

# How does patient outcomes influence the design of implants? Why did we design the POLARSTEM?

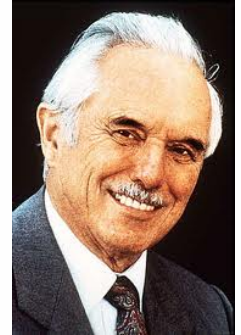


Dr A. FIQUET

Clinique Protestante de LYON

**Groupe GILES**

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# History of Development - Philosophy

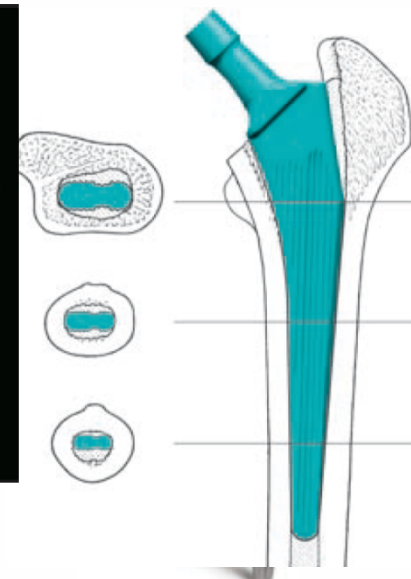
old Charnley



Müller "Banana"



Müller Straight



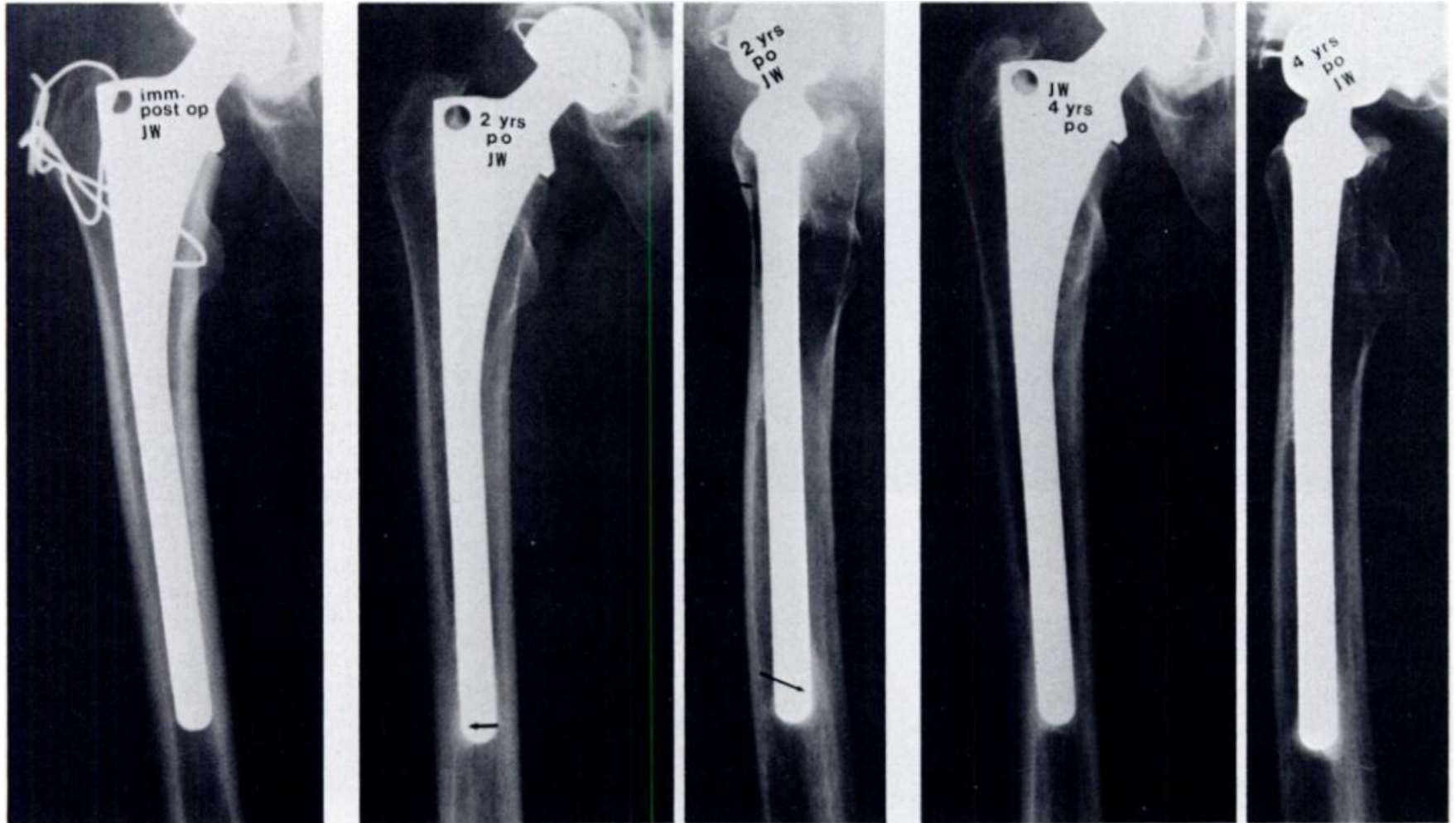
Cemented stems, fully surrounded with cement

**Bony contact in M/L**

\* SOURCE ZIMMER

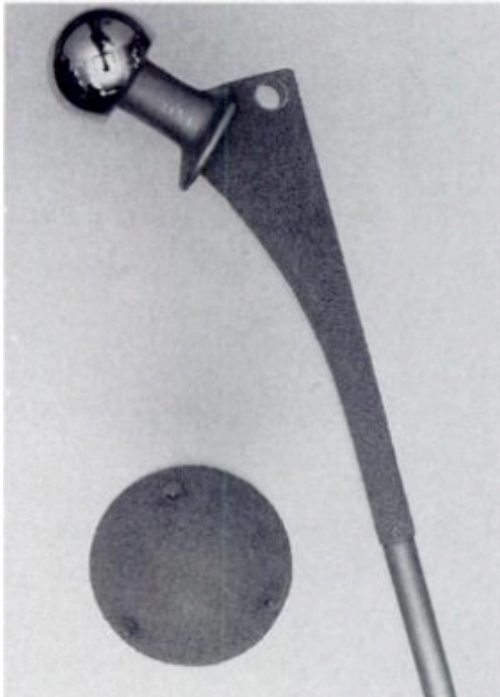


# History of Development

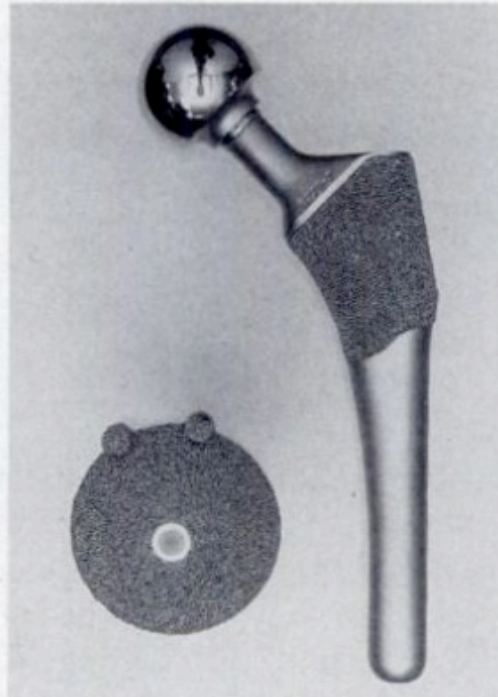


From 'Porous-coated hip replacement', C.A. ENGH, J.D. BOBYN, A.H. GLASSMAN  
JBJS Br, Vol69-B, N°1, January 1987

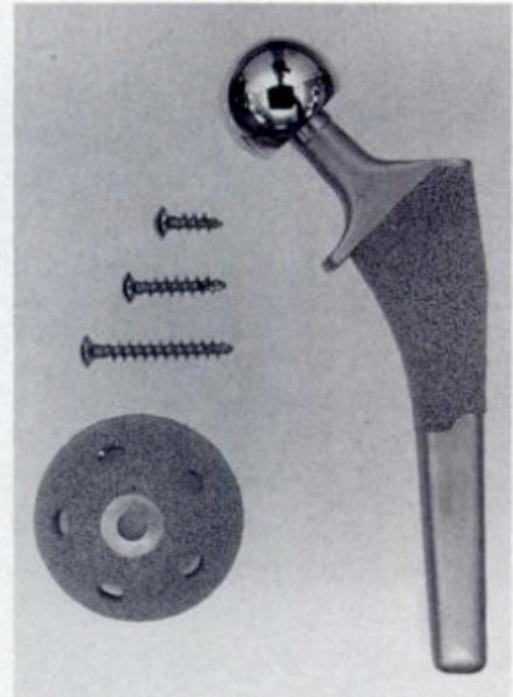
# History of Development



AML, Depuy



PCA, Depuy



LSF, Implant Technology

From 'A comparison of 3 varieties of non cemented porous-coated hip replacement',  
R.J. Haddad, S. D. COOK, M. R. BRINKER, JBJS Br, Vol 72-B, N°1, January 1990

# History of Development

Anatomic

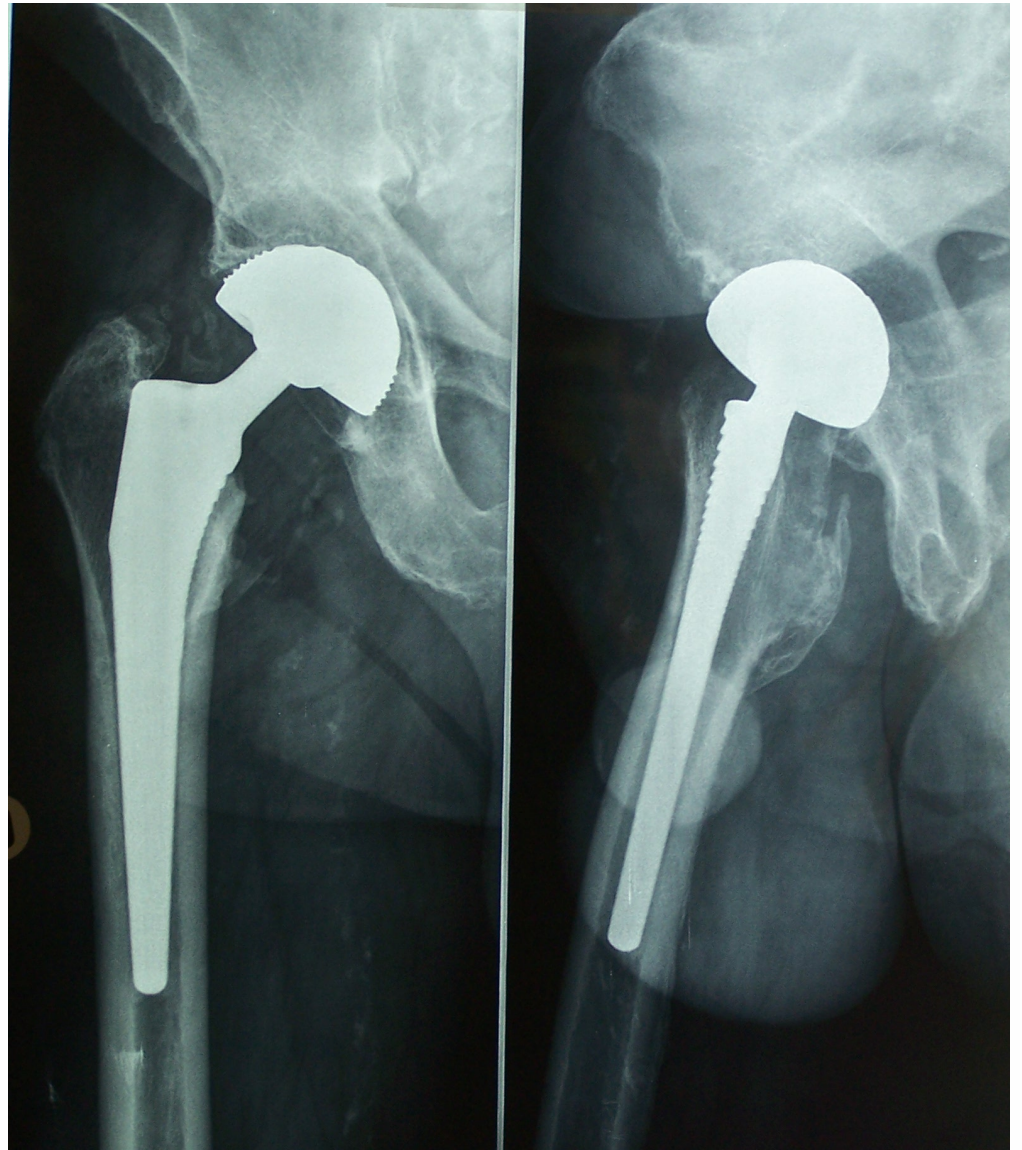


Straight



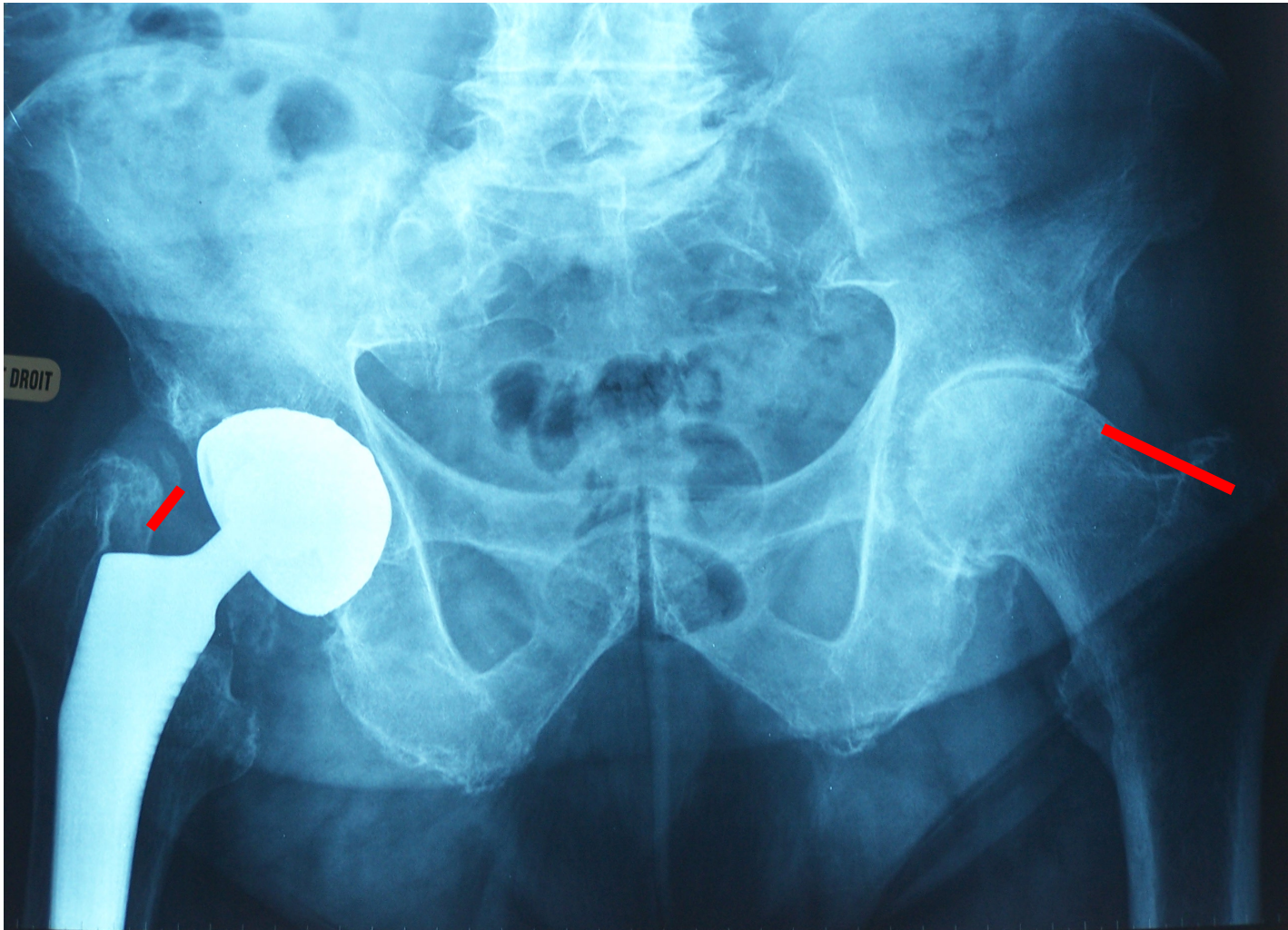


# History of Development



# History of Development

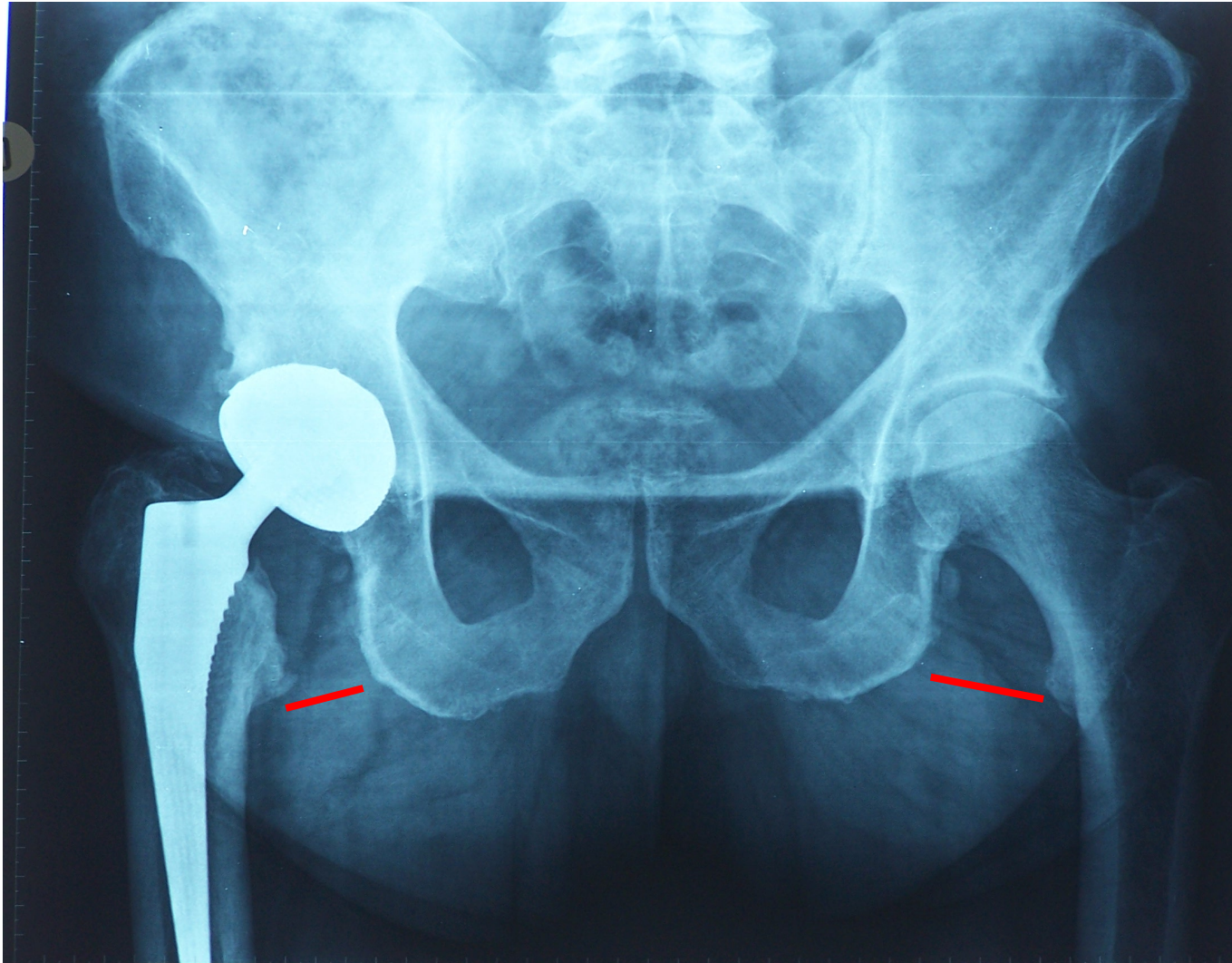
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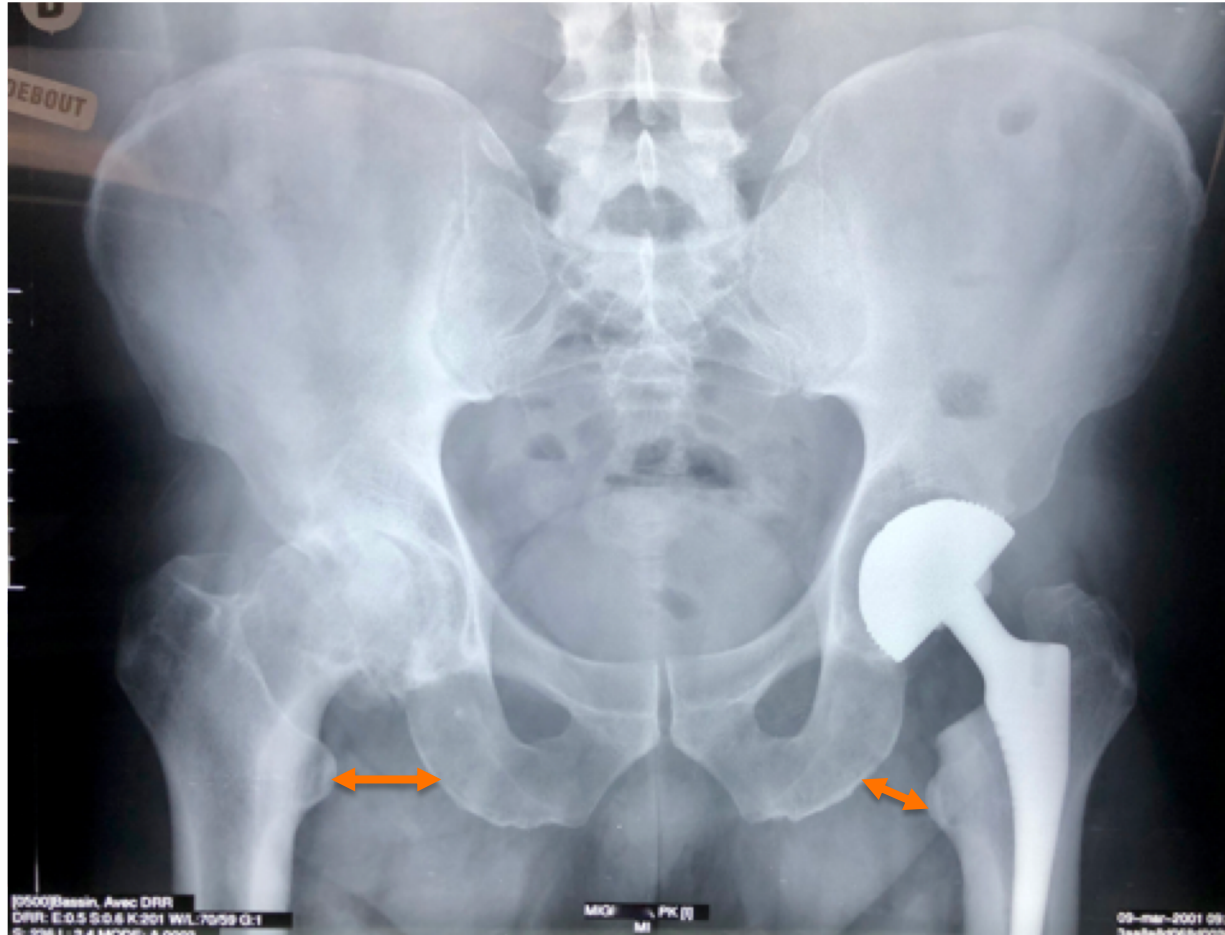




# History of Development

## OFFSET PROBLEM







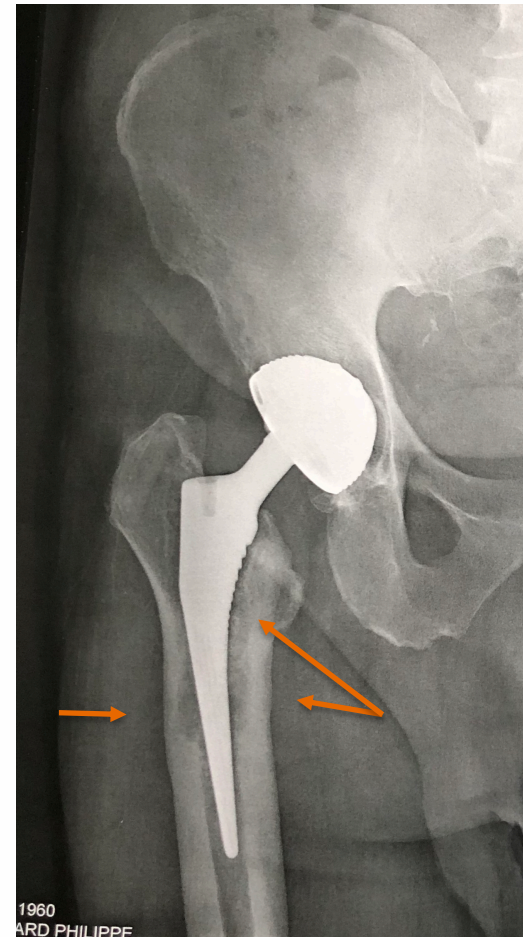
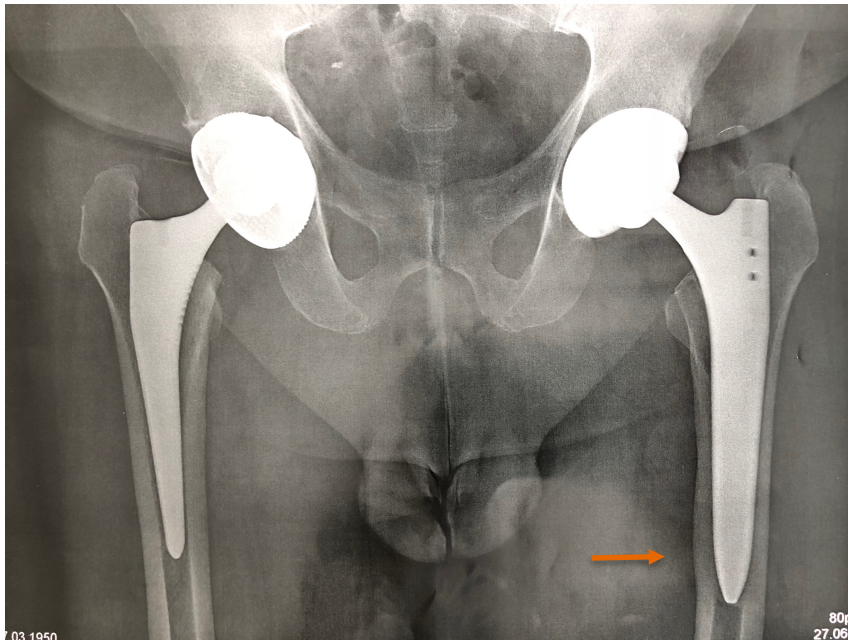
# History of Development



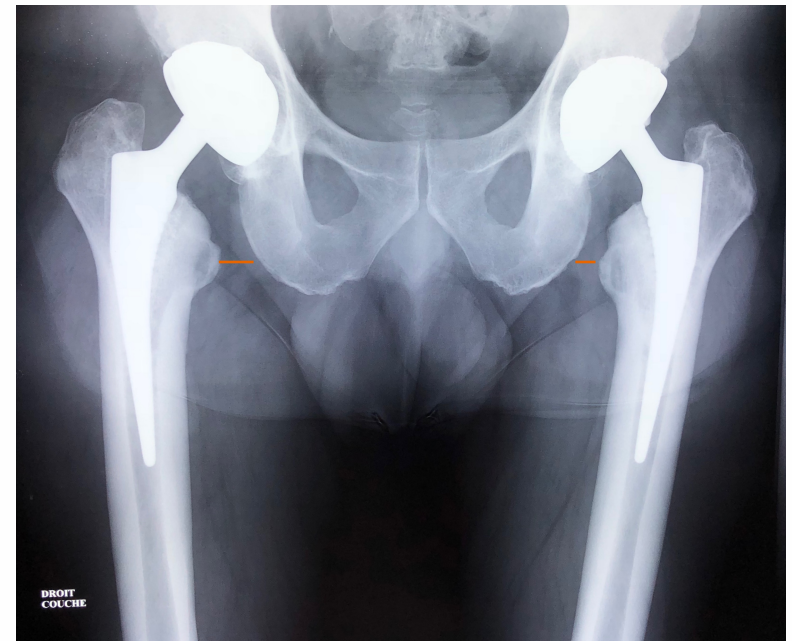
NARROW DIAPHYSIS

# History of Development

## NARROW DIAPHYSIS

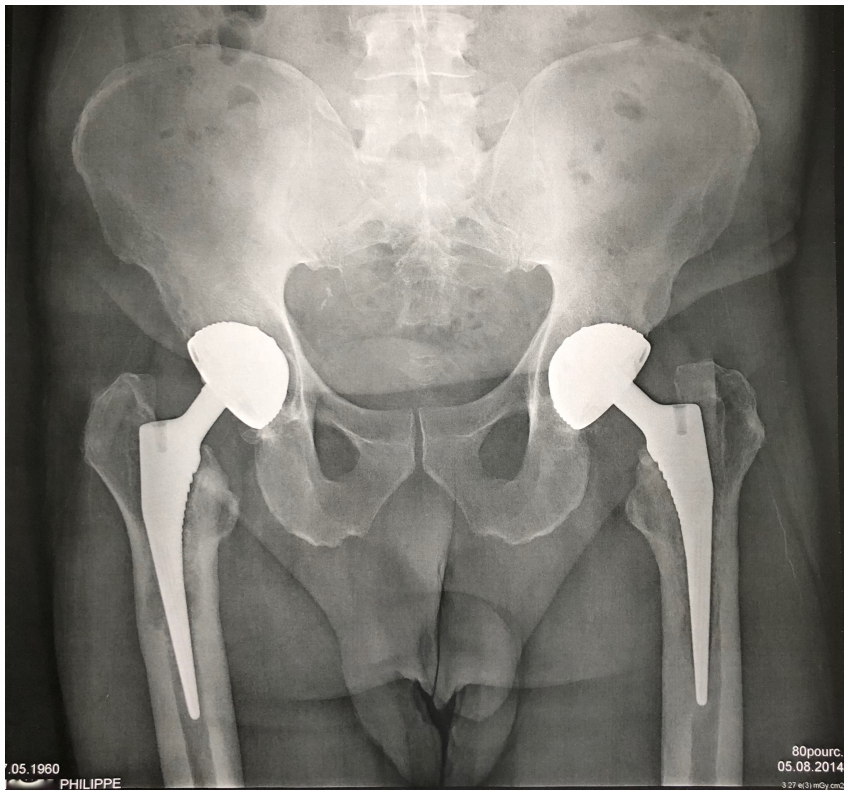


OFFSET PROBLEM + NARROW DIAPHYSIS = 😞

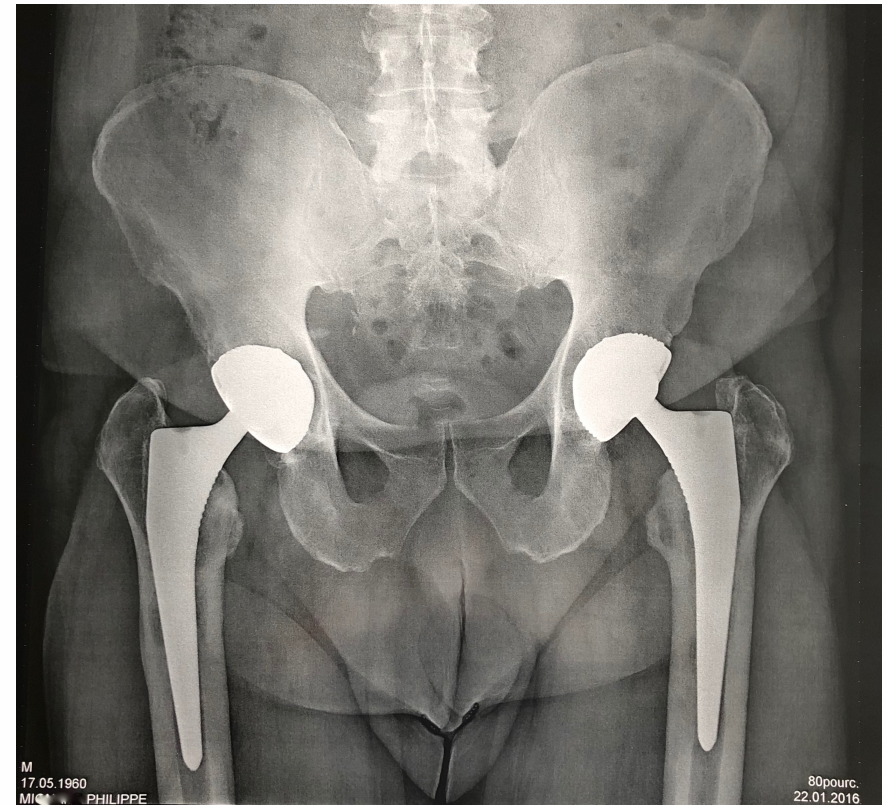
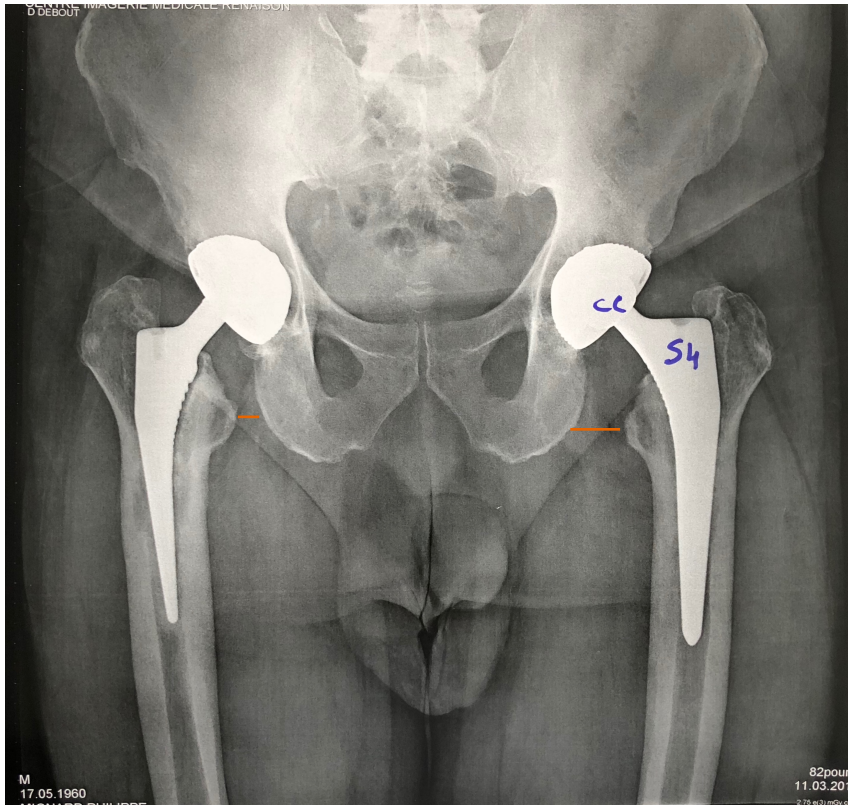




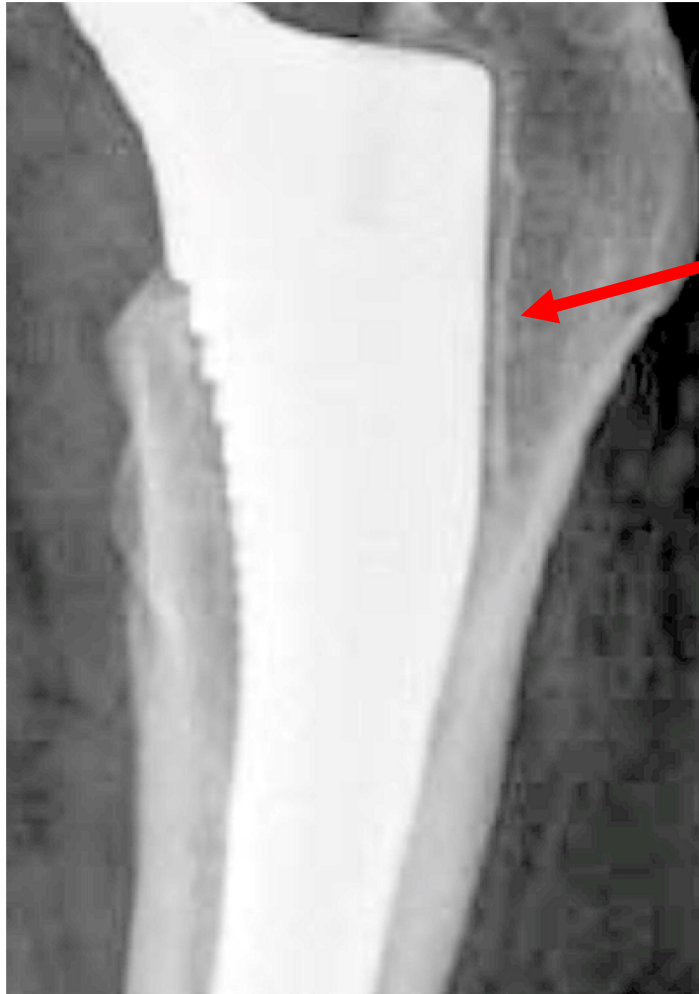
OFFSET PROBLEM + NARROW DIAPHYSIS = 😞



OFFSET PROBLEM + NARROW DIAPHYSIS = 😞



# History of Development



RADIOLUCENT  
LOOSENING



# History of Development



1977: cemented  
Müller Geradschaft



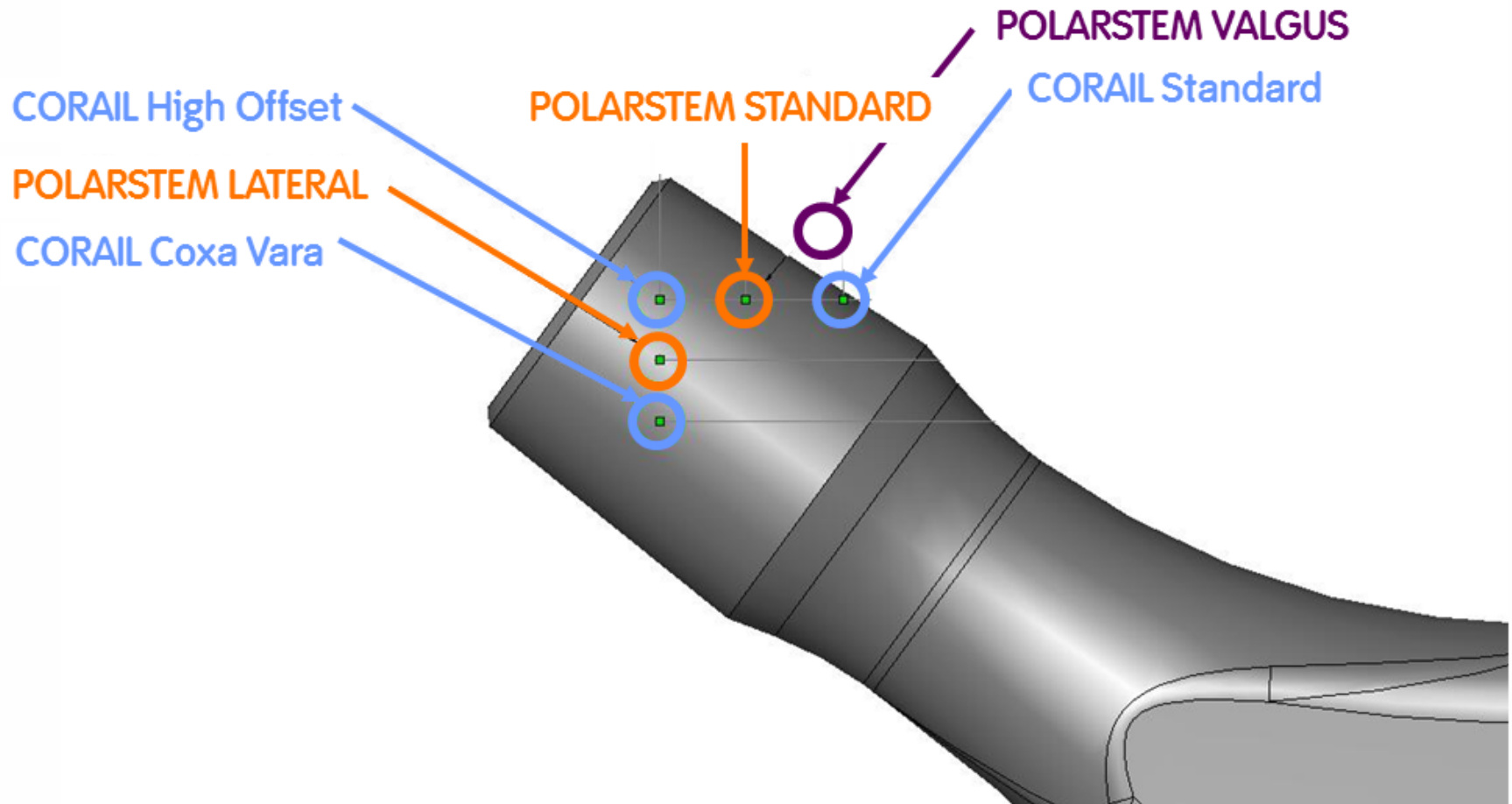
1986: cementless  
fully HA coated  
CORAIL stem



2002: cementless fully  
HA coated &  
cemented  
POLARSTEM™

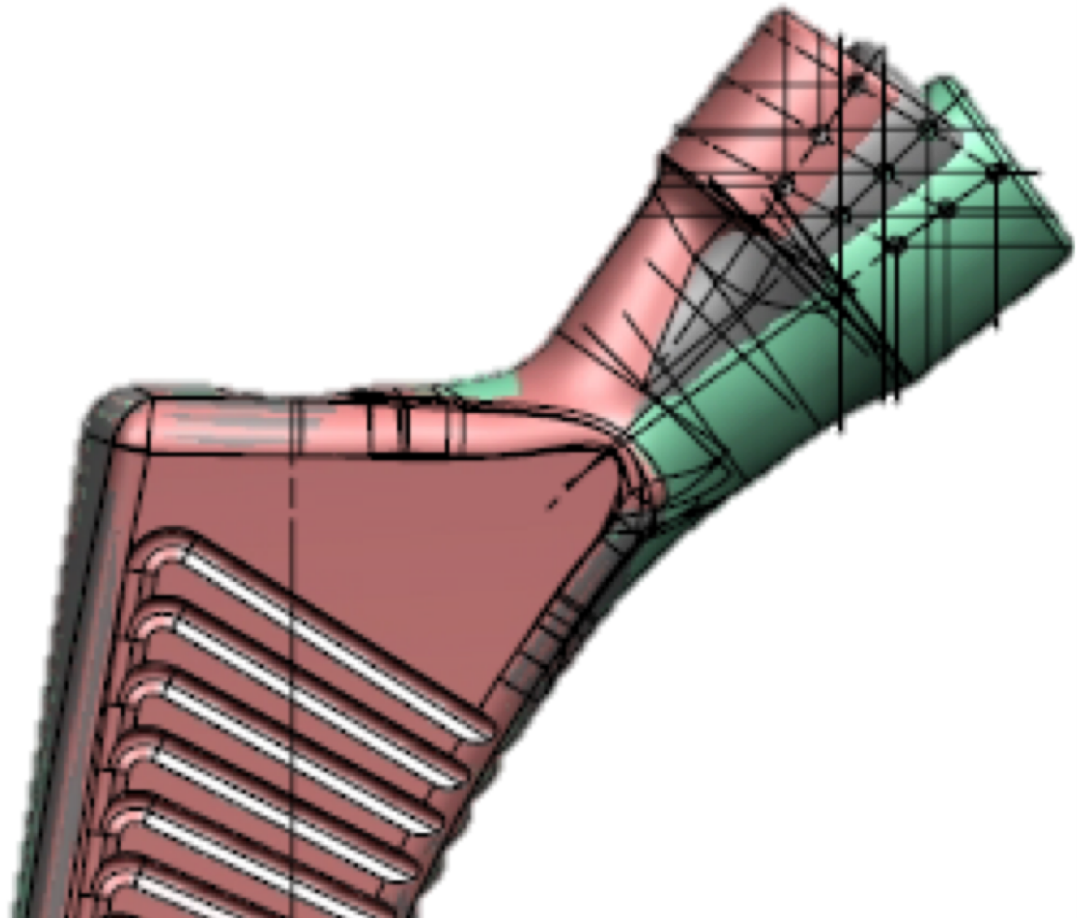


# POLARSTEM Offset vs CORAIL

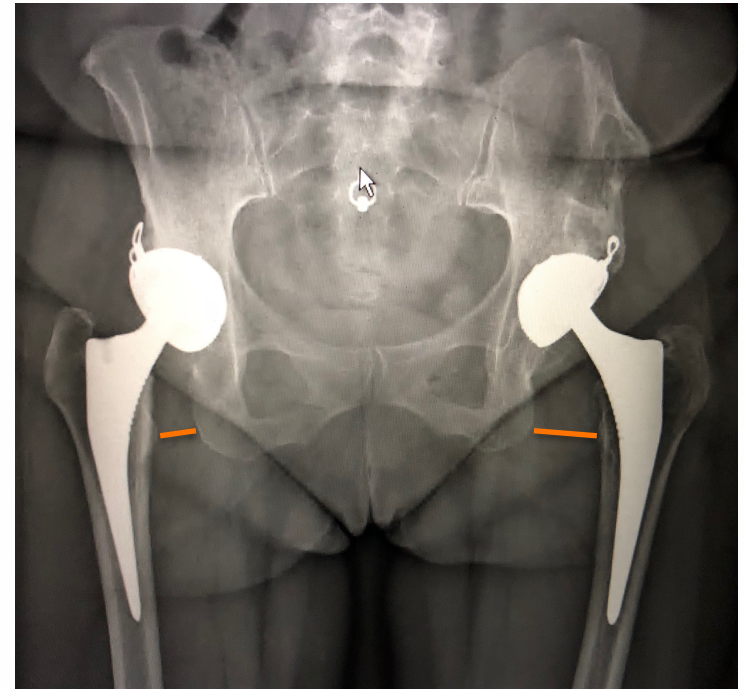
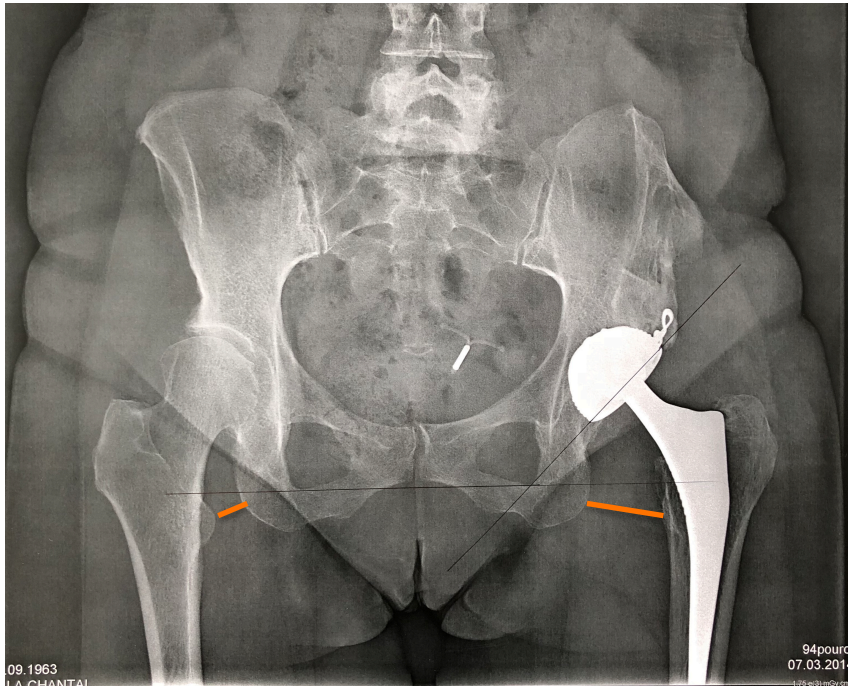


# POLARSTEM

neck shaft angle  
and offset ratio,  
keeping stem body  
unchanged

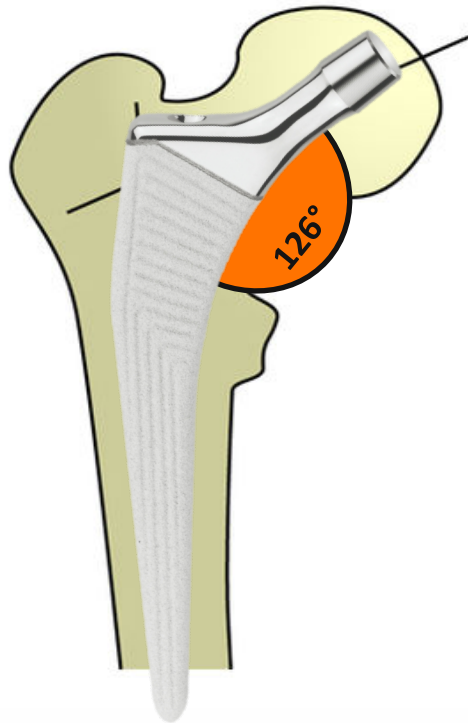


## VALGUS OFFSET

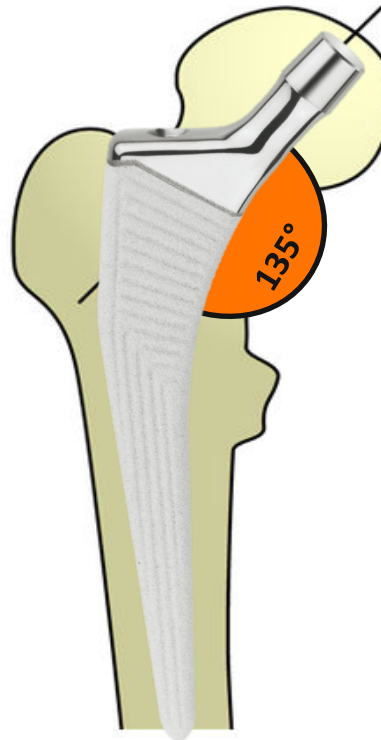


# POLARSTEM VARUS - STD - VALGUS

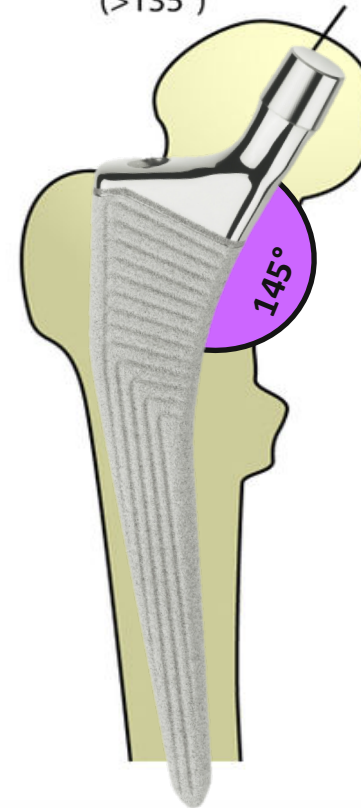
Coxa vara  
( $<120^\circ$ )



Normal  
( $120^\circ$ - $135^\circ$ )



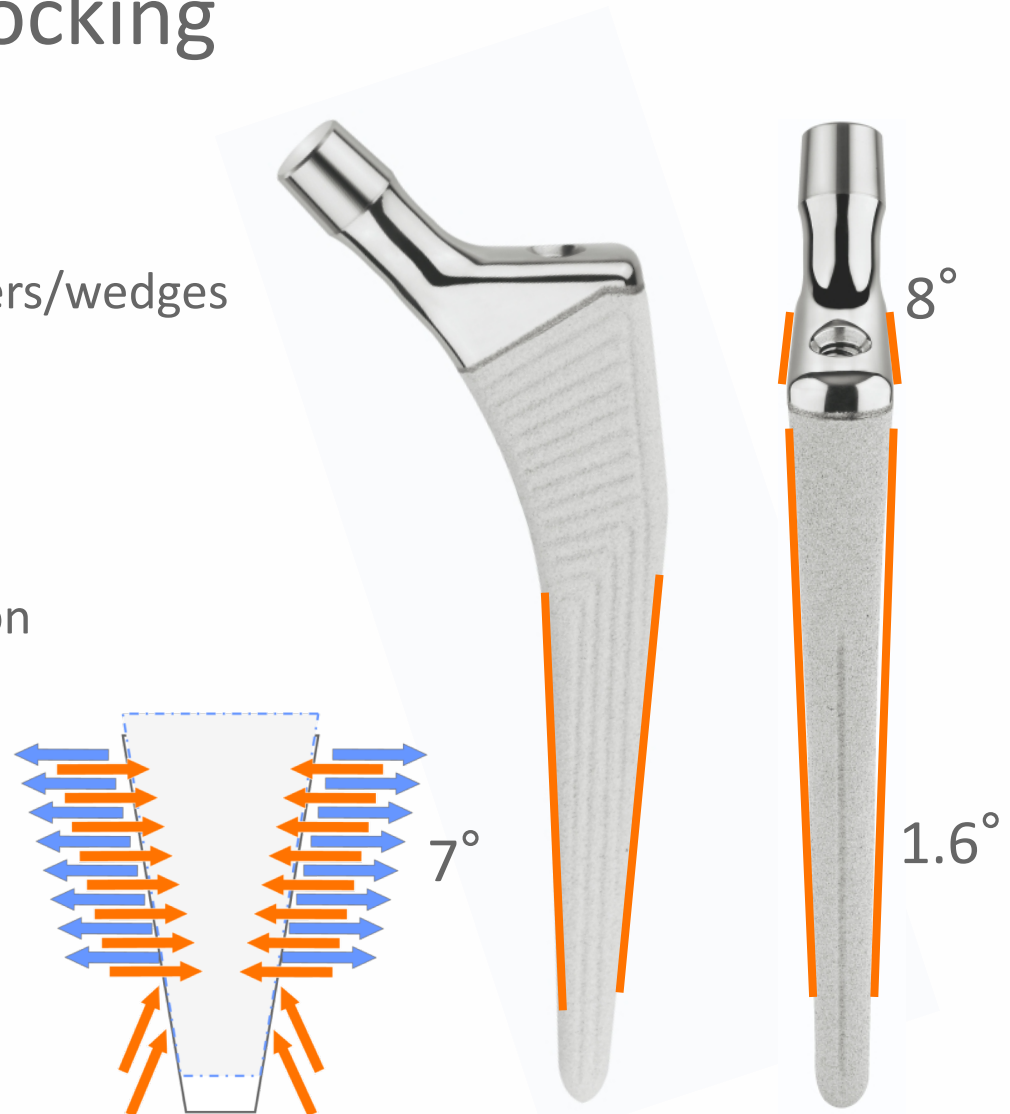
Coxa valga  
( $>135^\circ$ )



# POLARSTEM™ - self locking

## Triple Taper

- Transverse, coronal & sagittal tapers/wedges
- Proximal bone loading
- Excellent rotational stability
- Created forces accelerate bone growth with better stress allocation





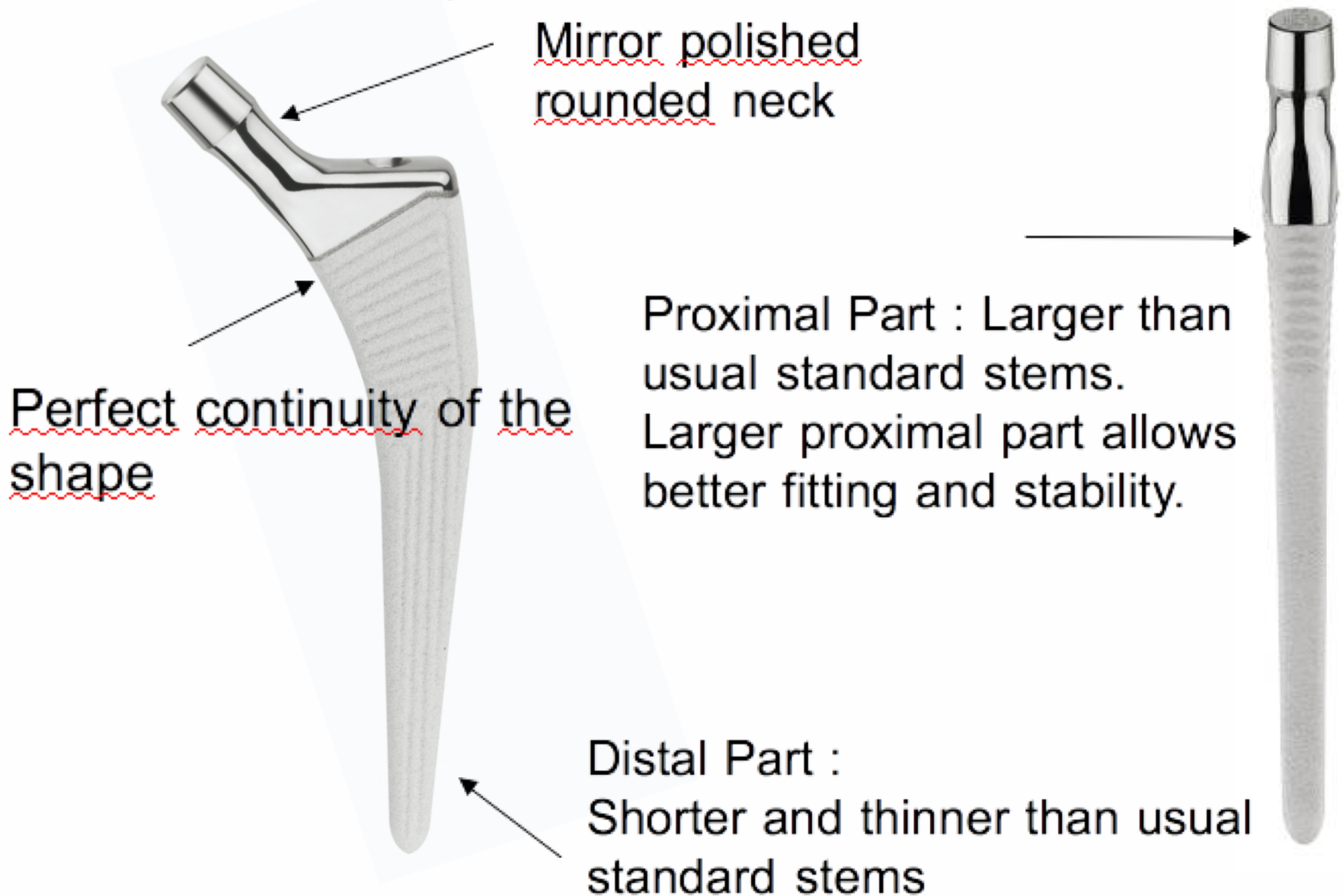
# POLARSTEM™ - stable

## Surface Structure

- Proximal grooves perpendicular to load transmission
- Open porous Ti-Plasma coating for primary stability
- Thin HA layer for quick osseointegration



# Polarstem design

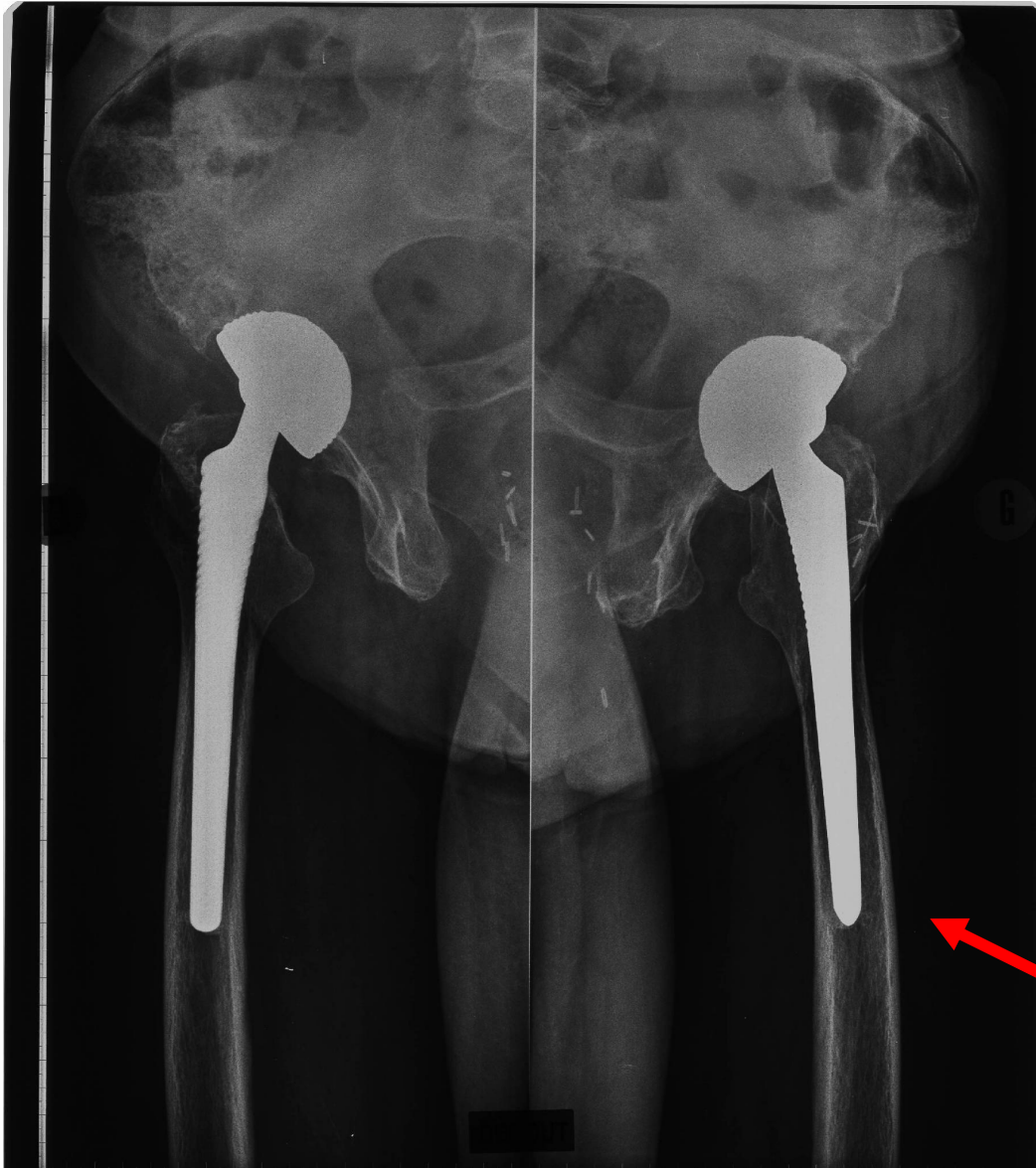




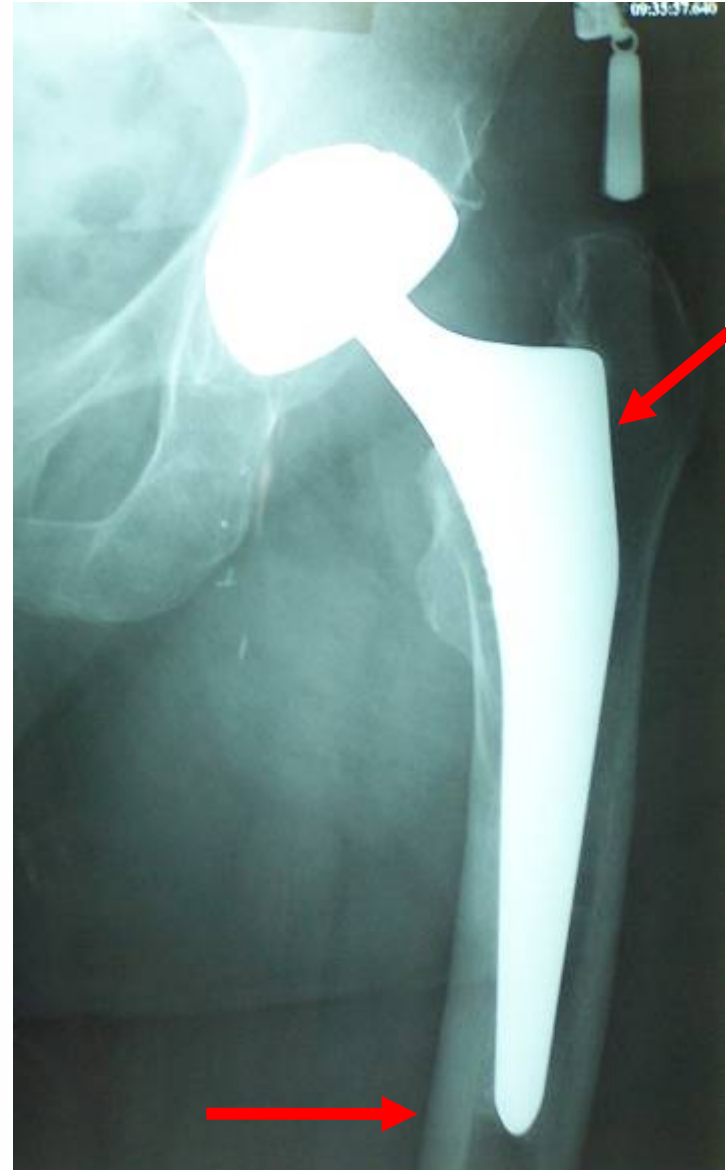
# Polarstem design



# Polarstem design



# Polarstem design



## **Results of a retrospectively reviewed 502 consecutive THRs performed at 3 centers between 2002 and 2005**

**The Kaplan-Meier Survivorship Estimate at 10 years follow-up was 99.1% (95% CI, 97.6-99.7) with revision of the femoral stem for any reason**

There were 4 revisions of the femoral stem component :

- Periprosthetic fracture with loosening of the stem at 14 days
- Bipolar loosening at 24.2 months
- Periprosthetic fracture at 1.1 months
- Femoral bone fracture at 61.2 months

The 2018 Annual Report of the English Register has been published today.

It confirms for the POLARSTEM / R3 at 7-year a revision rate of 0.97%, ie the lowest rate of all THA in the UK, Welsh, Northern Ireland and UK markets. 'Isle of man...

Uncemented									
Accolade / Trident	26,073	66 (59-73)	44	0.95 (0.84-1.08)	1.91 (1.75-2.09)	2.61 (2.41-2.83)	3.13 (2.89-3.38)	4.46 (4.04-4.92)	5.24 (4.37-6.28)
Corail / Duraloc Cementless Cup	4,053	70 (64-75)	39	0.77 (0.54-1.09)	1.71 (1.35-2.16)	2.51 (2.07-3.06)	3.60 (3.05-4.25)	5.58 (4.83-6.43)	9.69 (8.27-11.35)
Corail / Pinnacle	137,857	66 (59-73)	45	0.79 (0.75-0.84)	1.60 (1.53-1.67)	2.44 (2.34-2.53)	3.64 (3.50-3.77)	5.96 (5.72-6.22)	
Corail / Trilogy	3,030	68 (61-74)	40	0.65 (0.41-1.01)	1.15 (0.82-1.62)	1.65 (1.23-2.21)	2.23 (1.71-2.90)	3.45 (2.65-4.49)	4.53 (3.24-6.32)
Corail / ASR Resurfacing Cup	2,633	61 (54-67)	54	1.07 (0.74-1.54)	7.51 (6.56-8.59)	23.40 (21.81-25.09)	35.48 (33.64-37.38)	43.54 (41.57-45.57)	
Corail / Pinnacle Gription	6,089	67 (58-75)	40	1.00 (0.77-1.30)	1.77 (1.39-2.24)	2.21 (1.68-2.89)	2.97 (2.08-4.22)		
Furlong HAC Stem / CSF	17,173	69 (62-76)	40	1.06 (0.92-1.23)	1.76 (1.58-1.98)	2.15 (1.94-2.39)	2.67 (2.43-2.94)	3.60 (3.30-3.94)	5.05 (4.47-5.71)
Furlong HAC Stem / Furlong HAC CSF Plus	22,253	66 (59-73)	45	1.13 (1.00-1.28)	1.84 (1.66-2.03)	2.15 (1.95-2.36)	2.48 (2.26-2.74)	2.89 (2.31-3.61)	
Polarstem Cementless / R3 Cementless	8,543	66 (58-73)	46	0.60 (0.45-0.79)	0.93 (0.73-1.19)	0.97 (0.75-1.24)	0.97 (0.75-1.24)		
SL-Plus Cementless Stem / EP-Fit Plus	5,402	66 (59-73)	43	1.24 (0.97-1.57)	2.61 (2.21-3.09)	3.78 (3.27-4.35)	4.45 (3.89-5.08)	5.83 (5.14-6.62)	
Synergy Cementless Stem / R3 Cementless	3,348	65 (57-71)	51	0.97 (0.69-1.37)	1.42 (1.05-1.91)	1.95 (1.45-2.64)	3.50 (2.40-5.09)		
Taperloc Cementless Stem / Exceed ABT	22,851	65 (58-72)	44	1.07 (0.94-1.21)	1.52 (1.36-1.70)	1.83 (1.65-2.04)	2.12 (1.90-2.37)	2.16 (1.93-2.42)	
Anthology / R3 Cementless	4,042	63 (54-70)	42	1.13 (0.84-1.51)	1.60 (1.23-2.07)	2.30 (1.77-2.99)	3.57 (2.56-4.98)		
Metafix Stem / Trinity	4,403	64 (56-70)	46	0.80 (0.57-1.13)	1.44 (1.09-1.90)	1.80 (1.33-2.43)	1.80 (1.33-2.43)		
M/L Taper Cementless / Continuum	5,406	61 (53-68)	49	1.17 (0.92-1.50)	1.79 (1.45-2.20)	2.15 (1.74-2.64)	2.31 (1.86-2.87)		
M/L Taper Cementless / Trilogy IT	3,748	64 (55-70)	51	1.00 (0.72-1.38)	2.27 (1.75-2.93)	2.27 (1.75-2.93)			
Furlong Evolution Cementless / Furlong HAC CSF Plus	3,463	62 (52-70)	40	1.19 (0.87-1.63)	1.76 (1.31-2.35)	1.94 (1.45-2.61)			

# Thanks !

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## G.I.L.E.S Group

(ex-assistants of  
Pr. Gilles BOUSQUET)



Dr Bauchu, Dr Girardin, Dr Noyer, Dr Cyprès, Dr Bonnard, Dr Fiquet

All surgeons of G.I.L.E.S GROUP are issued from Pr Bousquet's school in Saint-Etienne using this concept for many years, some from 1977.

The **Polarcup**® and **Polarstem**® range is the second generation of implants summarising experience, know-how and wishes.