ACCURACY OF ANATOMICAL HIP RECONSTRUCTION USING COMPUTERISED THREE-DIMENSIONAL 
PRE-OPERATIVE PLANNING AND A CEMENTLESS MODULAR-NECK PROSTHESIS. (HIP-PLAN)

+1 Sariali, E; 2Mouttet, A; 3Pasquier, G; 1 Durante, E
41 Pitié Salpêtrière Hospital, Paris, France, 2Clinique Saint Roch, Perpignan ; 3 Hospital de Roubaix
Senior author hedisari@yahoo.fr

ABSTRACT INTRODUCTION:
The use of two-dimensional plain X-rays for preoperative planning in total hip arthroplasty is unreliable [1,2]. For example, in the presence of rotational hip contracture the lateral femoral off-set can be significantly under-estimated [3]. Pre-operative planning is of particular importance when using uncemented prostheses. The aim of this study was to determine the precision of a novel 3D CT-based preoperative planning methodology with the use of a cementless modular-neck femoral stem.

METHODS:
Pre-operative computerised 3D planning was performed using HIP-PLAN® (Symbios) software for 223 patients undergoing THA with a cementless cup and cementless modular-neck stem (SPS Modular, SYMBIOS, Switzerland). Components were chosen that best restored leg length and lateral off-set [Fig 1]. Postoperative anatomy was assessed by CT-scan and compared to the pre-operative plan [Fig 2].

RESULTS SECTION:
The implanted component was the same as the planned one in 86% of cases for the cup and 94% for the stem. There was no significant difference between the mean planned femoral anteversion (26.1° +/- 11.8) and the mean postoperative anteversion (26.9° +/- 14.1) (p=0.18) with good correlation between the two (coefficient 0.8) [Fig 3]. There was poor correlation, however, between the planned values and the actual post-operative values of acetabular cup anteversion (coefficient 0.17). The rotational centre of the hip was restored with a precision of 0.73mm +/- 3.5 horizontally and 1.2mm +/- 2 laterally. Limb length was restored with a precision of 0.3mm +/- 3.3 and femoral off-set with a precision of 0.8mm +/- 3.1. There was no significant alteration in femoral off-set (0.07mm, p=0.4) which was restored in 98% of cases.

Almost all of the operative difficulties encountered were predicted pre-operatively, especially the cases where simultaneous restoration of limb length and femoral off-set required the use of neck-modularity.

DISCUSSION:
The accuracy of the three-dimensional pre-operative planning methodology investigated in this study is higher than that reported in the literature using two-dimensional X-ray templating [1,2]. It may allow a safer and more accurate surgery. Cup navigation may be a useful adjunct to increase the accuracy of cup positioning.

REFERENCES:
3- Sugano et al.. Comput Aided Surg. 1998; 3 (6): 320-324