

# CAS vs. manual TKA: no difference in clinical or radiographic outcomes at 5-year follow-up

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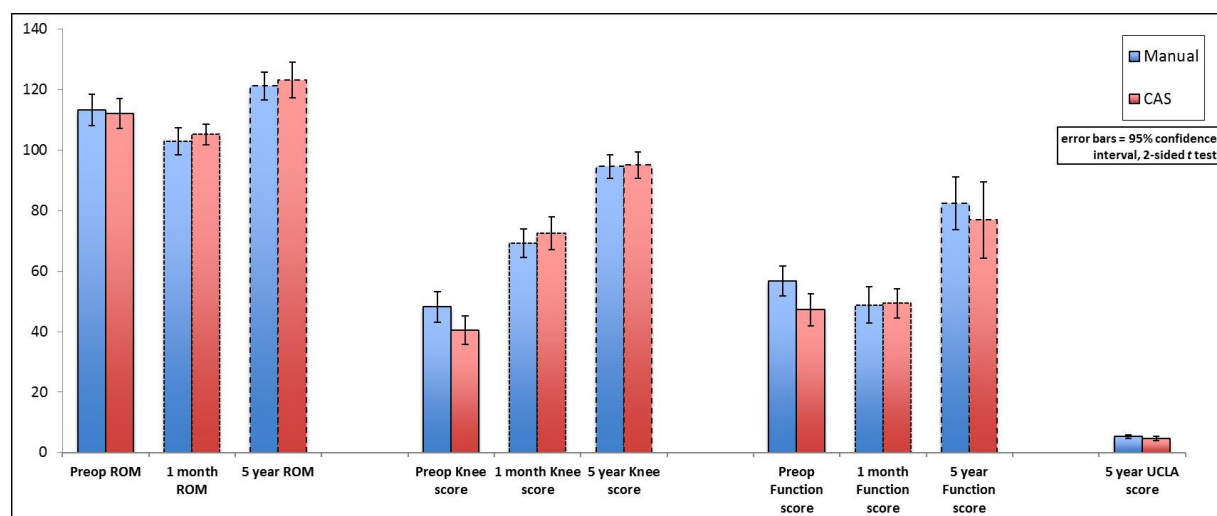
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**Introduction:** The use of computer-assisted surgery (CAS) offers the experienced surgeon the ability to improve limb and implant alignment and reduce outliers. Two recent high quality meta-analyses have demonstrated that CAS can produce more accurate and precise limb alignment results. It has not been clearly established whether these benefits translate to improved patient outcomes. A previous case-controlled study by this author demonstrated no significant difference in clinical, functional, or radiographic outcomes between CAS and manual TKA at short term follow-up. However, the impact of CAS navigation may not be realized for a number of years following surgery. The purpose of the present study was to determine whether any differences in clinical, functional, or radiographic outcomes exist between patients who underwent either CAS or manual TKA at 5-year follow-up.

**Methods:** A single surgeon with extensive prior experience with both computer-assisted and manual total knee arthroplasty performed 78 consecutive TKA. Of the 78 TKA, 40 were manual and 38 were CAS TKA. The groups were identical with regard to age, sex, body mass index, diagnosis, surgical technique, implants, and peri-operative management. (Table 1) 61 patients were available for 5-year follow-up. Pre and post-operative radiographic measurements of the mechanical axis was assessed. The Knee Society scoring system and UCLA activity score were used to assess clinical and functional outcomes related to range of motion, knee stability, pain, patient mobility, and movement independence.

**Results:** There were no significant differences in clinical or functional outcomes between manual and CAS TKA at 5-year follow-up (Figure 1). There were no statistically significant differences between 5-year postoperative pain scores, ROM, or UCLA activity scores (Figure 1). Postoperative mechanical axis measurements did not reveal a significant difference between manual and CAS at 1 month or 5-year postoperative.



**Discussion:** This study found similar clinical, functional and radiographic outcomes at 5-year follow-up between manual and CAS TKA. These results were consistent with the short-term results found previously in the same patient cohort. The results of the current study suggest that the alignment goals

upon which CAS has an impact (limb and implant alignment, ligament balance) can be equally

	Unilateral Manual	Unilateral CAS	Total
# Patients	40	38	78
Age (years)	64.0 (25.1 - 87.5)	65.7 (48.0 - 86.1)	64.8 (25.1 - 87.5)
Sex (% Male)	43%	37%	40%
Dx (% OA)	100%	100%	100%
BMI Avg	31.5 (19.6-54.8)	33.9 (23.9-44.2)	32.7 (19.6-54.8)
Pre-op Mechanical Axis Alignment	5.2 (-27 - 22)	8.9 (-12 - 20)	6.8 (-27 - 22)
Pre-op Knee Score	48.1 (17 - 77)	44.5 (22 - 79)	46.3 (17 - 79)
Pre-op Function Score	56.7 (35 - 80)	50.4 (30 - 80)	53.6 (30 - 80)
Pre-op ROM	113.7 (70 - 140)	112.1 (70 - 140)	112.9 (70 - 140)
Pre-op Pain Score	12.8 (0 - 30)	12.0 (0 - 45)	12.4 (0 - 45)

Table 1: Demographic Data

achieved or closely enough approximated with manual instrumentation to result in equivalent clinical and radiographic results at 5 years. We continue to believe that the learning effects afforded by working with a navigation system can lead to improvements in manual TKA technique. Our initial experience with CAS found that manual instruments introduced consistent and significant errors when compared with computer-assisted instrumentation. These errors were largely eliminated in our second series in which we found no significant difference in clinical, functional, or radiographic outcomes between CAS and manual TKA performed by the same surgeon. The current study suggests that surgeons experienced in TKA surgery can improve the accuracy with which they perform the procedure to the point that clinical, functional, and radiographic outcome results with manual and CAS instruments are equivalent.

**Conclusion:** This study did not demonstrate any significant differences in clinical, functional, or radiographic outcomes between computer-assisted and manual TKA at 5 year follow-up. These results are similar to the short-term results from our previously published case-controlled study. We attribute improvements in manual TKA technique to the real-time intraoperative feedback afforded by working with an intraoperative navigation system.