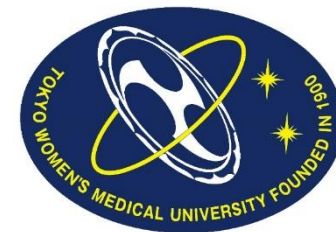




Calipered measurements method for kinematically aligned total knee arthroplasty has a risk of excessive varus cut for the proximal tibia in Japanese varus knees

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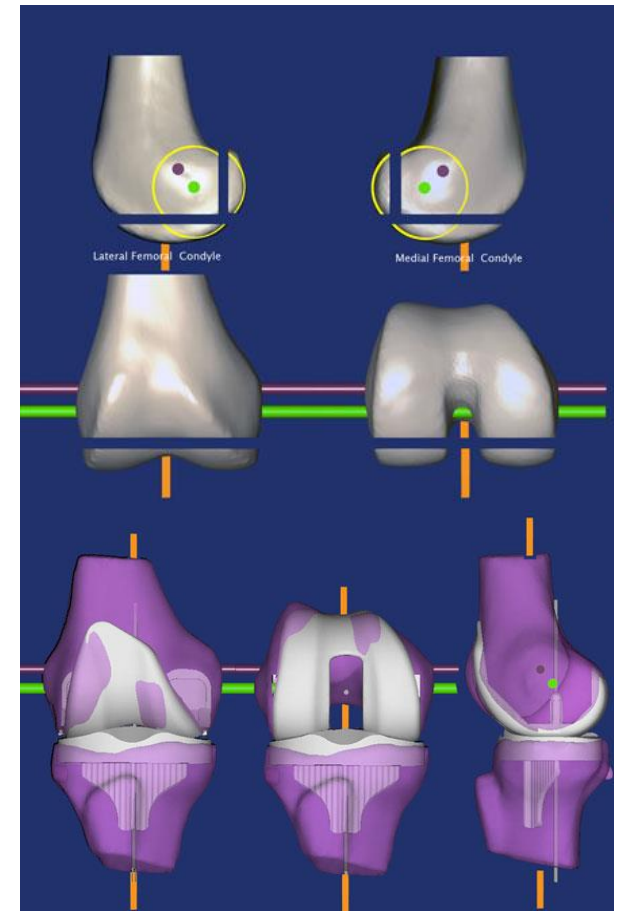
COI

We have no potential conflicts of interest to declare.

Introduction

Calipered Kinematically Aligned Total knee arthroplasty (Calipered KA-TKA)

- Restore the original patient-specific joint geometry
- Good clinical results ^[2]
- Comparable long-term survival rates compared with mechanical alignments ^[3]



Introduction

Calipered KA-TKA for Japanese knees

- Mainly tibia excessive varus deformity^[4] in Japanese osteoarthritic knees
- Risk of **excessively varus inclination** in tibia after calipered KA-TKA ??



Purpose

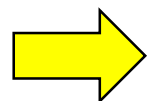
To elucidate the tibial and femoral joint line angles in patients undergoing TKA in Japan

To determine the risk of significant obliquity of the osteotomy surface ($> 5^\circ$) in the calipered KA method

Methods

Demographic data	N = 50 knees (47 patients)
Age (years)	72.8 ± 8.1 (52 – 84)
Sex (Male / Female)	12 / 38
Body mass index (kg/m ²)	26.3 ± 3.7 (19.4 – 35.8)
Pre- Kellgren-Lawrence grade	III:3 / IV:47
Pre- hip-knee-ankle angle (HKA) (°)	-10 ± 4.6 (-21 – 0)

- Calipered KA-TKA simulated with the pre-CT images & software (ZedKnee; LEXI, Tokyo, Japan)
- Implant: Journey II CR (Smith and Nephew, Inc., Memphis, TN)
- Femoral and tibial implants: 9 mm thickness

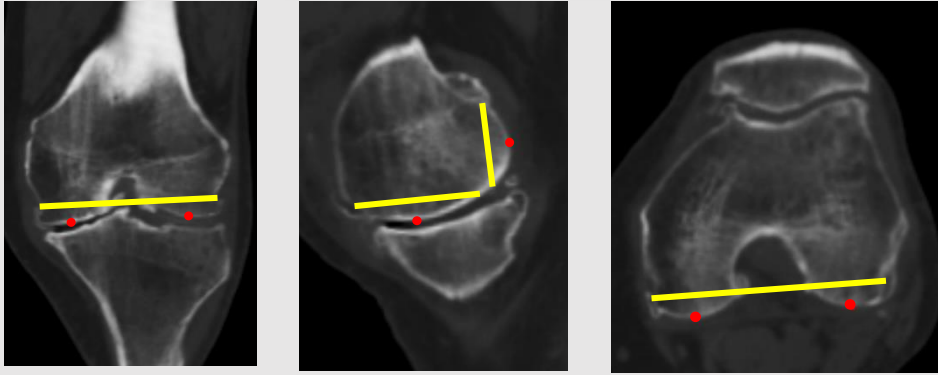


Resection of femur and tibia: **7 mm**

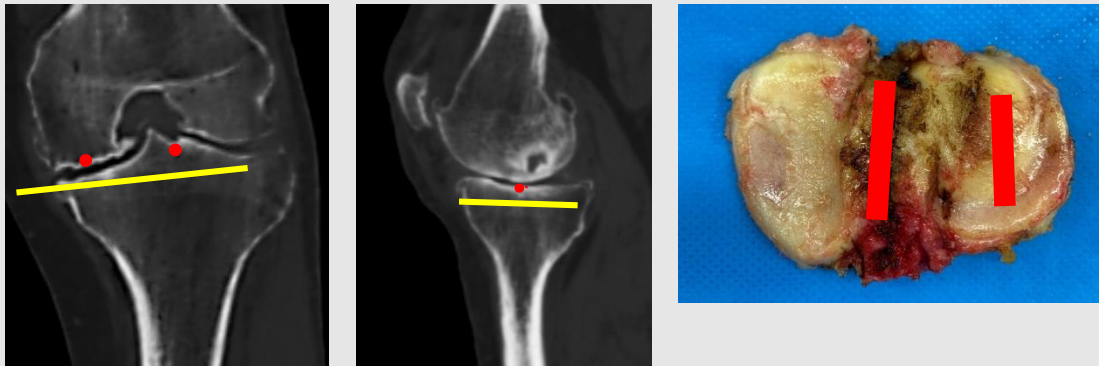
Methods

Reference points

Femur

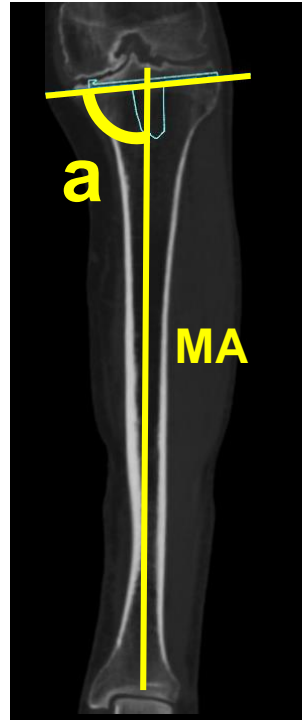


Tibia



Measurements

MPTA



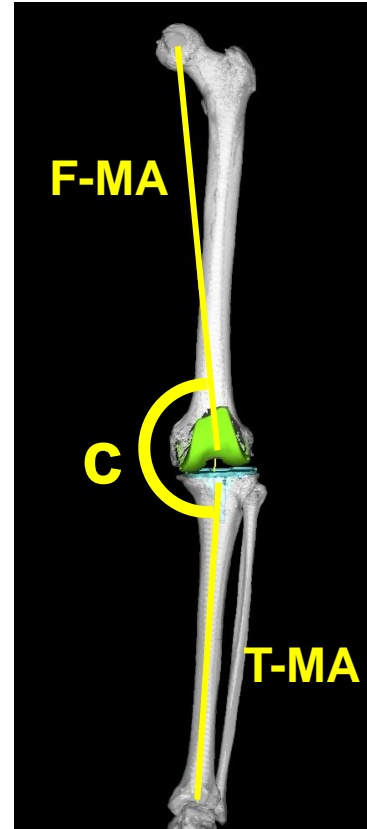
MPTA:
Medial Proximal
Tibial Angle

LDFA



LDFA:
Lateral Distal
Femoral Angle

HKA



HKA:
Hip-Knee-Ankle
Angle



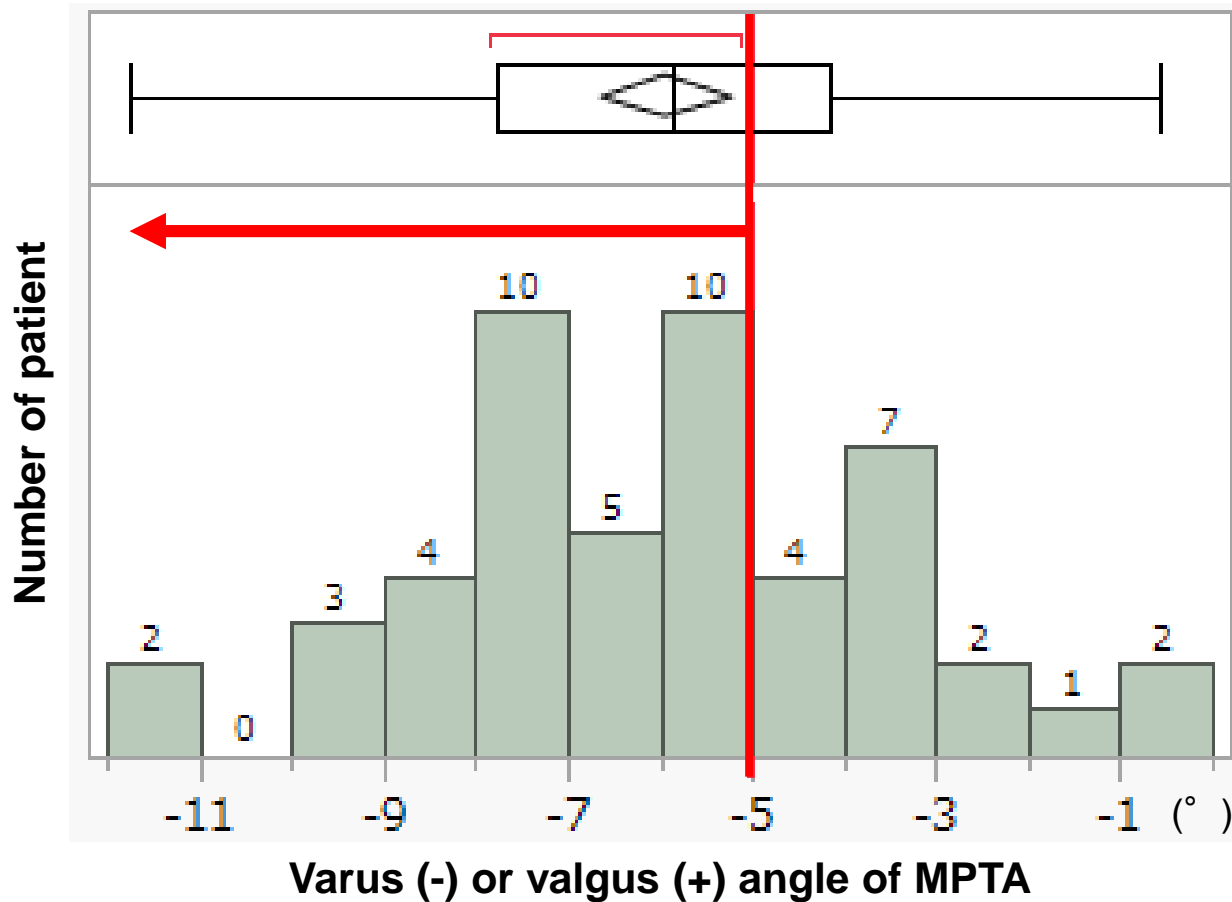
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Results

MPTA



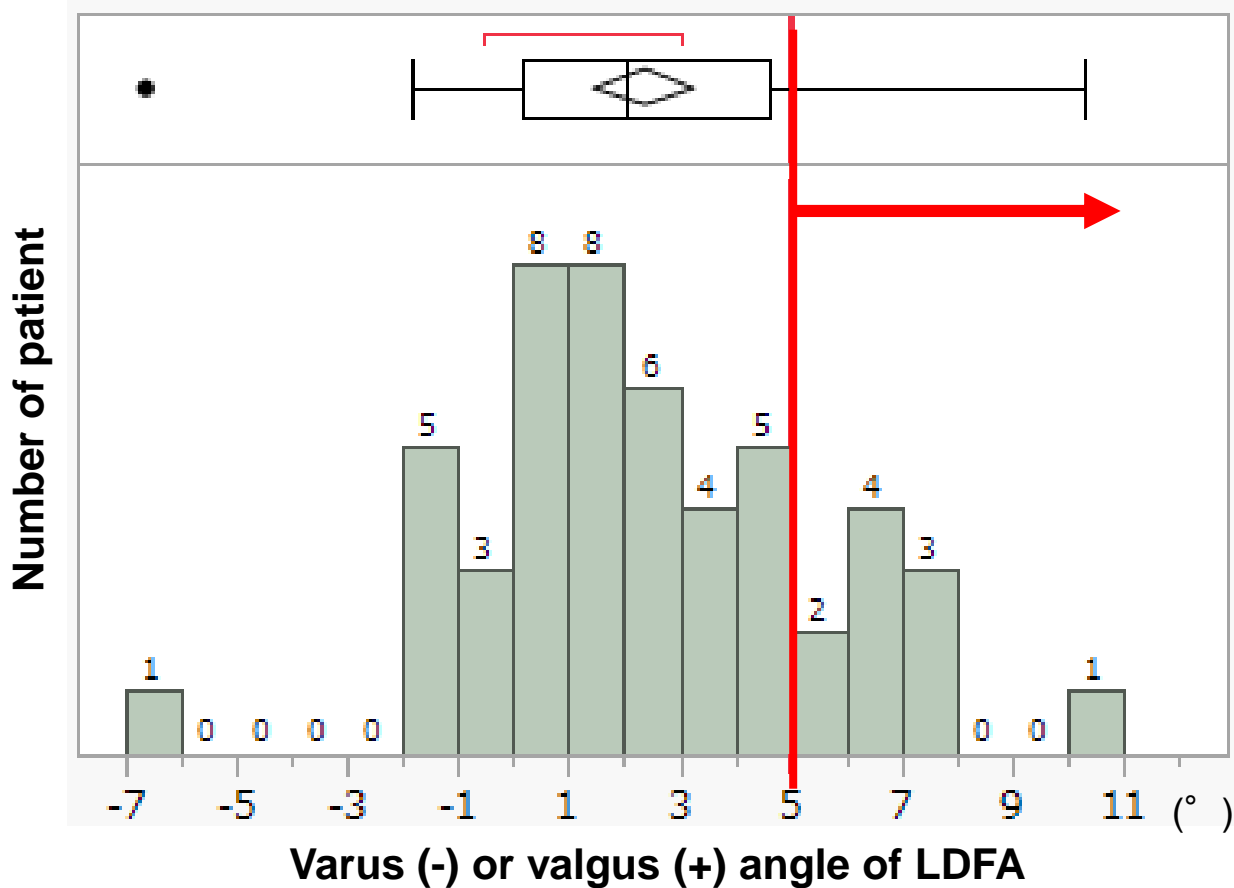
- Mean MPTA: $-5.9 \pm 2.5^\circ$
(-11.8° to -0.5°)

- **68%** of patients: MPTA of $< -5^\circ$

positive values: $90^\circ <$
negative values: $< 90^\circ$

Results

LDFA

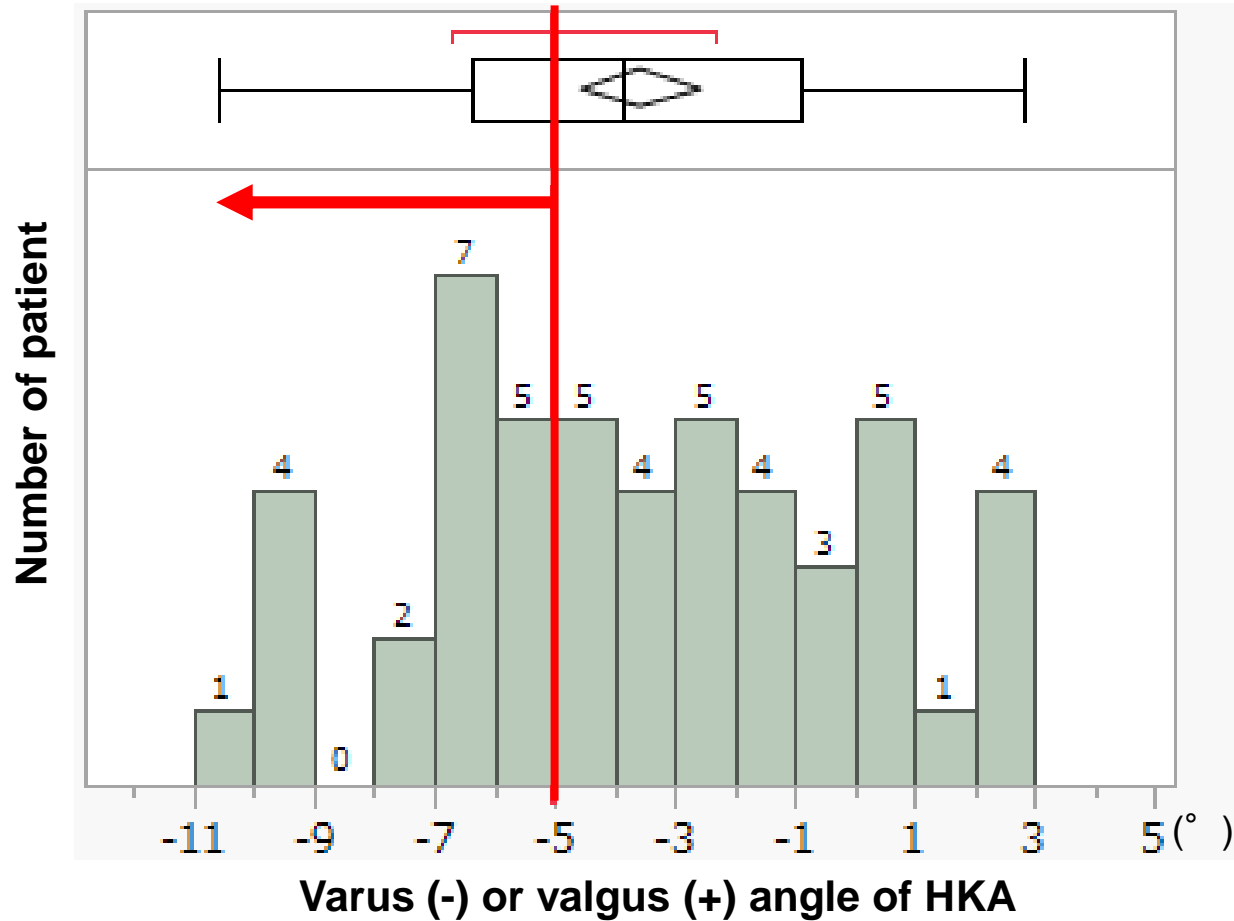


- Mean LDFA: $2.4 \pm 3.1^\circ$
(-6.6° to 10.3°)
- **20%** of patients: LDFA of $> 5^\circ$

positive values: $90^\circ <$
negative values: $< 90^\circ$

Results

HKA



- Mean HKA: $-3.6 \pm 3.6^\circ$
(-10.6° to 2.8°)
- **38%** of patients: HKA of $< -5^\circ$

positive values: $180^\circ <$ (valgus)
negative values: $< 180^\circ$ (varus)

Discussion

- Mean **MPTA**: $-5.9 \pm 2.5^\circ$ (-11.8° to -0.5°)
- **68%** of patients: **MPTA** of $< -5^\circ$

- Mean **HKA**: $-3.6 \pm 3.6^\circ$ (-10.6° to 2.8°)
- **38%** of patients: **HKA** of $< -5^\circ$

- ✓ This study: **56%** of patients showing a HKA of $< -3^\circ$
- ✓ Howell et al.: **8%** of patients showing a HKA of $< -3^\circ$ ^[3]

Risk of excessive varus inclination / varus alignment

- lift-off of >3 mm: alignment $>3^\circ$ varus & lateral laxity >2 mm ^[5]
- Positive correlation between tibia inclination & varus change at 10 years ^[6]

Conclusion

- The excessive joint line obliquity can occur when calipered KA TKA is performed in Japanese patients with varus OA knees
- Surgeons should consider employing modifications when determining the coronal alignment of the proximal tibial cut for calipered KA TKA in the patients with excessive varus deformity, such as Japanese population.

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