CLINICAL PAPER /

ORTHOPEDIC

Leg Length and Offset Measures with a Pinless Femoral Reference Array during THA.

Clin Orthop Relat Res. 2010 Jul; 468(7):1862-8

Renkawitz T. et al.

ABSTRACT

The bony fixation of reference marker arrays used for computer-assisted navigation during total hip arthroplasty (THA) theoretically involves the risk of fracture, infection, and/or pin loosening. We asked whether intraoperative assessment of leg length (LL) and offset (OS) changes would be accurate using a novel pinless femoral reference system in conjunction with an imageless measurement algorithm based on specific realignment of

the relationship between a dynamic femoral and pelvis reference array. LL/OS measurements were recorded during THA in 17 cadaver specimen hips.

Preoperatively and postoperatively, specimens were scanned using CT. Linear radiographic LL/OS changes were determined by two investigators using visible fiducial landmarks and image processing software. We found a high correlation of repeated measurements within and between (both 0.95 o greater) the two examiners who did the CT assessments. Pinless LL/OS values showed mean differences less than 1 mm and correlations when compared with CT measurements.

SUMMARY

In this case study including 10 specimens it was analyzed if the intraoperative leg length and offset changes could be measured accurately using a pinless and imageless CAS procedure (Brainlab navigation used).

The results of 17 THA surgeries were compared to an analysis of pre- and postoperative CT scans made by two examiners. The authors report a high correlation of the leg length and offset measurement methods.

CONCLUSION

With pinless navigation reliable leg length and offset measurements are reached.

“We found a high correlation of repeated measurements within and between […] the two examiners who did the CT assessments. Pinless LL/OS values showed mean differences less than 1 mm and correlations when compared with CT measurements.”

“We found femoral pinless LL and OS measures reliable in conjunction with an imageless navigation technique of realignment during THA in an experimental cadaver study.”

(continued…)

Pinless navigation avoids the pin-related risks like fracture, infection or pin loosening.

“[…] bony fixation of reference marker arrays used for navigation theoretically involves the risk of fracture, infection, and/or pin loosening”

“Application of noninvasive, femoral pinless reference systems could further reduce the risks of systems depending on pins while minimizing the risk of LL discrepancies.”