



Meta-analysis of alignment outcomes in computer-assisted total knee arthroplasty surgery.

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ABSTRACT

Computer-assisted surgery (CAS) has been advocated as a means to improve limb and prosthesis alignment and assist in ligament balancing in total knee arthroplasty (TKA). Thus, we sought to examine alignment outcomes in CAS vs conventional TKA. A systematic review of literature from 1990 to 2007 was performed. Direct comparison of alignment outcomes was performed using random effects meta analyses. Twenty-nine studies of CAS vs conventional TKA were identified, and included mechanical axis malalignment of greater than 3 occurred in 9.0% of CAS vs 31.8% of conventional TKA patients. The risk of greater than 3 malalignment was significantly less with CAS than conventional techniques for mechanical axis and frontal plane femoral and tibial component alignment.

Tibial and femoral slope both showed statistical significance in favor of CAS at greater than 2 malalignment. Meta-analysis of alignment outcomes for CAS vs conventional TKA indicates significant improvement in component orientation and mechanical axis when CAS is used. Key words: computer-assisted surgery, meta-analysis, alignment.

SUMMARY

Meta-Analysis of 29 comparative studies to assess the component alignment outcomes after computer assisted (CAS) versus conventional TKA including 3437 patients in total. The mean chance of malalignment was less using CAS for all analyzed parameters (Mechanical axis, femoral and tibial component alignment, femoral and tibial slope).

CONCLUSION

CAS navigation in TKA offers significant improvement in accuracy and reproducibility of component orientation.

“[...] computer-assisted navigation in TKA offers a significant ($P < .05$) improvement in both the accuracy and reproducibility of prosthetic component orientation for all alignment outcomes at $\pm 2^\circ$ when compared with conventional knee techniques.”

“[...] alignment outcomes for CAS vs conventional TKA indicates significant improvement in component orientation and mechanical axis when CAS is used.”

Significantly less mechanical axis malalignment with CAS.

“[...] a malalignment of greater than 3° occurred in only 9.0% of patients in the CAS TKA group (23 treatment arms) vs 31.8% of patients in the conventional TKA group.”