

 smith&nephew

**POLARSTEM<sup>®</sup>**

Cementless Stem System



Design Rationale

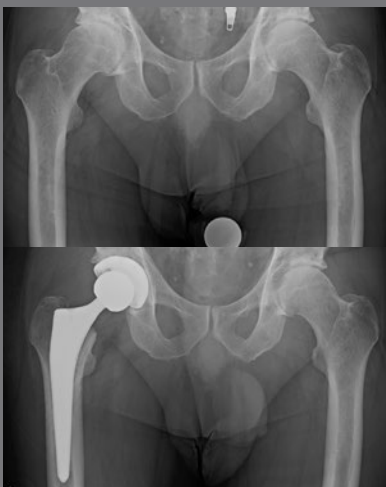
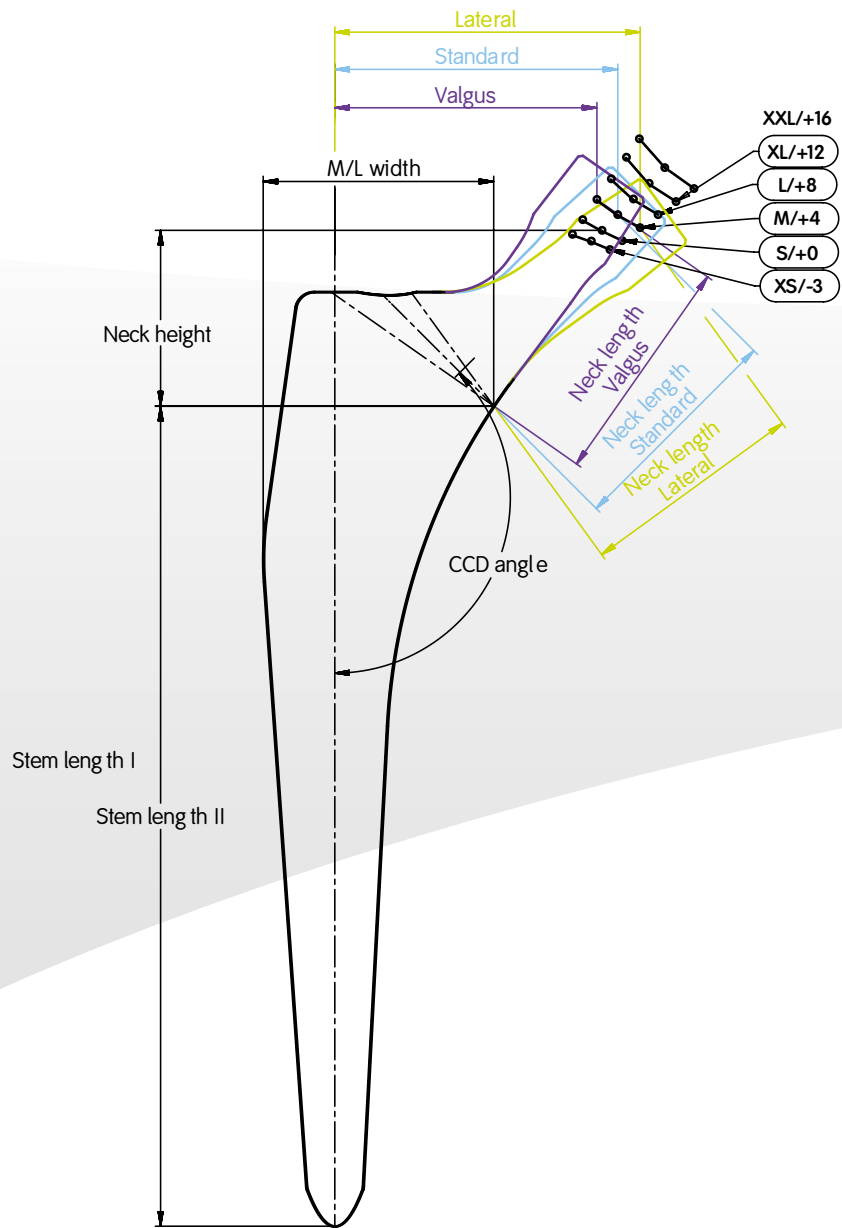
# The Design

## Designed to match femoral anatomy

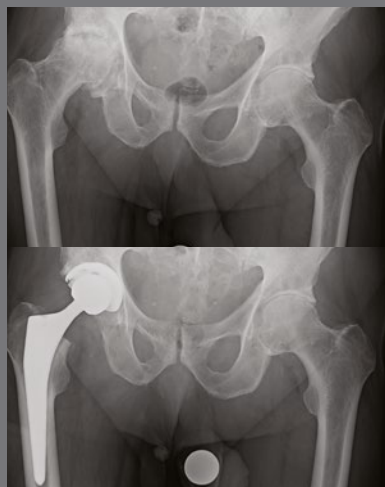
The triple taper, self-locking POLARSTEM<sup>®</sup> design with reinforced proximal body allows for excellent proximal stability. The shortened stem length and narrow distal tip allows for ease of implantation, especially in small intramedullary canals like Dorr Type A femurs.

## Accurate reconstruction of joint biomechanics

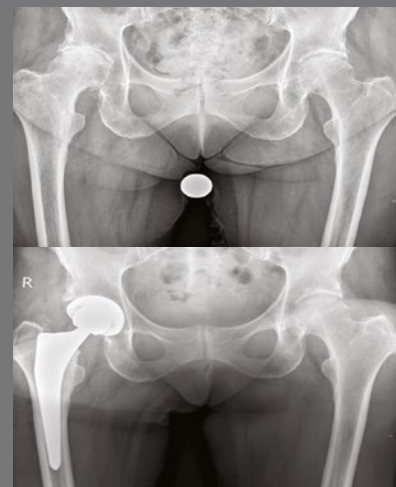
POLARSTEM is a HA coated stem, that offers **three different offset versions** to precisely reconstruct the hip joint respecting the soft tissue environment. The collared stem, offered in both standard and lateral (high offset), provides stability for surgeons who prefer a collared stem design. The valgus version was designed for patients that require a reduced offset option or have difficult valgus anatomy.



Normal Hip

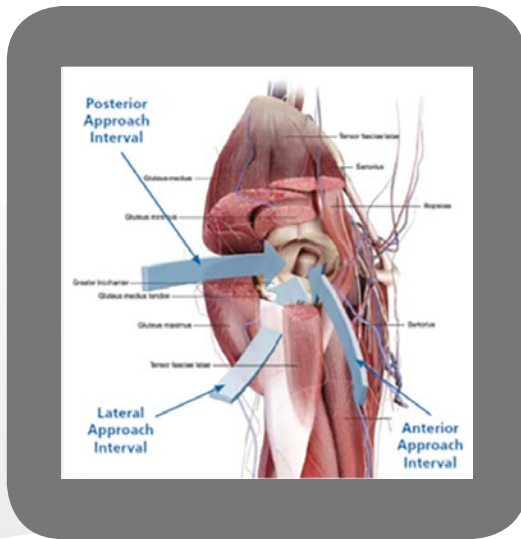


Varus Hip



Valgus Hip

# The Approach



## Challenges in minimally invasive approaches

There is a continuing trend in total hip arthroplasty to reduce damage to the surrounding soft tissues. However, such minimally invasive approaches require specific implant features and instrumentation that allow surgeons to perform surgery while viewing the femur in a different angle.

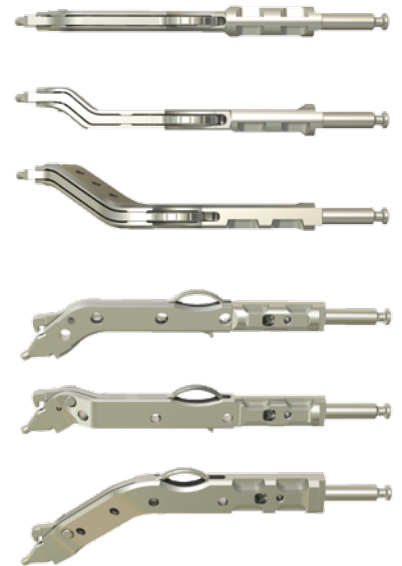
## Implant features and instrument options

POLARSTEM® offers several design features that assist with muscle sparing approaches:

- **Thick proximal area** to help reduce the risk of subsidence
- **Shorter stem length** than other fully HA coated stems
- **Thin distal area with a narrow tip**, making it easier to implant through a smaller incision
- Broaches with **compaction teeth anterior/posterior** and **bone cutting teeth medial/lateral** that allow for an optimal fit between the stem and cortical bone
- **180 microns of ti-plasma spray** plus **50 microns of HA**



A female connection pocket on the broaches gives surgeons the ability to prepare the acetabulum, irrespective of surgical preference, such as the “femur first” technique.



Different versions of adapter handles are available for every surgical approach

# The Bearing

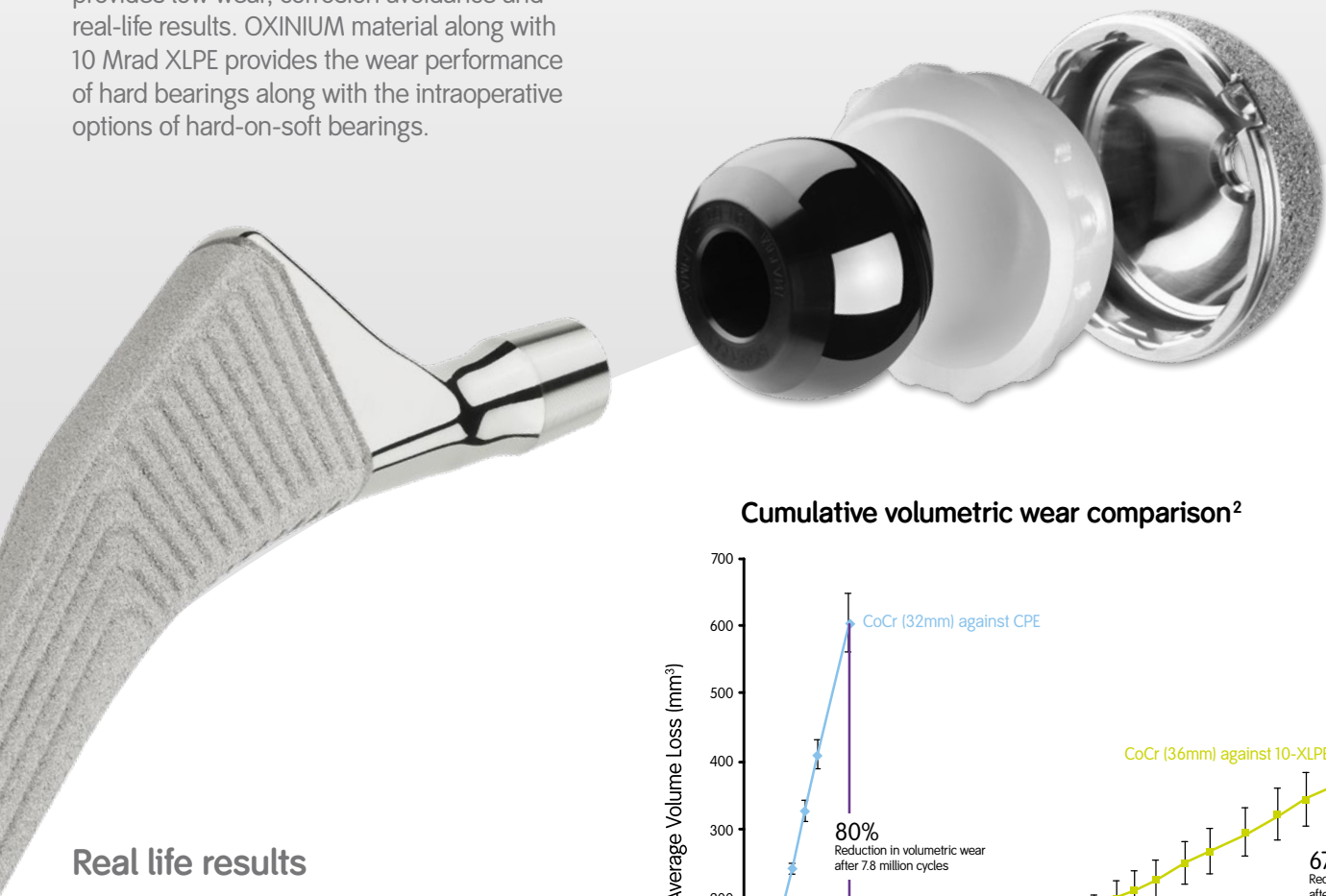
## R3° system with VERILAST® Technology is an advanced bearing option

VERILAST Technology for hips from Smith & Nephew uses the exclusive bearing combination of proprietary OXINIUM® and highly cross-linked polyethylene, which provide a clinically successful, cutting edge solution and biocompatibility without sacrificing versatility or introducing the risk of ceramic-like fracture.<sup>1</sup>

Most importantly, VERILAST Technology provides low wear, corrosion avoidance and real-life results. OXINIUM material along with 10 Mrad XLPE provides the wear performance of hard bearings along with the intraoperative options of hard-on-soft bearings.

## Wear performance

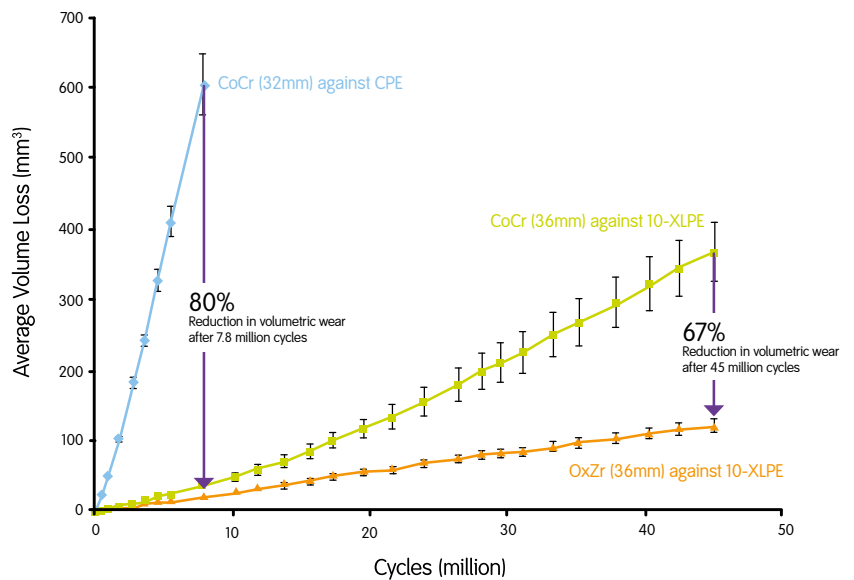
VERILAST Technology for total hip arthroplasty has been tested and shown to provide superior wear performance compared to CoCr on highly crosslinked polyethylene, for up to 45 million cycles.<sup>2</sup> With advanced materials designed to last, VERILAST Technology helps restore patients to their active lifestyles, allowing joint pain to be addressed earlier.



## Real life results

Oxidized Zirconium has a clinical history of more than 10 years. Over 190,000 components have been implanted successfully to date. Impressive clinical wear performance of OXINIUM heads has been reported in global registry data. In the 2014 Australian Registry, the ceramicized metal/cross-linked polyethylene category, which includes the exclusive OXINIUM alloy from Smith & Nephew, had the highest survivorship of all bearing categories at ten years: 96.7%.<sup>1</sup>

## Cumulative volumetric wear comparison<sup>2</sup>



Although the ceramicized metal/cross-linked polyethylene combination has the lowest reported cumulative percent revision at five years this results should be interpreted with caution (Figure HT21 and Table HT24). It is the Registry's view that this articulation cannot be compared to other articulations as it has only been used with a small number of femoral stem and acetabular combinations from a single company. The results should not be compared due to the inability to correct for the confounding effect of the limited number of stem/acetabular combinations.

# Voice of customers

## Dr. William Lutes, US

The POLARSTEM<sup>◊</sup> provides me with a stem that can accurately address most femur types while effectively restoring the patient back to his or her normal kinematics. Also, the predictability of the POLARSTEM is something I have learned to count on in my OR as broach to stem placement is very accurate.<sup>3</sup>

## Dr. Arnaud Fiquet, designer from Groupe GILES, France

In the Groupe GILES, we have implanted a large number of Corail™ stems and have had to revise them due to thigh pain. The design of the POLARSTEM was the result of our Corail stem experience. One of our major worries with this stem (Corail) was the offset – medialization. Another problem that we sometimes encountered was the need to ream distally because of a narrow diaphysis otherwise the stem could not be fully seated.<sup>4</sup>

## Mr. Philip John Roberts, UK

I have been a Corail user for the past 13 years and I have done over 2,500 Corail stems. I've been using the POLARSTEM now for the last two years. The Corail is teaching about preserving bone, it's about not having a fit and fill policy, but subsidence can be a major problem. The proximal bulk of the POLARSTEM is significant. From my perspective, with the POLARSTEM being rougher than the Corail, it means you get quicker bone integration to the stem. A well designed stem!<sup>5</sup>

### Corail™

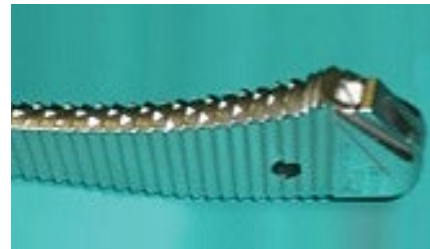
is designed to seat in cancellous bone only, cortical contact should be avoided!



Corail broaches have no cutting teeth but compaction grooves only

### POLARSTEM<sup>◊</sup>

is designed according the self-locking concept with cortical contact in M/L



POLARSTEM rasps have cutting teeth M/L

# Dimensions

## Specification (mm)

Size	Stem length I	Stem length II	M/L width	Valgus	Standard	Lateral
0	125	107	29	145	135	
1	132	114	31	145	135	126
2	136	118	32	145	135	126
3	139	122	34	145	135	126
4	143	125	35	145	135	126
5	147	129	36	145	135	126

Size	Stem length I	Stem length II	M/L width	Valgus	Standard	Lateral
6	151	133	38	145	135	126
7	155	137	38	145	135	126
8	159	141	40		135	126
9	163	145	41		135	126
10	167	149	43		135	126
11	171	154	44		135	126

## Neck height – Valgus / Standard / Lateral (mm)

Size	XS/-3			S/+0			M/+4			L/+8			XL/+12		
0	28	24		30	28		32	30		35	33		38	35	
1	28	26	25	30	28	26	32	30	28	35	33	30	38	35	32
2	28	26	25	30	28	26	32	30	28	35	33	30	38	35	32
3	28	26	25	30	28	26	32	30	28	35	33	30	38	35	32
4	28	26	25	30	28	26	32	30	28	35	33	30	38	35	32
5	28	26	25	30	28	26	32	30	28	35	33	30	38	35	32
6	28	26	25	30	28	26	32	30	28	35	33	30	38	35	32
7	28	26	25	30	28	26	32	30	28	35	33	30	38	35	32
8		26	25		28	26		30	28		33	30		35	32
9		26	25		28	26		30	28		33	30		35	32
10		26	25		28	26		30	28		33	30		35	32
11		26	25		28	26		30	28		33	30		35	32

## Neck offset – Valgus / Standard / Lateral (mm)

Size	XS/-3			S/+0			M/+4			L/+8			XL/+12		
0	34	35		36	37		38	39		40	42		42	44	
1	35	38	41	36	39	43	38	42	45	40	44	48	42	47	51
2	36	39	41	37	40	43	39	43	46	41	45	49	43	48	52
3	36	39	42	38	41	44	40	43	47	42	46	50	44	48	53
4	37	40	43	38	42	45	40	44	48	42	46	50	44	49	53
5	38	41	43	39	42	45	41	45	48	43	47	51	45	50	54
6	38	41	44	40	43	46	42	45	49	44	48	52	46	50	54
7	39	42	45	40	43	46	42	46	49	44	48	52	46	51	55
8		42	45		44	47		46	50		49	53		51	56
9		43	46		45	48		47	51		50	53		52	57
10		44	47		45	48		48	51		50	54		53	57
11		44	47		46	49		48	52		51	55		53	57

## Neck length – Valgus / Standard / Lateral (mm)

Size	XS/-3			S/+0			M/+4			L/+8			XL/+12		
0	30	27		32	29		36	33		39	36		43	40	
1	30	29	29	32	32	32	36	35	35	39	39	39	43	42	42
2	30	29	29	32	32	32	36	35	35	39	39	39	43	42	42
3	30	29	29	32	32	32	36	35	35	39	39	39	43	42	42
4	30	29	29	32	32	32	36	35	35	39	39	39	43	42	42
5	30	29	29	32	32	32	36	35	35	39	39	39	43	42	42
6	30	29	29	32	32	32	36	35	35	39	39	39	43	42	42
7	30	29	29	32	32	32	36	35	35	39	39	39	43	42	42
8		29	29		32	32		35	35		39	39		42	42
9		29	29		32	32		35	35		39	39		42	42
10		29	29		32	32		35	35		39	39		42	42
11		29	29		32	32		35	35		39	39		42	42

