INTRODUCTION

• Intra-operative fluoroscopy improves the accuracy of component position during THA

• Software is available to quantitatively assess fluoroscopic images to determine cup position and leg-length discrepancy (LLD)

• Recently, an artificial intelligence (AI) application has been introduced for fluoroscopy-assisted computer navigation, which obviates the need for human inputs

• However, to date there is no study which compares the accuracy of this AI software versus the human-controlled software

METHODS

• This is a retrospective review of prospectively collected data for 420 consecutive hips undergoing unilateral direct anterior THA by a fellowship-trained hip specialist at an orthopaedic teaching hospital.

• 211 hips were navigated using human-controlled fluoroscopic-assisted computer software, and 209 hips were navigated using an AI version of this same platform (OrthoGrid Systems, Inc).

• At the two-week post-operative visit, we obtained standing AP radiographs and assessed cup anteversion, cup inclination, and LLD.

RESULTS (continued)

• Post-operative cup inclination averaged 43 degrees (range 35-51) when navigated with human-controlled software, compared to 43 degrees (range 33-51) when navigated with AI software

• Post-operative cup anteversion averaged 19 degrees (range 7-30) when navigated with human-controlled software, compared to 21 degrees (range 10-28) when navigated with AI software

• Using human-controlled software, 94% (199/211) of hips had a post-operative LLD that was within 2mm of the intra-op navigated LLD (i.e. ΔLLD ≤ 2mm). Using AI software, 66% (137/209) of hips had a post-operative LLD that was within 2mm of the intra-op navigated LLD (i.e. ΔLLD ≤ 2mm), (p = 0.47)

• Using human-controlled software, 99% (209/211) of hips had a post-operative LLD that was within 5mm of the intra-op navigated LLD (i.e. ΔLLD ≤ 5mm). Using AI software, 98% (205/209) of hips had a post-operative LLD that was within 5mm of the intra-op navigated LLD (i.e. ΔLLD ≤ 5mm), (p = 0.45)

CONCLUSIONS

• Artificial Intelligence software has comparable accuracy to human-controlled software for calculating cup position and LLD during fluoroscopy-assisted direct anterior THA

REFERENCES
