CPAK Alignment Effect on Goal Attainment and Patient Satisfaction: Methods

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INTRODUCTION

There is controversy among orthopaedic surgeons regarding alignment strategies for total knee arthroplasty (TKA). Mechanical alignment has historically been considered the most popular strategy. However, there has been a shift toward kinematic alignment TKAs over the past decade.

DEFINITIONS

Mechanical alignment TKA: restores a neutral mechanical axis of the lower extremity and a joint line that is perpendicular to the mechanical axis

Kinematic alignment TKA: restores an anatomic joint line that more closely aligns with the patient's pre-arthritic alignment

PRIMARY OBJECTIVE

To evaluate the effect of kinematic versus mechanical alignment TKA on patient goal attainment and post-operative satisfaction.

SECONDARY OBJECTIVE

To assess the effect of pre- and post-operative CPAK classification on patient goal attainment and satisfaction.

HYPOTHESES

1. Patients who undergo kinematic alignment TKA will be more likely to achieve their goal and will be more satisfied.
2. Patients who have a CPAK classification that is maintained pre- and post-operatively will have better outcomes than patients who have a changed CPAK classification.

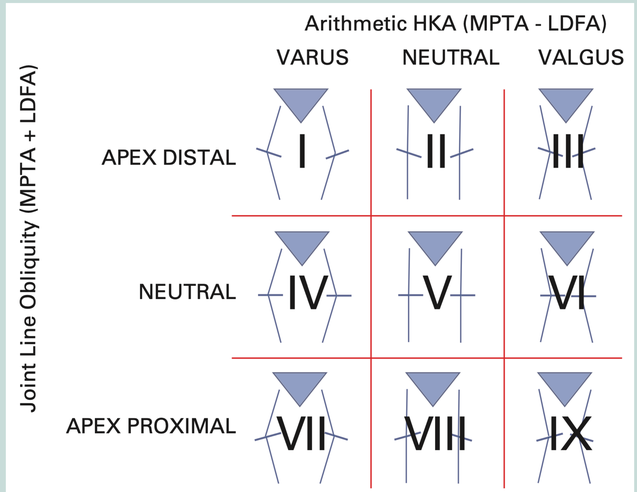

Figure 1. *The CPAK classification system classifies knees into varus, neutral, or valgus alignment and a joint line obliquity (JLO) of apex distal, apex neutral, or apex proximal to create a 3x3 grid of nine possible CPAK classes. (Image: MacDessi et al., 2021)*

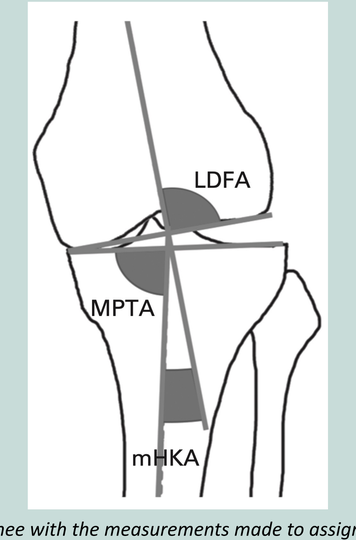

Figure 2. *Left knee with the measurements made to assign CPAK classification. Lateral distal femoral angle (LDFA) and medial proximal tibial angle (MPTA) are shown in relation to the mechanical hip-knee-ankle angle (mHKA). (Image: MacDessi et al., 2021)*

METHODS

- Manually reviewed charts of TKA patients enrolled in the mGAME study to evaluate each patient's pre- and post-operative knee radiographs.
- Used Epic's image viewing platform to make anatomic measurements of the radiographs.
- Assigned **CPAK classifications** to each knee joint using the following scheme:

Arithmetic HKA (aHKA) = MPTA – LDFA
- **Varus < -2°**
- **Neutral = -2 +/- 2°**
- **Valgus > -2°**

Joint Line Obliquity (JLO) = MPTA + LDFA
- **Apex Distal < 177°**
- **Apex Neutral = 180° +/- 3°**
- **Apex Proximal > 183°**

- Patient reported outcome measures were :
  - KOOS Jr (measure of patient knee health)
  - GAOM (measure of goal attainment)
  - CollaboRATE (measure of patient reported shared decision making)
- Outcome measures were compared between the mechanical vs. kinematic alignment groups to assess differences in goal attainment and satisfaction between groups.

References

1. MacDessi SJ, Griffiths-Jones W, Harris IA, Bellemans J, Chen DB. Coronal Plane Alignment of the Knee (CPAK) classification. Bone Joint J. 2021;103-B(2):329-337.