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KNEE – FUNCTIONAL OUTCOME

Pang H.-N. et al. (2011)

- CAS facilitates gap balancing method which leads to fewer outliers and improved knee scores

Lehnen K. et al. (2010)

- Using a navigated ligament balanced technique, patient outcome after TKA improves significantly.
- Patients undergoing navigated surgery are more satisfied after 12 months postoperatively.

Lützner J. et al (2010)

- Computer-assisted TKA leads to a significant improvement (P = 0.03) in Knee Society Knee Score after 20 months.
- Long-term follow-up needed to evaluate lower revision rates due to navigation.

Choong P.F. et al (2009)

- Better mechanical alignment through CAS leads to better functional and patient quality-of-life outcome
- Benefit of CAS in knee surgery
- Benefit in particular for obese patients
- Longer procedure time during CAS is justifiable

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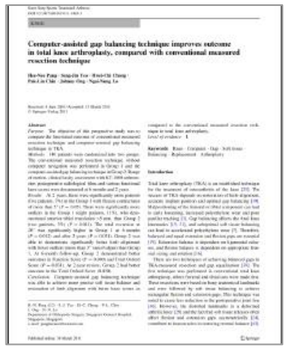

Computer-assisted gap balancing technique improves outcome in total knee arthroplasty, compared with conventional measured resection technique.

Knee Surg Sports Traumatol Arthrosc, 2011 Mar 30

Pang, H.-N. et al.

ABSTRACT

Methods: 140 patients were randomized into two groups. The conventional measured resection technique without computer navigation was performed in Group 1 and the computer-assisted gap balancing technique in Group 2. Range of motion, clinical laxity assessment with KT-1000 arthrometer, postoperative radiological films and various functional knee scores were documented at 6 months and 2 years.

Results: At 2 years, there were significantly more patients (five patients, 7%) in the Group 1 with flexion contractures of more than 5° (P = 0.05). There were significantly more outliers in the Group 1 (eight patients, 11%), who demonstrated anterior tibial translation [5 mm, than Group 2 (two patients, 3%) (P = 0.041). The total excursion at 20° was significantly higher in Group 1 at 6 months (P = 0.012) and after 2 years (P = 0.031). Group 2 was able to demonstrate significantly better limb alignment with fewer outliers (more than 3° varus/valgus) than Group 1. At 6-month follow-up, Group 2 demonstrated better outcomes in Function Score (P = 0.040) and Total Oxford Score (P = 0.031). At 2-year review, Group 2 had better outcome in the Total Oxford Score (0.030).

Conclusion: Computer-assisted gap balancing technique was able to achieve more precise soft tissue balance and restoration of limb alignment with better knee scores as compared to the conventional measured resection technique in total knee arthroplasty.

SUMMARY

The objective of this prospective randomized study on 140 patients was to compare the functional outcome of conventional measured resection technique and computer-assisted gap balancing technique in TKA (Brainlab navigation used). Various functional knee scores and other knee parameters were documented at 6 months and 2 years. At 6-month follow-up, the CAS group demonstrated better outcomes in Function Score (P = 0.040) and Total Oxford Score (P = 0.031). At 2-year review,

the CAS group had better outcome in the Total Oxford Score (P = 0.030).

CONCLUSION

CAS facilitates gap balancing method which leads to fewer outliers and improved knee scores.

"(...) CAS is a useful tool to facilitate the gap balancing method. In addition, mechanical alignment was improved. With better gap balancing and mechanical alignment, our randomized, controlled trial was able to demonstrate improved knee scores at 6 months and 2 years in patients who underwent computer-assisted gap balancing technique in total knee arthroplasty."

(continued…)

"Patients in Group 2 [CAS group] had significantly better alignment of the mechanical axis (P = 0.02) and significantly fewer people in the outlier group (>3° deviation from the mechanical axis) (P = 0.01) at 2 years"

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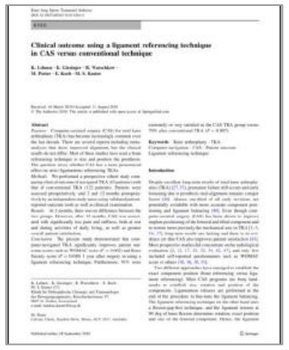

Clinical outcome using a ligament referencing technique in CAS versus conventional technique.

Knee Surg Sports Traumatol Arthrosc. 2010; Sept 18.

Lehnen K. et al.

ABSTRACT

Methods: We performed a prospective cohort study comparing clinical outcome of navigated TKA (43 patients) with that of conventional TKA (122 patients). Patients were assessed preoperatively, and 2 and 12 months postoperatively by an independent study nurse using validated patient-reported outcome tools as well as clinical examination.

Results: At 2 months, there was no difference between the two groups. However, after 12 months, CAS was associated with significantly less pain and stiffness, both at rest and during activities of daily living, as well as greater overall patient satisfaction.

Conclusion: The present study demonstrated that computer-navigated TKA significantly improves patient outcome scores such as WOMAC score (P = 0.002) and Knee Society score (P = 0.040) 1 year after surgery in using a ligament referencing technique. Furthermore, 91% were extremely or very satisfied in the CAS TKA group versus 70% after conventional TKA (P = 0.007)

SUMMARY

A prospective cohort study was done including 43 navigated (Brainlab navigation used) and 122 conventional TKA surgeries. Surgical technique in all cases was strict ligament balancing in flexion and extension. Compared was the clinical outcome

which has been assessed preoperatively, after 2 months and after 12 months. The outcome was measured by two different scores

(WOMAC, KSS) which account for functionalparameters like mobility and patient satisfaction.

CONCLUSION

Using a navigated ligament balanced technique, patient outcome after TKA improves significantly.

“[…] computer-navigated TKA significantly improves patient outcome scores such as WOMAC score (P = 0.002) and Knee Society score (P = 0.040) 1 year after surgery in using a ligament referencing technique”

Patients undergoing navigated surgery are more satisfied after 12 months postoperatively.

“Twelve months postoperatively, patients in the navigated group were more satisfied with their knee replacement compared to patients in the non-navigated group”

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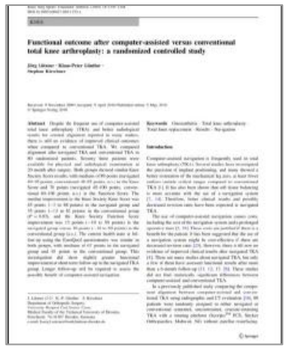

Functional outcome after computer-assisted versus conventional total knee arthroplasty:a randomized controlled study.

Knee Surg Sports Traumatol Arthrosc. 2010 Oct; 18(10):1399-44

Lützner J. et al.

ABSTRACT

Despite the frequent use of computer-assisted total knee arthroplasty (TKA) and better radiological results for coronal alignment reported in many studies, there is still no evidence of improved clinical outcomes when compared to conventional TKA. We compared alignment after navigated TKA and conventional TKA in 80 randomized patients. Seventy three patients were available for physical and radiological examination at 20 month after surgery. Both groups showed similar Knee Society Score results, with medians of 89 points (navigated 49–95 points, conventional 48–95 points, n.s.) in the Knee Score and 70 points (navigated 45–100 points, conventional 40–100 points, n.s.) in the Function Score.

The median improvement in the Knee Society Knee Score was 45 points (-3 to 88 points) in the navigated group and 35 points (-13 to 62 points) in the conventional group (P = 0.03), and the Knee Society Function Score improvement was 15 points (-10 to 50 points) in the navigated group versus 10 points (-10 to 50 points) in the conventional group (n.s.).

The current health state at follow-up using the EuroQuol questionnaire was similar in both groups, with medians of 67 points in the navigated group and 65 points in the conventional group.

This investigation did show slightly greater functional improvement at short-term follow-up in the navigated TKA group. Longer follow-up will be required to assess the possible benefit of computer-assisted navigation.

SUMMARY

After a randomized controlled trial including 40 navigated and 40 conventional TKA surgeries a follow-up was done 20 months postoperatively. Evaluated were the preoperative and postoperative functional results after this short term using the KSS (Knee Society Score) and other scores.

The KSS is divided into the knee score and the function score. The knee score is based on pain, range of motion, stability and alignment of the leg. The function score is based on activities of daily living.

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✓ CONCLUSION

Computer-assisted TKA leads to a significant improvement (P = 0.03) in Knee Society Knee Score after 20 months.

“This investigation did show slightly greater functional improvement at short-term follow-up in the navigated TKA group.”

“[…] the improvement in the Knee Society Knee Score was statistically significant.”

Long-term follow-up needed to evaluate lower revision rates due to navigation.

“[…] it may take a longer period of follow-up to evaluate whether better alignment after navigated compared to conventional TKA may reduce wear and consequently result in lower revision rates.”

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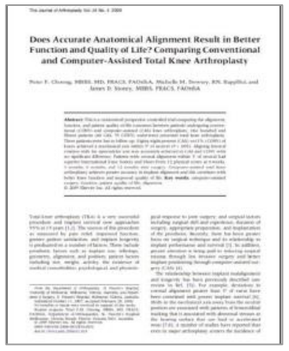

Does Accurate Anatomical Alignment Result in Better Function and Quality of Life? Comparing Conventional and Computer-Assisted TKA

J Arthroplasty. 2009 Jun; 24(4):560-9. Epub 2008

Choong P.F., Dowsey M.M., Stoney J.D.

ABSTRACT

This is a randomized prospective controlled trial comparing the alignment, function, and patient quality-of-life outcomes between patients undergoing conventional (CONV) and computer-assisted (CAS) knee arthroplasty. One hundred and fifteen patients (60 CAS, 55 CONV) underwent cemented total knee arthroplasty.

Three patients were lost to follow-up. Eighty-eight percent (CAS) vs 61% (CONV) of knees achieved a mechanical axis within 3° of neutral (P = .003). Aligning femoral rotation with the epicondylar axis was accurately achieved in CAS and CONV with no significant difference.

Patients with coronal alignment within 3° of neutral had superior International Knee Society and Short-Form 12 physical scores at 6 weeks,3 months, 6 months, and 12 months after surgery. Computer-assisted total knee arthroplasty achieves greater accuracy in implant alignment and this correlates with better knee function and improved quality of life.

SUMMARY

Patients in the navigated group report a significantly and increasingly better quality of life than non-navigated patients!

This is the first randomized controlled study to compare the alignment, function and patient quality-of-life outcomes between patients who underwent conventional and computer-assisted TKA. Patients with a mechanical axis within 3º (88% of Patients from CAS group and 61% of Patients from Conventional group) demonstrated superior outcomes in two independent functional scores (International Knee Society Score (IKS) and Short- Form 12 Score) at 6 weeks, 3 months, 6 months, and 12 months following surgery.

CONCLUSION

Better mechanical alignment through CAS leads to better functional and patient quality-of-life outcome

“(…) as a result of the proven positive correlation between the use of computer-navigation in TKA and accuracy of prosthetic alignment, we can also assert that computer-assisted TKA results in better function and quality of life for patients compared to conventional TKA”

Benefit of CAS in knee surgery

“Our results demonstrated for the first time significantly better functional scores using the IKS as early as 6 weeks postoperatively in patients with a mechanical axis within 3° of neutral”

(continued…)

Benefit in particular for obese patients
“93% of our obese patients in the computer-navigated group had a postoperative mechanical alignment within 3° of neutral compared to only 56% of those in the conventional group”

Longer procedure time during CAS is justifiable
“Indeed, we believe the extra 15 minutes [for CAS] to be justifiable if it resulted in better limb alignment.”