Large variance in a lateral osteoarthritic population prior to and following lateral unicompartmental arthroplasty

An analysis of knee phenotypes

Roderick J.M. Vossen[1,2], MD; Gaby V. ten Noever de Brauw[1,2], BS; Lindsey V. Ruderman[1], BA; Tarik Bayoumi[1,2], MD; G.M.M.J. Kerkhoffs[2], MD PhD; Hendrik A. Zuiderbaan[3], MD PhD; Andrew D. Pearle[1], MD

[1]Hospital for Special Surgery, Department of Sports Medicine and Computer Assisted Surgery, New York, USA

[2]Amsterdam UMC location University of Amsterdam, Department of Orthopaedic Surgery and Sports Medicine, Amsterdam, The Netherlands

[3]Medische Kliniek Velsen, Department of Orthopaedic Surgery and Sports Medicine, Velsen-Noord, The Netherlands

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I (and/or my co-authors) have something to disclose.

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Background and Objective

Background

- several articles have shown a variation in pre-arthritic coronal alignment and a broad phenotype distribution in healthy knees and knees with generalized OA using the CPAK and functional phenotype classification systems.[1,2,3]

- The pre-operative and post-operative phenotype distribution for patients with isolated lateral compartment OA undergoing a lateral UKA has not been reported.

Objective

- To present the pre-operative and post-operative CPAK phenotype distribution in patients undergoing lateral UKA.

- To compare patient-reported outcomes among CPAK phenotypes and investigate a potential beneficial effect of restoration of pre-operative CPAK phenotype.

UKA, unicompartmental knee arthroplasty; CPAK, Coronal Plane Alignment of the Knee

METHODS AND MATERIALS

The study comprised 305 knees (mean follow-up 2.0 years, mean age 64.0 ± 11.0 years, 58.0% female), selected from a single-surgeon's registry.

Patient selection

- Robot-assisted, lateral, fixed-bearing UKA between March 2012 and March 2022.
- End-stage lateral OA (KL ≥3) with an unaffected medial compartment.
- Available AP long-leg weightbearing radiographs
- complete data on patient-reported outcomes (KOOS-JR, Kujala patient satisfaction and likelihood on re-do of surgery) and implant failure.

Radiographic evaluation

- Pre- and post-operative CPAK phenotype [1] – *figure 1, figure 2*
  - aHKA = MPTA – LDFA
    - Neutral (aHKA 0º ± 2º), varus (aHKA ≤ -2º), and valgus (aHKA ≥ 2º).
  - JLO = MPTA + LDFA
    - Apex neutral (JLO 180º ± 3º), apex distal (JLO ≤ 177º), and apex proximal (JLO ≥ 183º).

Figure 1.

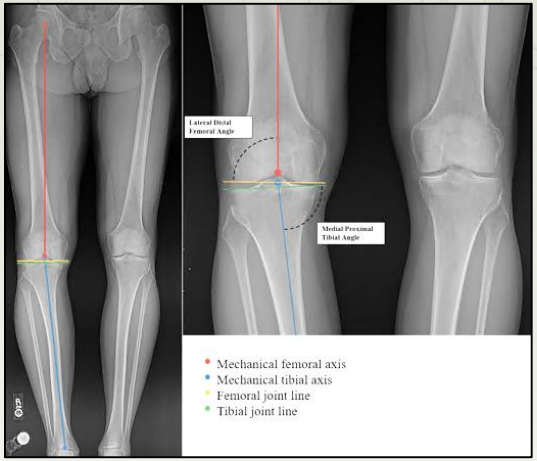
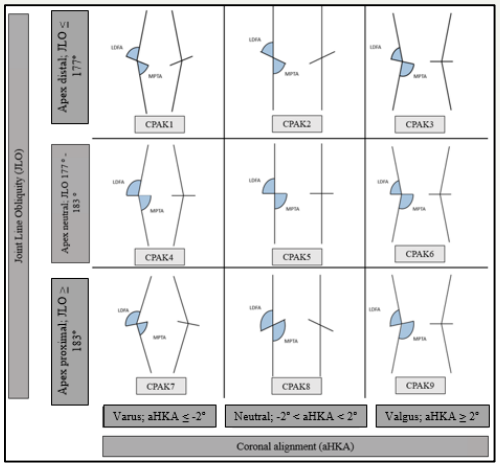
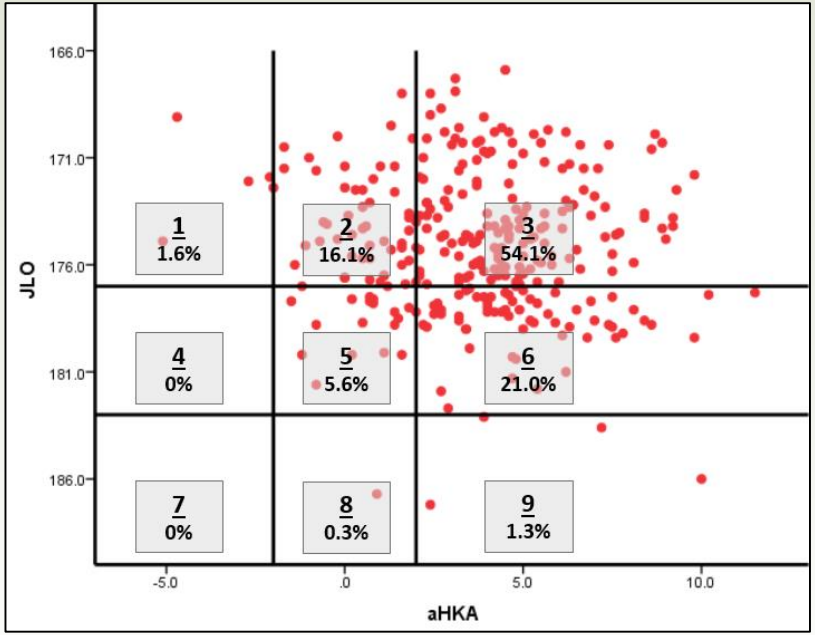


Figure 2.

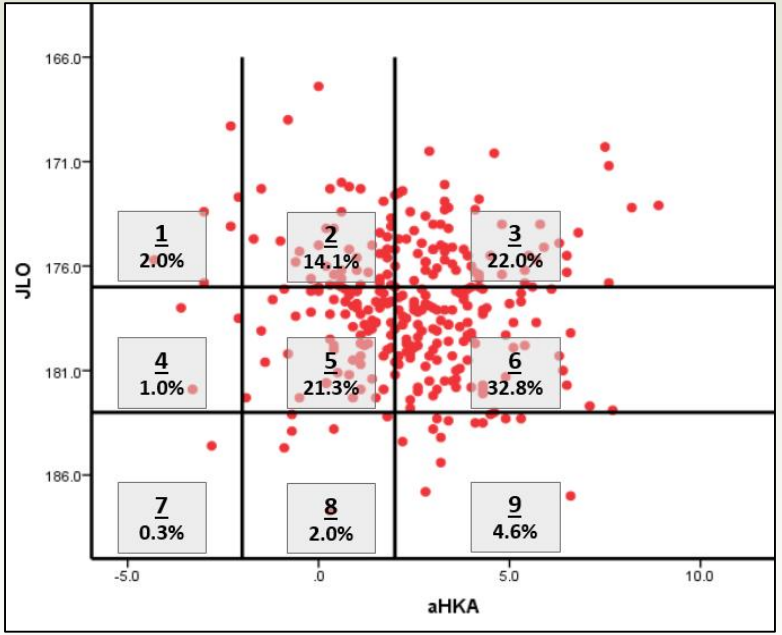


KL, Kellgren Lawrence; AP, anteroposterior; KOOS-JR, Knee injury and Osteoarthritis Outcome Score; CPAK, Coronal Plane Alignment of the Knee

SUMMARY OR RESULTS - CPAK



Pre-operative CPAK distribution



Post-operative CPAK distribution

SUMMARY OR RESULTS - PROMS

- No significant differences in Post-operative PROMs between various pre-operative CPAK phenotypes.
- No significant differences in postoperative PROMs among pre-operative CPAK phenotypes that were either preserved or altered to a different phenotype.

Table 4. Two-year postoperative PROMs according to preservation of CPAK phenotype

	KOOS JR.×	Kujala×	Patient satisfaction ¶	Re-do Surgery ¶
Preservation of CPAK phenotype, total cohort				
Preservation	86.4 ± 13.6	83.6 ± 15.0	91.9%	95.1%
Altered	86.1 ± 13.9	85.5 ± 15.1	94.0%	94.0%
P-value	0.438	0.267	0.418	0.539

Two-year Postoperative patient-reported outcome measures (PROMs) were presented for preserved and altered CPAK phenotype, described as mean ± standard deviation (SD) or in frequencies (%). Percentages presented the proportion of patients who were either 'very satisfied' or 'satisfied' or would undergo the surgery again if they could choose again. *CPAK; Coronal Plane Alignment of the Knee. aHKA; arithmetic hip-knee-ankle angle. KOOS JR; Knee Injury and Osteoarthritis Outcome Score for Joint Replacement.*

* Significant value.

CONCLUSION

- Diverse pre-operative CPAK distribution, indicating that a one-size-fits all approach might not be optimal for all patients
- No significant differences in post-operative PROMs among the differing CPAK phenotypes
- No significant differences in post-operative PROMs between preserved or altered pre-operative CPAK phenotypes

Reference to full-text article

Vossen RJM, Ten Noever de Brauw GV, Ruderman LV, et al. Large variance in a lateral osteoarthritic population prior to and following lateral unicompartmental arthroplasty: An analysis of knee phenotypes. Knee. 2024;49:97-107. doi:10.1016/j.knee.2024.05.010.

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