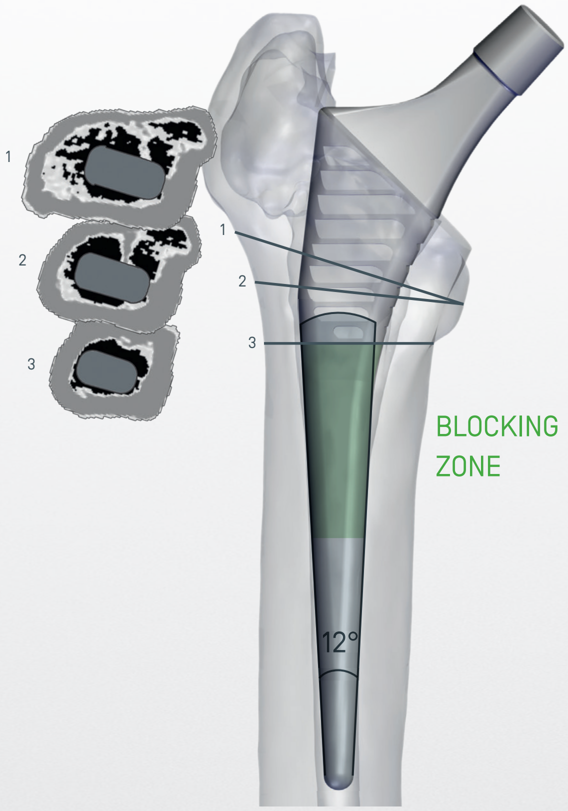


Anatomic

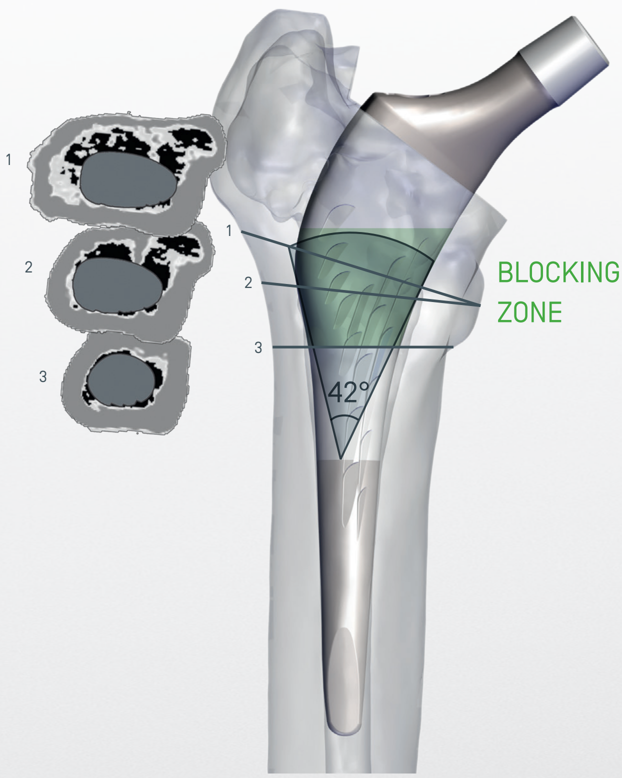
for optimal metaphyseal blocking[8]

Improving control of the intramedullary position

Straight stem



SPS® Evolution



Proximal blocking, at a predictable and reliable height

The lateral flare of the SPS® guarantees its direct abutment on the external cortical bone and forms a large splay angle with the medial curvature of 42°. Thus, the position of primary stability is predictable, at a reproducible height, and does not depend on the density of the spongious bone.

Frontal and sagittal sections (HIP-PLAN®) superimposing the preoperative and postoperative scans on the basis of the bone references. The 3D planning of the SPS® Evolution (blue) and the effective postoperative position (pink) illustrate the predictability of the SPS® intramedullary design.

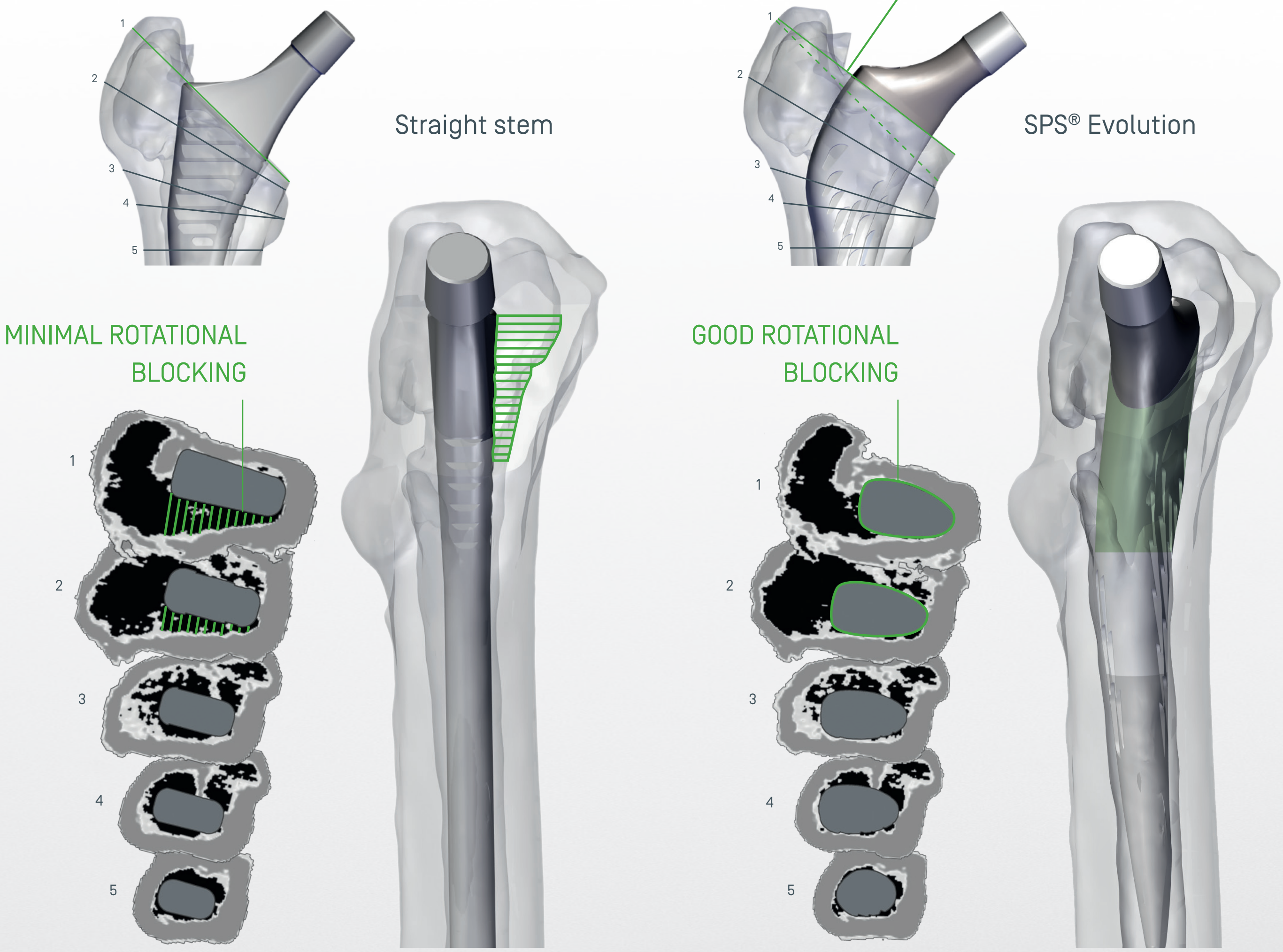
"The component implanted was the same as that planned in 94% for the stems."

Sariali et al. Journal of Bone and Joint Surgery Br. 2009 [5]

"The implant size was correctly predicted in 100% of the stems."

Hassani et al. Journal of Arthroplasty. 2014 [7]

Improve the transmission of stresses proximally

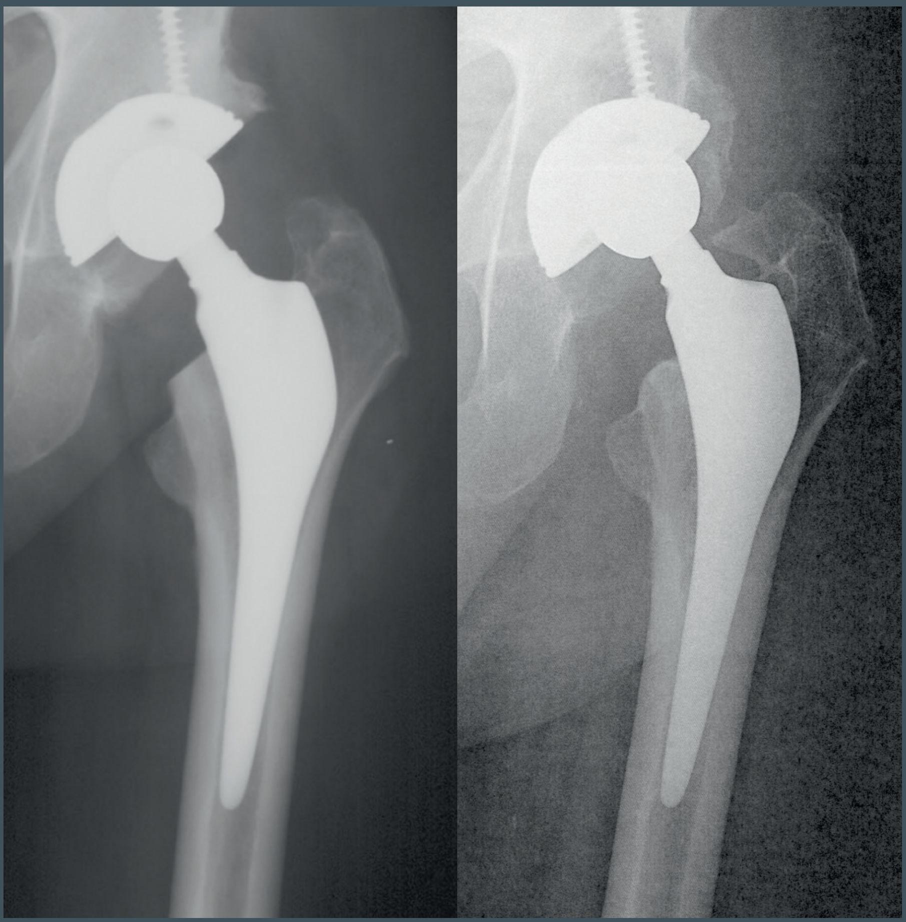


The concept of metaphyseal fixation [8]

Due to its three-dimensional anatomic design, in particular its anterior sagittal curvature, the SPS® benefits from a better-fitting antero-posterior dimension along the entire length of the metaphysis. In this way it obtains the best possible metaphyseal contact following the natural torsion of the femur in the sagittal and axial planes, which gives it superior rotational stability and ensures load transmission within the proximal zone.

SPS®
postoperative x-ray

SPS®
postoperative x-ray (14 years)



"The anatomic SPS® allowed correct transmission of physiologic loading to the metaphyseal cancellous bone, minimizing proximal stress-shielding and enhancing bone remodelling around the stem in the proximal femur."

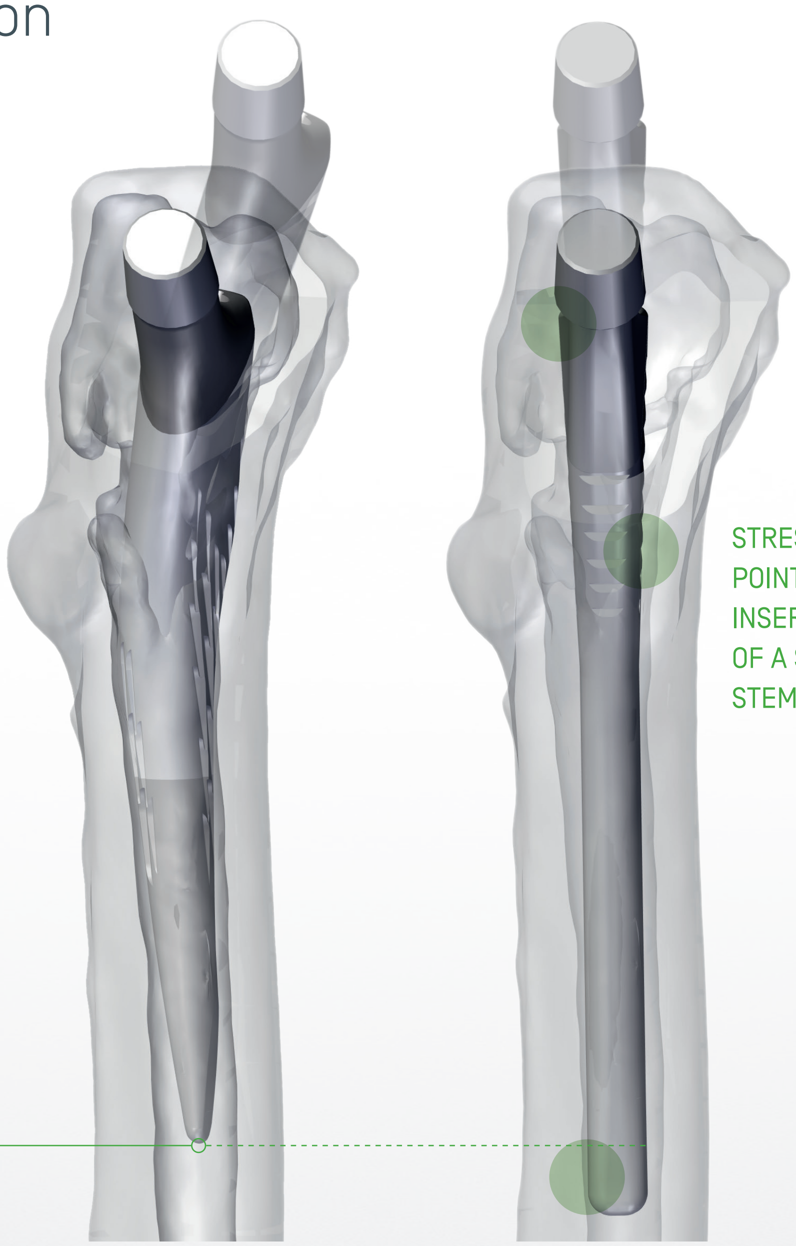
Sariali et al. Clinical Orthopaedics and Related Research, 2012 [4]

SPS® System

Anatomic

for minimally-invasive surgery

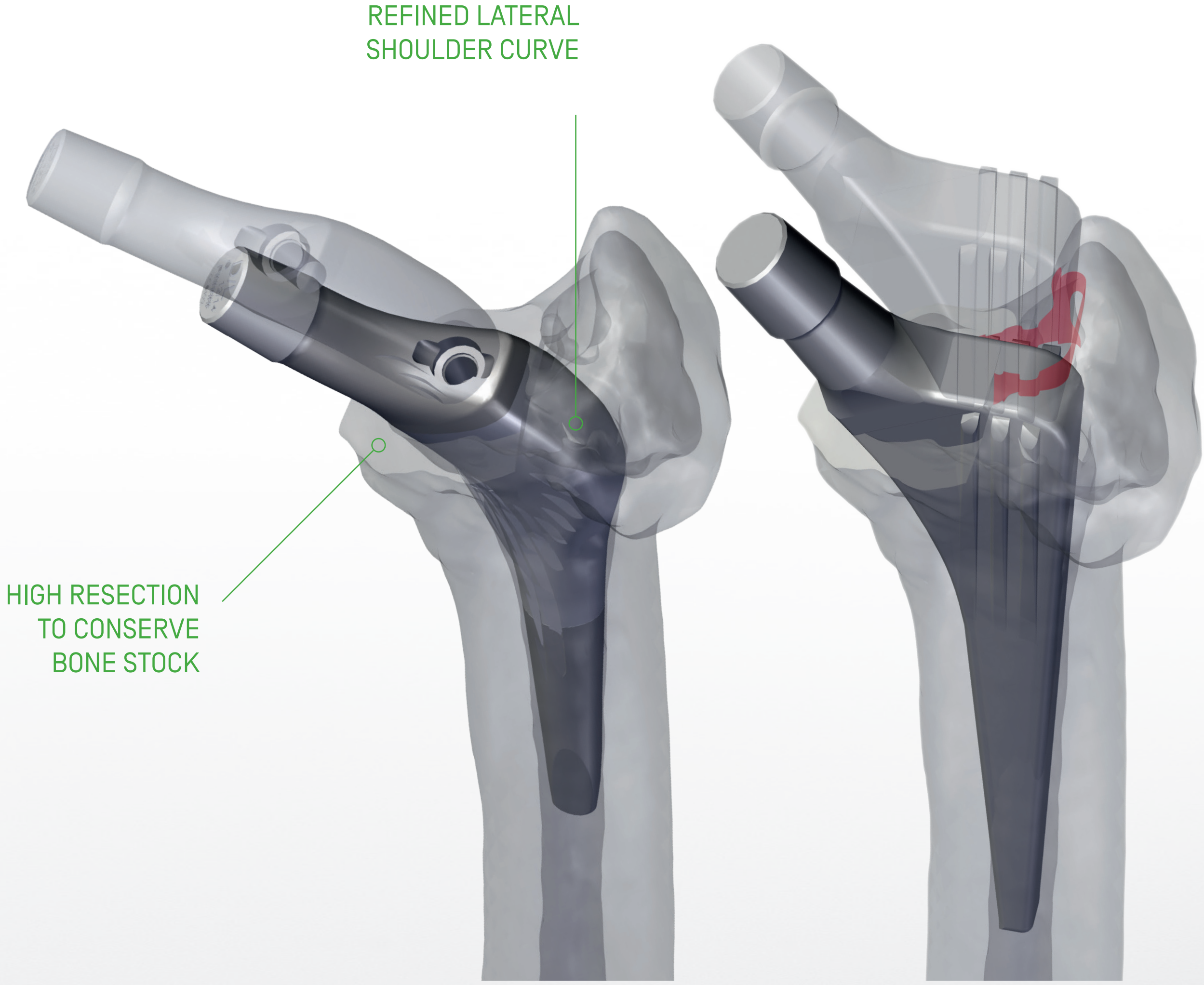
Facilitate femoral insertion



Naturally anatomic anterior insertion

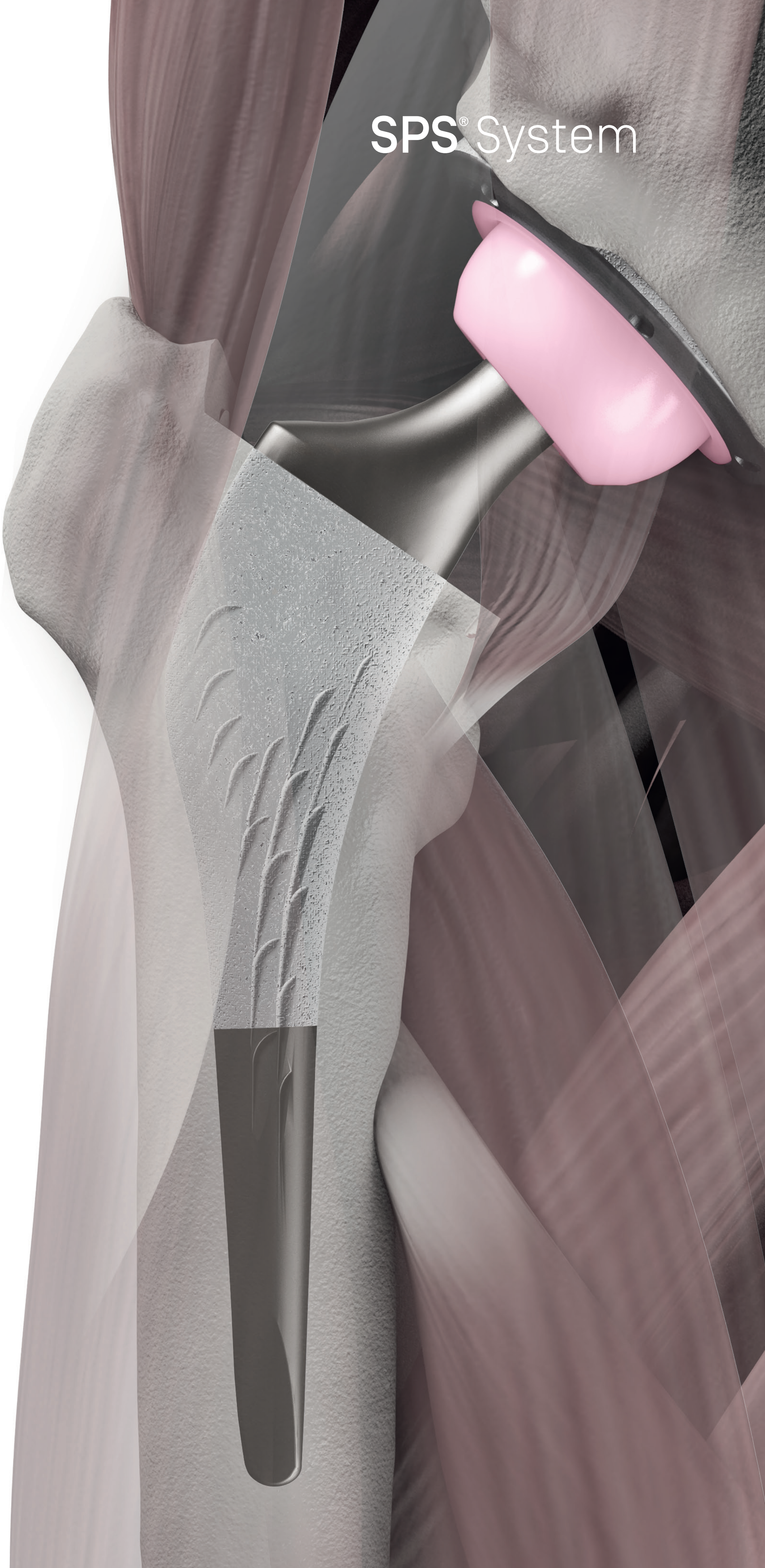
The sagittal curvature of the SPS®, as well as its short refined distal part, allows introduction into the canal to be approached via the anterior femur without having to work the posterior aspect. The insertion of the SPS® is thus facilitated, compared to that of a longer straight stem that cannot follow the curvature of the femur. The SPS® thus allows the soft tissues to be preserved during this surgical approach, particularly during the minimally invasive approach where exposure is often reduced.

Preserve bone stock and soft tissues



A lateral shoulder with a refined design

The lateral shoulder of the SPS® was designed to accommodate the shape of the trochanteric overhang. This characteristic curve design prevents any conflict within the trochanteric zone, and facilitates the gentle introduction and progress of the SPS®. Unlike traditionally designed stems which require lateralisation of the shoulder, the greater trochanter is preserved during preparation of the canal.


SPS® System

Anatomic

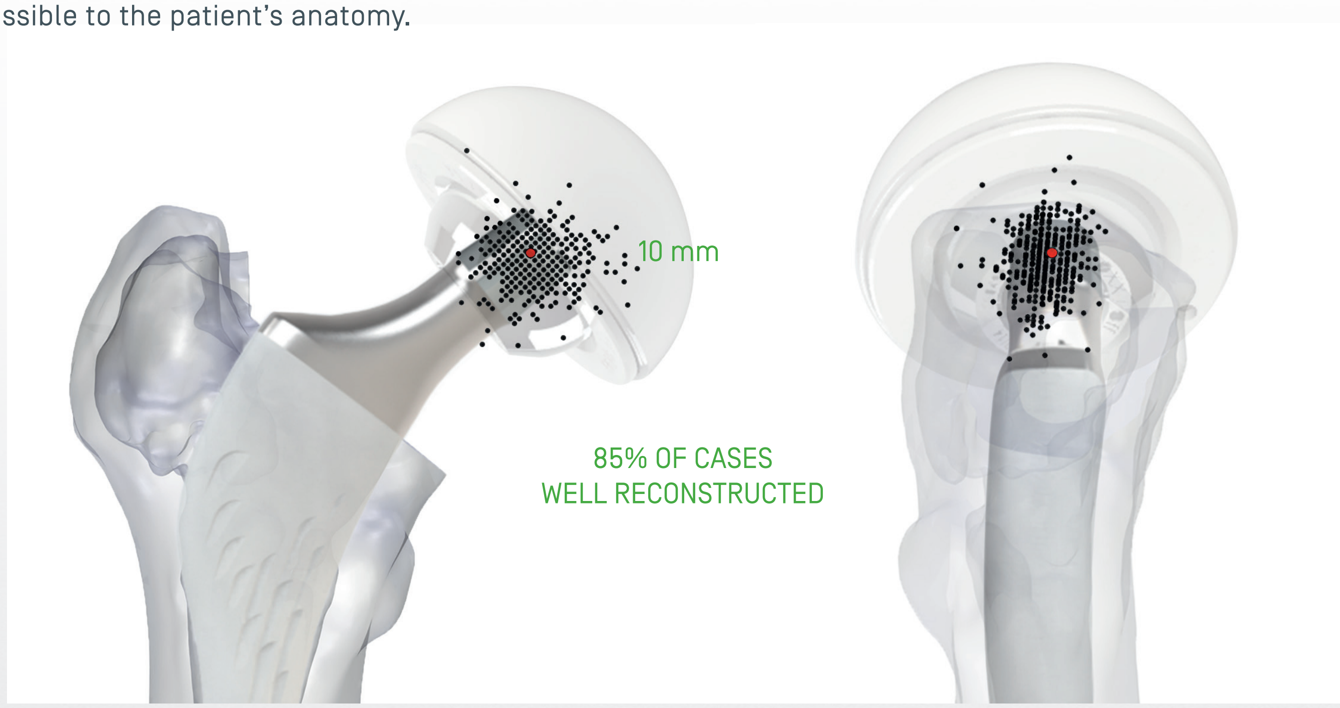
for an optimal reconstruction

The culmination of 20 years of continuous evolution of the concept

The SPS® Evolution design is underpinned by the study of more than 600 cases of implanted SPS® stems, for which the preoperative and postoperative scans were superimposed and analysed in 3D.

For every size of SPS® implanted, the optimal reconstruction objective was determined—taking into account the native center of rotation and the average medialization factor induced by acetabular reaming—in relation to the reference point defined by the intramedullary position of the stem obtained during the perioperative phase.

The results of this study show that, for each SPS® size, 95% of the coordinates obtained fall within a 3D sphere with a 10-mm radius. Our engineers have thus been able to complete the extramedullary design of the SPS® Evolution so that its prosthetic center of rotation lies at the center of this distribution, thus facilitating reconstruction as close as possible to the patient's anatomy.



A simple and effective reconstruction

"Simplicity
is supreme
sophistication"

Leonardo Da Vinci

SPS® Evolution: The heart of the system for standard indications

Because the stem was designed to match the average intramedullary and extramedullary patient anatomy, the SPS® Evolution is at the centre of the SPS® system. Thus, you can optimally reconstruct the majority of your patients with the same standard implant.

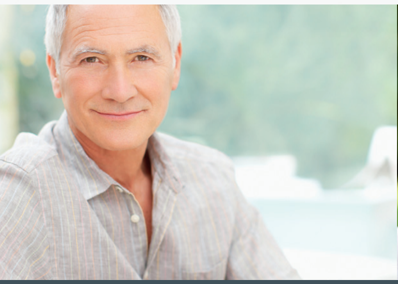
SPS® HA: For Valgus cases

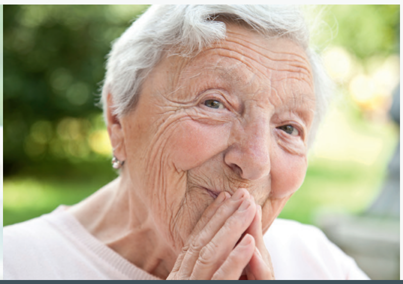
In Valgus cases, the SPS® HA with a 134° CCD angle helps provide a more suitable anatomic solution for this type of indication.

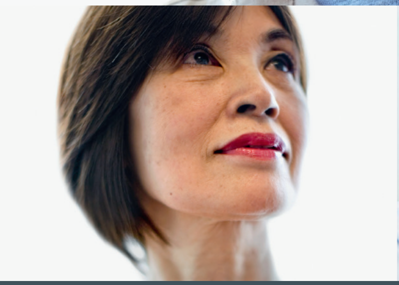
CUSTOM HIP™: Security for complex indications

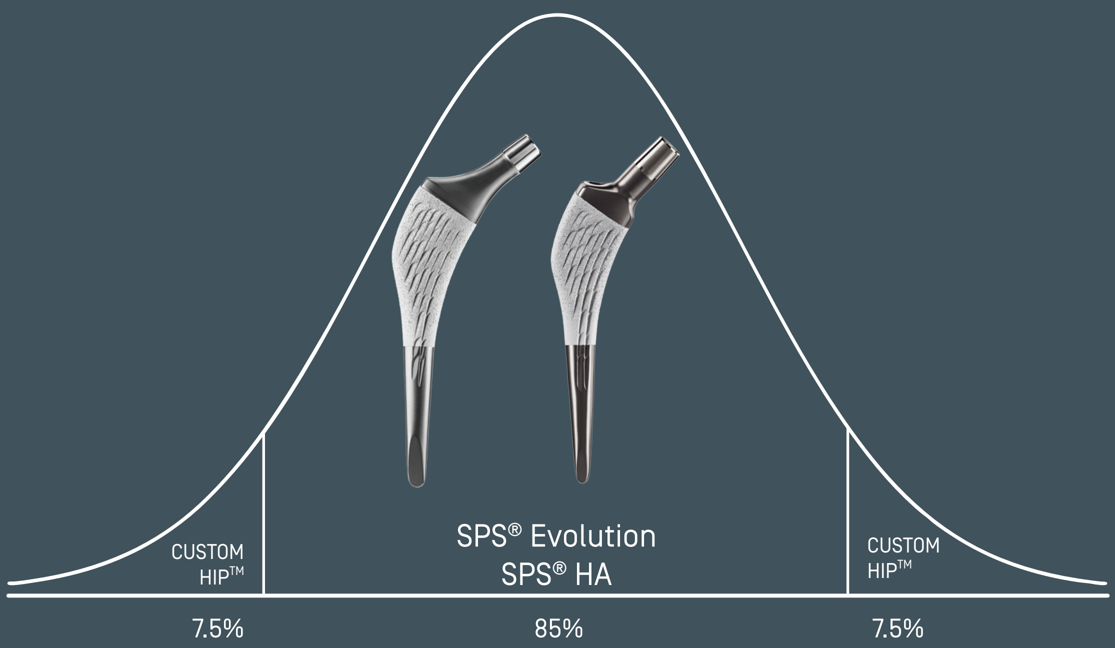
From its results published 15 years post-operatively [1], the CUSTOM HIP™ stem has demonstrated an especially effective response in the treatment of complex indications, such as severe dysplasias[9] or young patients[10]. You therefore have an elegant and safe solution for treating these highly specific and difficult indications.

A solution adapted to each of your patients

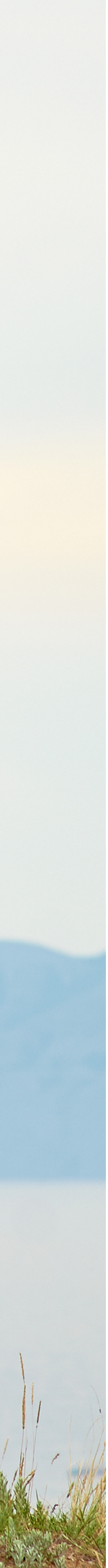








Based on a complete range of implants, the SPS® system in all cases offers the best cost-treatment effectiveness ratio, which is proportional to the actual distribution of your patients' indications.



Anatomic

for improved function

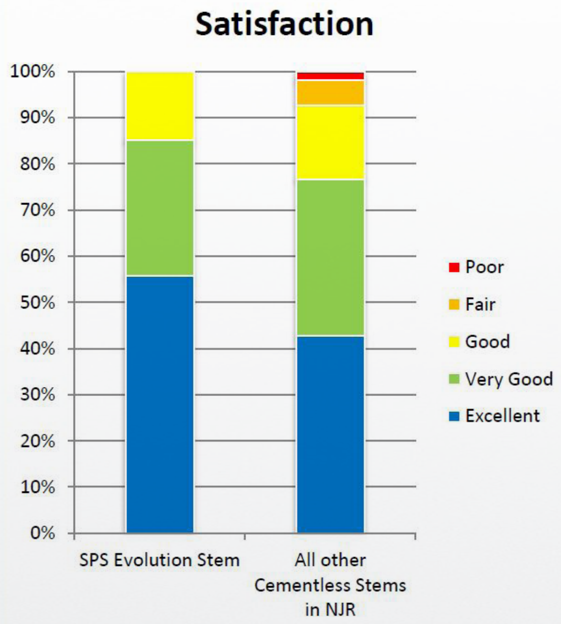
Optimise recovery in the short term

Improve function thanks to a closely controlled reconstruction

Thanks to the system composed of the SPS® Evolution, the SPS® HA and the CUSTOM HIP™, there is always a solution available to you for restoring optimal function to each of your patients.

The planning and control of the reconstruction in 3D using HIP-PLAN® with the SPS® system, enables one to :

- Rapidly restore the efficiency of the abductor muscles as well as normal gait
- Reduce the risk of leg length discrepancy and limping [5][6][11]
- Reduce the risk of postoperative dislocation



SPS® Evolution Patient satisfaction is significantly higher*

compared to other cementless stems from the National Joint Registry**

Chi Squared p-value for difference : <0.001
Answer to 6-months general health question :
How would you describe the results of your operation ?

Benefit from an anatomic stem suitable for minimally-invasive surgery

Thanks to its anatomic design, the SPS® favours conditions for surgery that are less aggressive, preserving the greater trochanter as well as the soft tissues, thus facilitating rapid postoperative recovery of the patient.

* Data from the National Joint Registry (08/2017) p<0.001.

** The data used for this analysis was obtained from the NJR data collection system. The Healthcare Quality Improvement Partnership (HQIP) and / or the National Joint Registry (NJR) are not responsible for the precision, currency, reliability or exactitude of the data used or mentioned in the report, nor are they responsible for the precision, currency, reliability or exactitude of the links or references to other information sources. They make absolutely no guarantees concerning these data, links and references, to the maximum extent permitted by law.

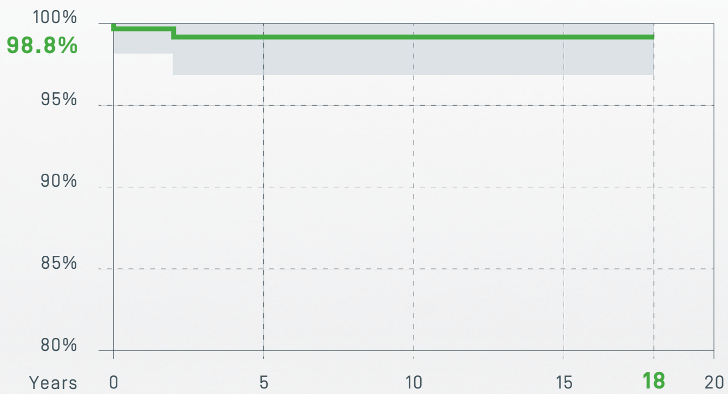
Prepare the conditions for maximum longevity

Preserve bone stock

In favouring a high osteotomy (30°), the SPS® permits the calcar conservation, which represents a bone stock that is important for long-term stability of the implant.

Promote metaphyseal bone remodelling without "stress-shielding"

The excellent metaphyseal contact achieved with the SPS® ensures distribution of the mechanical stresses within the proximal zone[8]. Metaphyseal bone remodelling is thus favoured throughout the lifetime of the implant, thus creating the conditions for maximum longevity.



98.8%
Survivorship of the SPS® HA after 18 years[3]

endpoint: all femoral revisions[3]

Survivorship curve for the SPS® HA stem
Failure = all femoral revisions

Clinical cases

Case n°1 : SPS® with HILOCK cup at 16 years

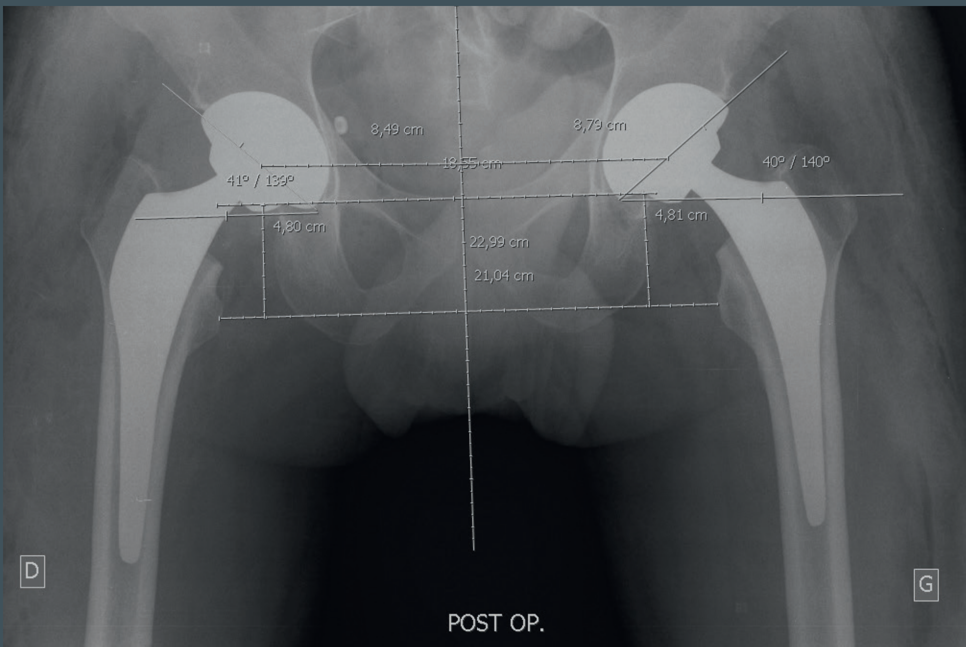
Preoperative x-ray

Postoperative x-ray

Postoperative x-ray (1 year)

Postoperative x-ray (16 years)

CASE N°2 : Bilateral SPS® Evolution with APRIL® cup, postoperative control

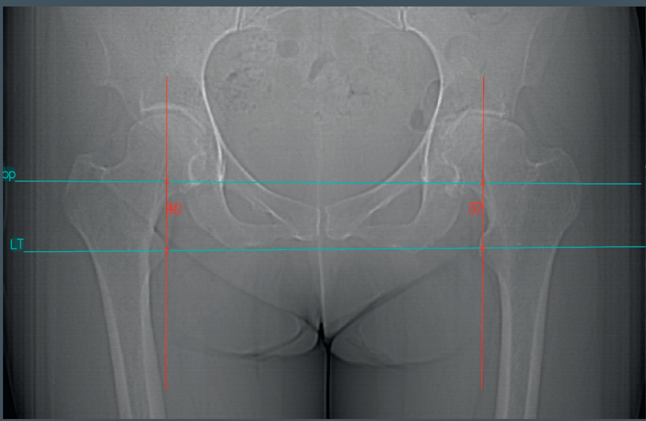


Postoperative front x-ray

Postoperative profile x-ray

Plan SPS® in 3D for greater precision

Case n°3 : SPS® Evolution with APRIL® cup planned and monitored in 3D with HIP-PLAN®

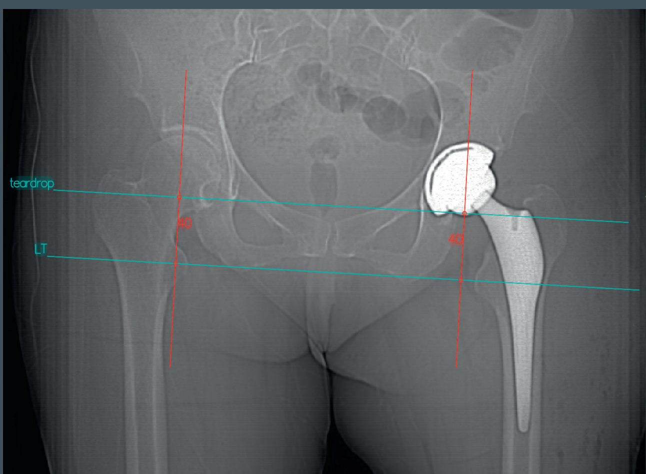


Preoperative planning

2D PLANNING :
Left arthrosis with a leg length difference of -3 mm (intra-articular) on the side to be operated on.

3D PLANNING (HIP-PLAN®) :

- Femoral offset of 41 mm
- Planned lengthening of +4 mm
- Planned lateralisation of +1 mm
- **PLANNED IMPLANTS :**
    - SPS® Evolution E
    - APRIL® 52
    - BIOLOX® Delta Head +0 mm



Postoperative control

2D POSTOP :
Control x-ray reveals correct positioning of the implant. The asymmetry of intra-articular length has been corrected.

3D POSTOP :
FUSION OF PREOP / POSTOP CT SCANS (HIP-PLAN®)

- Achieved lengthening of +3 mm for +4 mm planned
- Achieved lateralisation of +2 mm for +1 mm planned
- **IMPLANTS USED :**
    - SPS® Evolution E
    - APRIL® 52
    - BIOLOX® Delta head +0 mm

APPENDICES

SPS® HA

Cementless anatomic femoral stem.
Titanium alloy (Ti6Al4V-ISO 5832-3).
Coatings : Porous titanium and hydroxyapatite.
12/14 5°40' taper. CCD shaft angle 134°.

Sizes	Right (R)	Left (L)	Length
B	3022 0200	3022 0201	115 mm
C	3022 0300	3022 0301	120 mm
D	3022 0400	3022 0401	124 mm
E	3022 0500	3022 0501	131 mm
F	3022 0600	3022 0601	139 mm
G	3022 0700	3022 0701	146 mm
H	3022 0800	3022 0801	153 mm

SPS® Evolution

Cementless anatomic femoral stem.
Titanium alloy (Ti6Al4V-ISO 5832-3).
Coatings : Porous titanium and hydroxyapatite.
12/14 5°40' taper. CCD shaft angle 129°.

Sizes	Right (R)	Left (L)	Length
B	3023 0200	3023 0201	115 mm
C	3023 0300	3023 0301	120 mm
D	3023 0400	3023 0401	124 mm
E	3023 0500	3023 0501	131 mm
F	3023 0600	3023 0601	139 mm
G	3023 0700	3023 0701	146 mm
H	3023 0800	3023 0801	153 mm

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