

Preoperative planning of THA: Must this essential part of the procedure be necessarily performed by the orthopaedic surgeon? Is the templating influenced by the implant design? A prospective study about 200 THA using 3 different stem designs.

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Background

Templating in THA is essential for accurately predicting the optimal size of the implants required. Preoperative planning decreases the risk of implant undersizing or oversizing, facilitates intraoperative orientation and also reduces the risk of potential complications. To our knowledge, it is unclear if planning is influenced by the background of planner and/or the implant design.

Objectives

The first objective of the present study was to check the reproducibility of our preoperative digital 2D templating and to compare the accuracy between three independent planners with different clinical experiences : orthopedic surgeon (OS), orthopedic resident (OR) and data manager (DM).

The other aim of this study was to compare the effect of three different femoral component designs on preoperative planning accuracy.

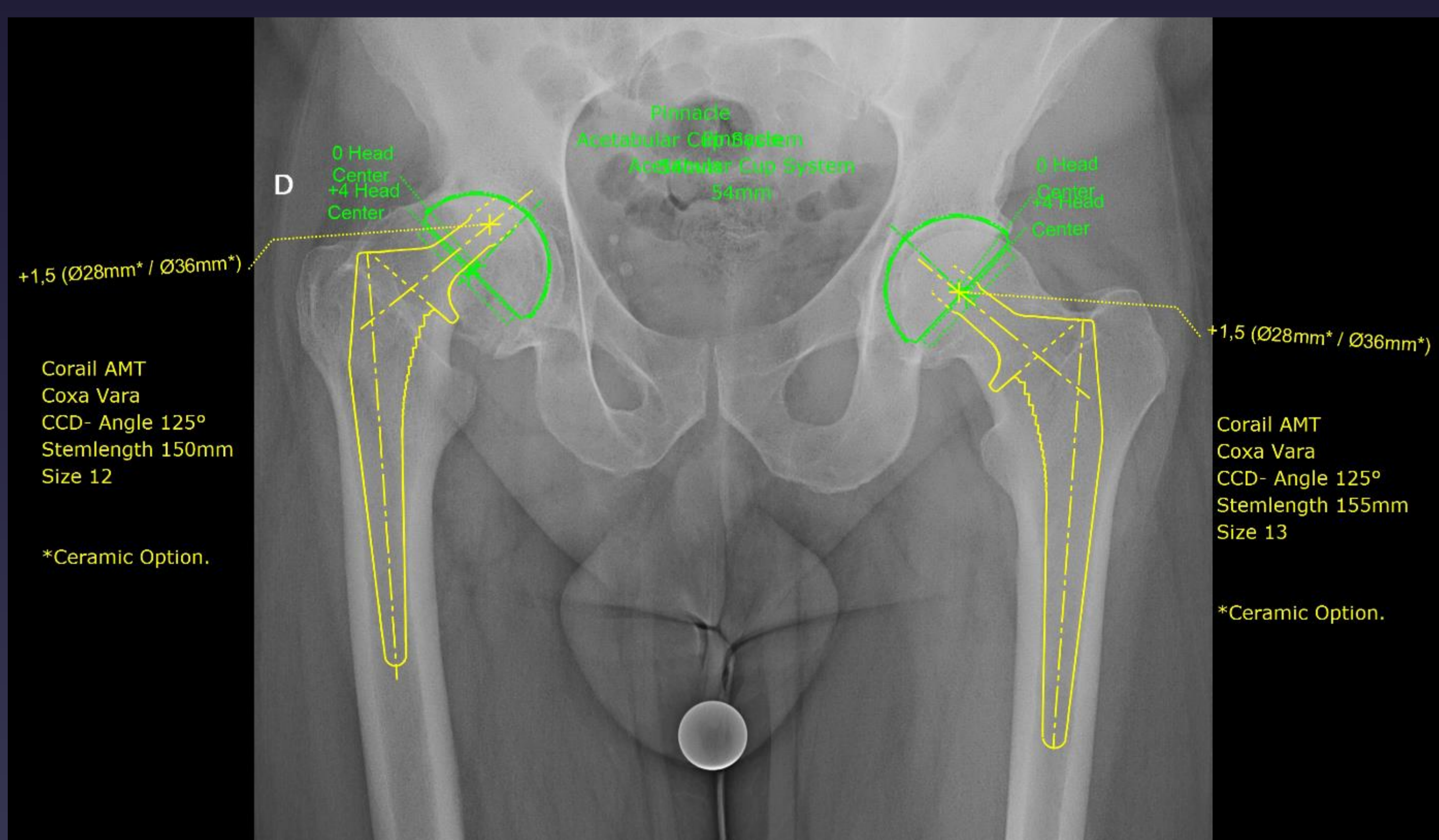
Study design and Methods

One hundred uncemented Corail[®] stems (KA, KHO, KLA) associated with Pinnacle[®] cups, 59 CLS[®] (125°, 135°, 145°) and 41 cemented MS-30[®] (STD, LAT) stems associated with Allofit[®] cups were included in the study.

The bearing surfaces were ceramic/ceramic or ceramic/crosslinked polyethylene.

The software used for templating was IMPAX-Orthopaedic-Tools[®]. A metallic ball was used for calibration.

All the anteroposterior pelvis radiographs were planned by three participants (OS, OR, DM).



Results

We systematically collected the planned size measurements as well as the variation by 1, 2 or more sizes of implanted prostheses.

Regarding Pinnacle[®]/Corail[®] implants, at +/- 1 size, we did not find any significant difference between the participants (OS, OR and DM) with respectively 94%, 96% and 93% concordance for the cup, 88%, 90% and 90% for the stem.

Regarding Allofit[®] cups, at +/- 1 size, we did not find any significant difference between the planners (OS, OR and DM) with respectively 85%, 84% and 100% concordance.

Regarding CLS[®] stems, at +/- 1 size, we did not find any significant difference between the participants (OS, OR and DM) with respectively 86%, 80% and 97% concordance.

Regarding MS-30[®] stems, at +/- 1 size, we did not find any significant difference between the participants (OS, OR and DM) with respectively 95%, 95% and 100% concordance.

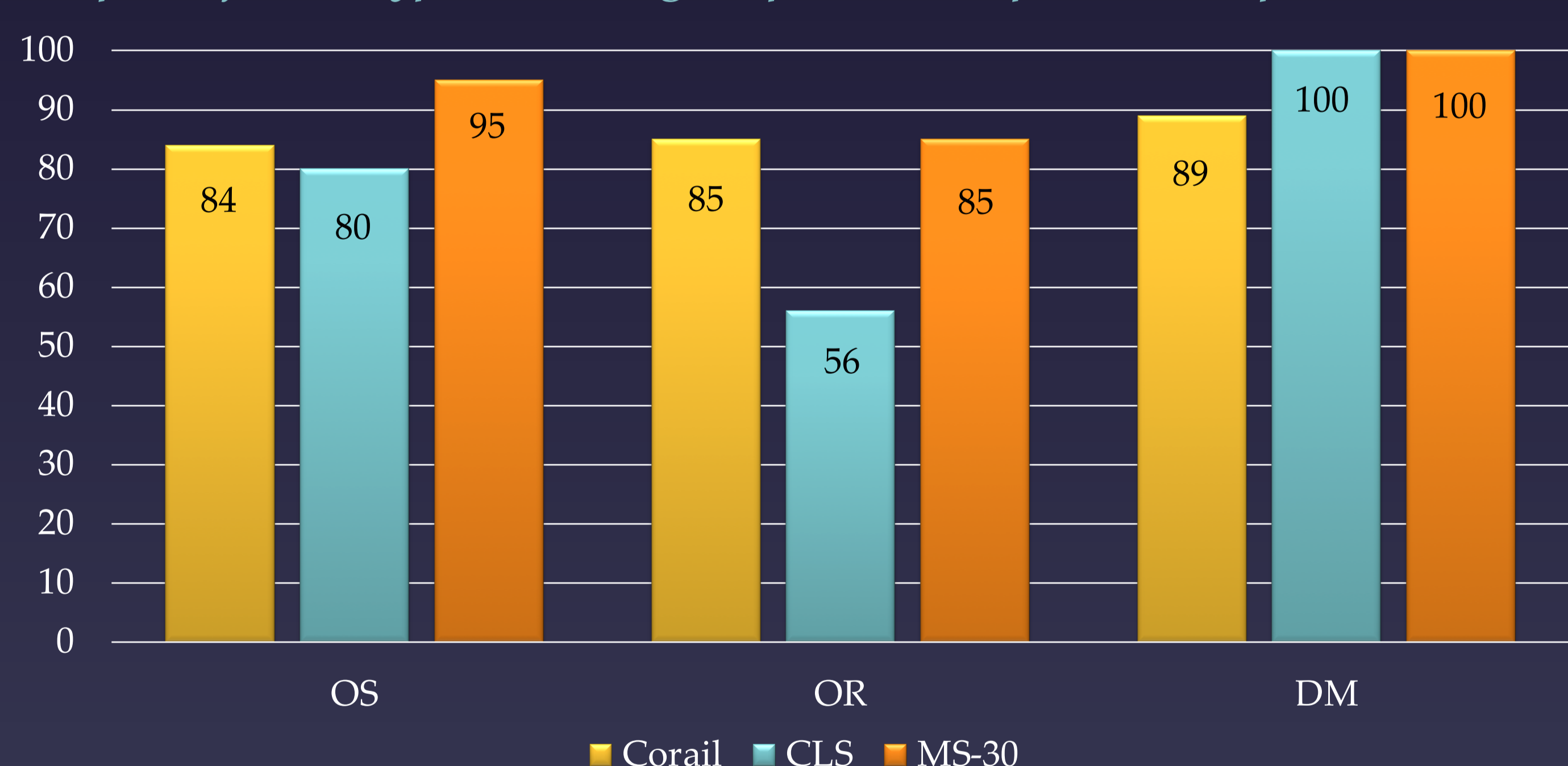
Interobserver comparison for the cup size (planned/implanted).

	OS	OR	DM		
Pinnacle[®]					
Exact Size	47%	54%	57%	OS/OR	P=0,082
+/- 1 Size	94%	96%	93%	OS/DM	P=0,347
+/- 2 Sizes	100%	99%	100%	OR/DM	P=0,261
Allofit[®]					
Exact Size	46%	42%	79%	OS/OR	P=0,607
+/- 1 Size	85%	84%	100%	OS/DM	P=0,506
+/- 2 Sizes	94%	96%	100%	OR/DM	P=0,923

Interobserver comparison for the stem size (planned/implanted).

	OS	OR	DM		
Corail[®]					
Exact Size	46%	47%	56%	OS/OR	P=0,343
+/- 1 Size	88%	90%	90%	OS/DM	P=0,526
+/- 2 Sizes	100%	99%	100%	OR/DM	P=0,439
CLS[®]					
Exact Size	41%	34%	78%	OS/OR	P=0,990
+/- 1 Size	86%	76%	97%	OS/DM	P=0,537
+/- 2 Sizes	93%	95%	100%	OR/DM	P=0,971
MS-30[®]					
Exact Size	61%	49%	88%	OS/OR	P=0,091
+/- 1 Size	95%	95%	100%	OS/DM	P=0,561
+/- 2 Sizes	100%	100%	100%	OR/DM	P=0,247

Respect of stem type (CCD angle) (planned/implanted) in percent.



Conclusions

Regarding the interobserver comparison, we did not show any significant difference in terms of planned cups and stems compared to the prostheses truly implanted up to a variation of +/- 1 size. The implant design had no negative influence on the templating accuracy whatever the planner involved.

Our preoperative templating was accurate in predicting the required implant size and results were similar to those available in the literature. Although the planning of a total hip arthroplasty should preferably be performed by the surgeon in charge, we concluded that this essential part of the planning procedure can also be performed by an orthopedic resident or a data manager who has anatomical knowledge.