

Precise Anatomic Reconstruction Verified with Computerised Tomography Does Not Improve Outcomes of Total Hip Arthroplasty

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Background:

Restoration of native hip biomechanics and stability is a key principle of optimal total hip arthroplasty (THA), which involves restoring both hip offset and achieving leg length equality.

The aim of this study was to determine the relationship between precise anatomic THA assessed with Computerised Tomography (CT) with patient reported outcomes (PRO).

Methods:

129 subjects who consented to participation and underwent elective THA between 2019 and 2020 with pre and post-operative CT imaging formed the study group. 3D reconstructions were created to measure hip offset, leg length, cup inclination and anteversion. Subjects completed PRO including Oxford Hip Scores (OHS), HOOS JR score and satisfaction before and 12 months after THA. Participants allocated to the Precise Anatomic Reconstruction (PAR) group met all of the following criteria: hip lengthening reproduced within 5mm, global offset reproduced within 5mm, cup inclination within 10° and anteversion within 10° of plan. If any of these criteria were not met, the subject was allocated to the control group. Groups were compared for 12 month outcomes.

Results:

1 year PROs were completed 125 subjects (97%). There were 60 females (48%) with a mean age was 66 years (range 42-87). The mean difference between the planned and achieved THA placement assessed with CT

scan for leg length was 3.2mm (SD 2.3), hip offset was 2.70 (SD 2.3), acetabular cup inclination was 4.80 (SD 3.6), and combined cup and stem anteversion was 5.80 (SD 4.7). There was

	PAR Group (n=70)	Control (n=55)	P
Mean Hip Pain VAS/100	7 (14)	6 (10)	0.359
Mean HOOS JR Score/100	91 (11)	90 (13)	0.630
Mean Oxford Hip Score/48	43 (6)	44 (5)	0.438
Mean Oxford Δ	19 (10)	21 (10)	0.168
No limp on Oxford Hip Score	54 (77%)	44 (80%)	0.700
No hip pain on Oxford Score	43 (61%)	33 (60%)	0.871
EQ Mobility no problems	54 (77%)	44 (80%)	0.700
Satisfied	67 (95%)	53 (96%)	0.854
Same surgery again	66 (94%)	51 (93%)	0.526

no significant correlation between the 1 year OHS and variation of planned from achieved leg length ($r = -0.06$, $p = 0.520$), offset ($r = -0.13$, $p = 0.676$), cup inclination ($r = -0.12$, $p = 0.203$), or combined anteversion ($r = -0.10$, $p = 0.973$). PAR was achieved for leg length in 82%, offset in 87%, cup inclination in 92% and combined anteversion 84%, and 56% met all 4 criteria (PAR group). There was no significant difference in 1 year PRO between the PAR and control groups (Table 1).

Conclusions:

Variance from achieved to planned placement of THA was not associated with inferior 1 year outcomes. Meeting all criteria for PAR of THA was not associated with improved 1 year patient reported outcomes or satisfaction with surgery.

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