Comparison of CT and EOS in assessing coronal lower limb alignment when planning knee arthroplasty

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Introduction

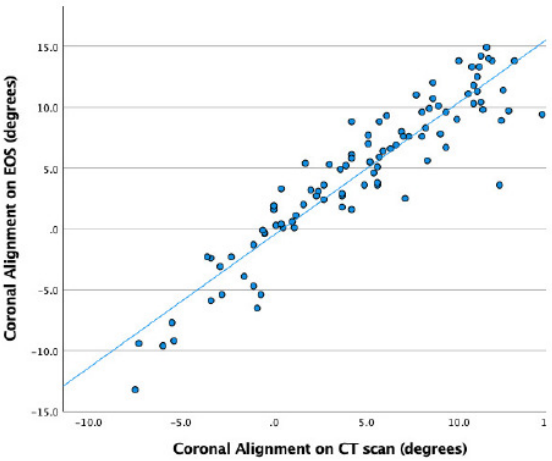
As surgical technologies and alignment strategies develop, accuracy of lower limb alignment assessment gains increasing importance. The current gold standard remains long leg (4%) radiographs. Other measures include computed tomography (CT) and EOS scans. This study aims to compare CT and EOS long leg views to determine the reliability of assessment of hip-knee-angle (HKA) in arthritic knees.

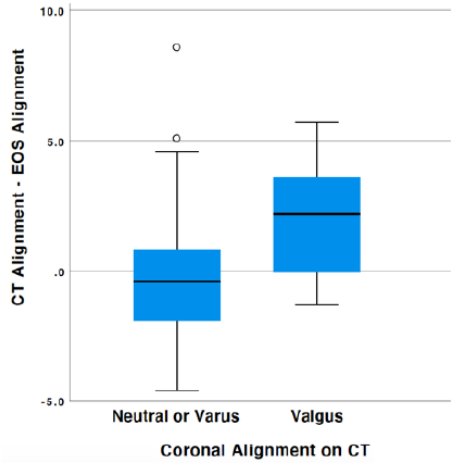
Materials and Methods

A retrospective study of 96 knees in patients undergoing total knee arthroplasty (TKA) was performed comparing HKA alignment data from EOS and CT. Coronal HKA and sagittal flexion angle were assessed by two independent observers at two time points. Inter-observer correlation was calculated.

Results

The mean difference of HKA between the 2 imaging modalities was 0.09° ± 2.4°. 12 knees (13%) exceeded a CT vs EOS difference of 3°. Inter-rater reliability was excellent with intra-class coefficients >0.9. The mean difference between CT and EOS was significantly greater for patients with fixed flexion >10° (0.68) vs <10 deg (-0.2) p=0.004. Mean difference in HKA did not differ between those 0-10° varus and >10° varus (p=0.273). Valgus HKA had a higher mean difference (1.9°) compared to varus knees (-0.4°) (p=0.001).





Conclusion

CT and EOS showed excellent inter-rater reliability and correlated well. Increased sagittal plane deformity does effect coronal HKA assessment. Extreme varus did not affect the mean difference significantly while valgus did. For the majority of patients either CT or EOS will give a reliable assessment of HKA but beware those with significant valgus or sagi□al deformity where both modalities may be necessary to plan TKA.

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Table 1: Interrater Reliability of the Coronal Alignment with EOS and CT scans

	N	Mean Assessor 1	Mean Assessor 2	ICC	95% CI	p	LK classification
EOS	96	4.6±6.2	4.4±6.3	0.995	0.99-1.00	0.001	Almost perfect
CT	96	4.7±5.3	4.5±5.3	0.983	0.98-0.99	0.001	Almost perfect

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