ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

High Incidence Of Torsional Deformities In Knee Osteoarthritis In Asian Population

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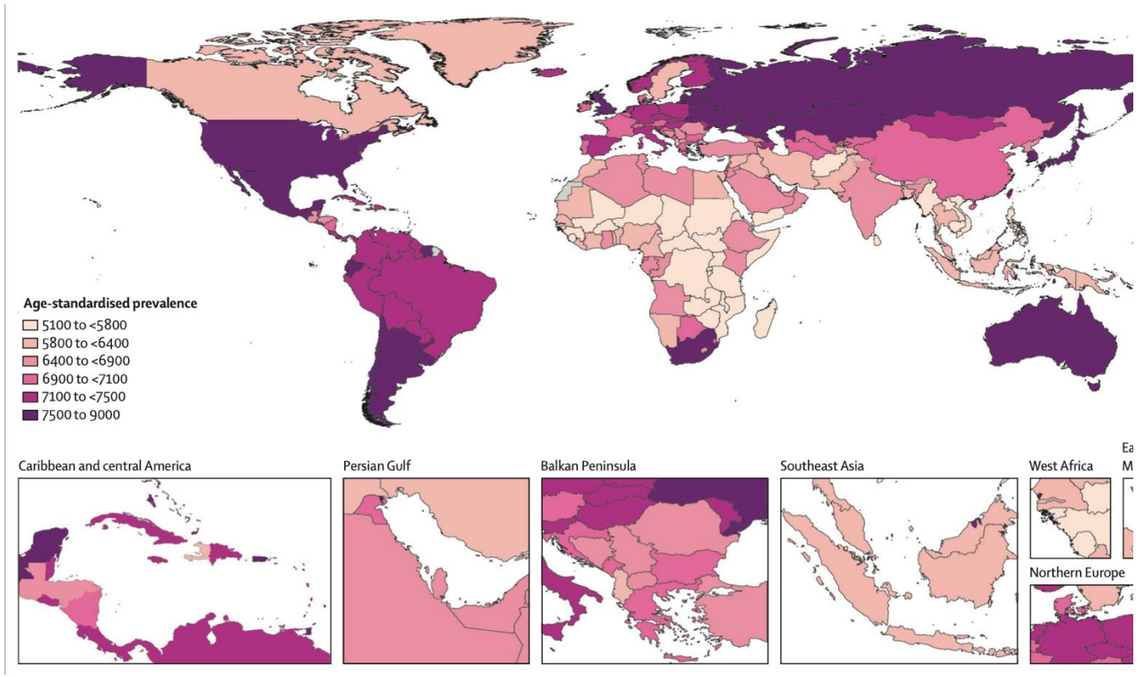
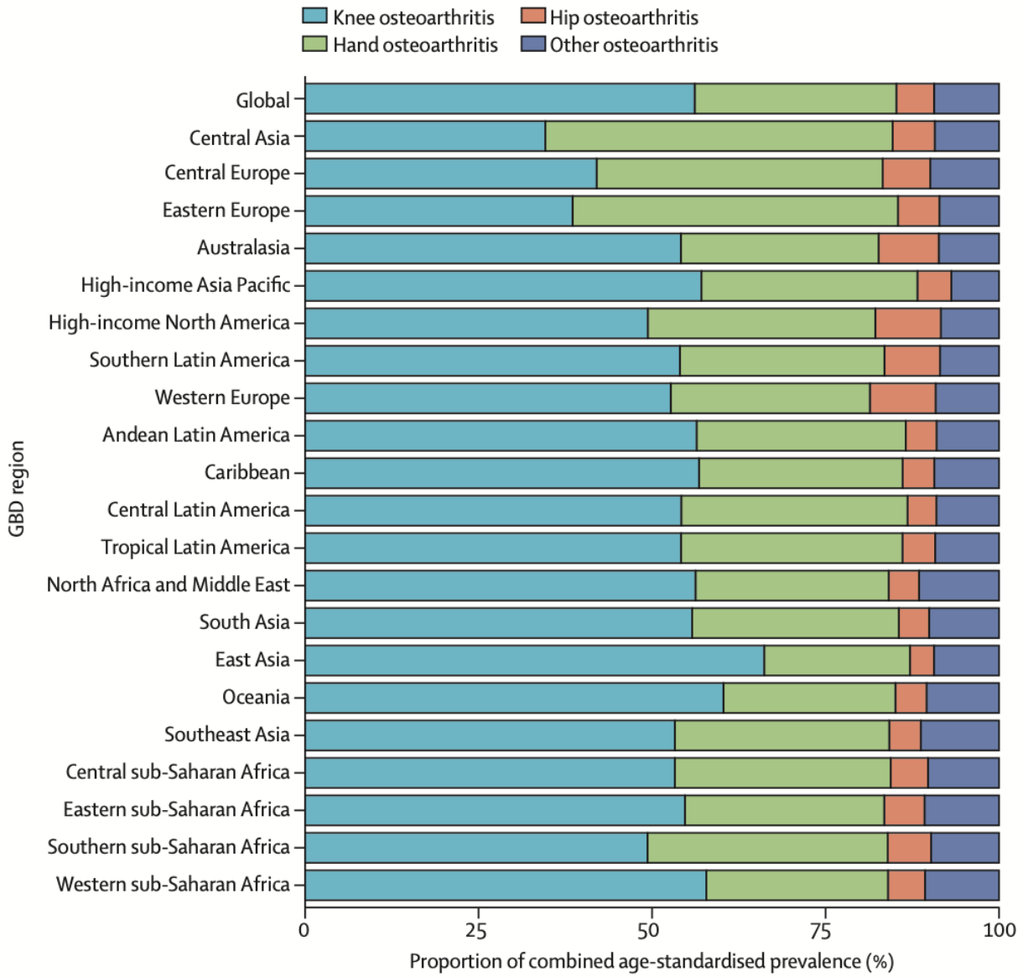
Faculty Disclosure Information

- Nothing to disclose

Background





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Purpose

- The purpose of this study is to investigate the incidence of lower limb rotational deformities in an Asian population with knee osteoarthritis (KOA), as well as analyze if these have any relationship with hip-knee-ankle angle (HKA), lateral distal femoral angle (LDFA) or medial proximal tibial angle (MPTA).

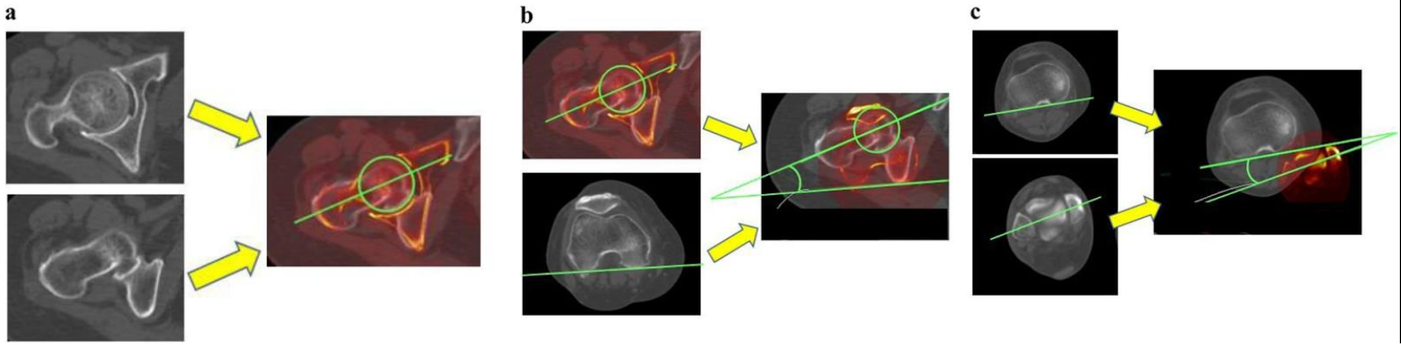
Materials & Methods

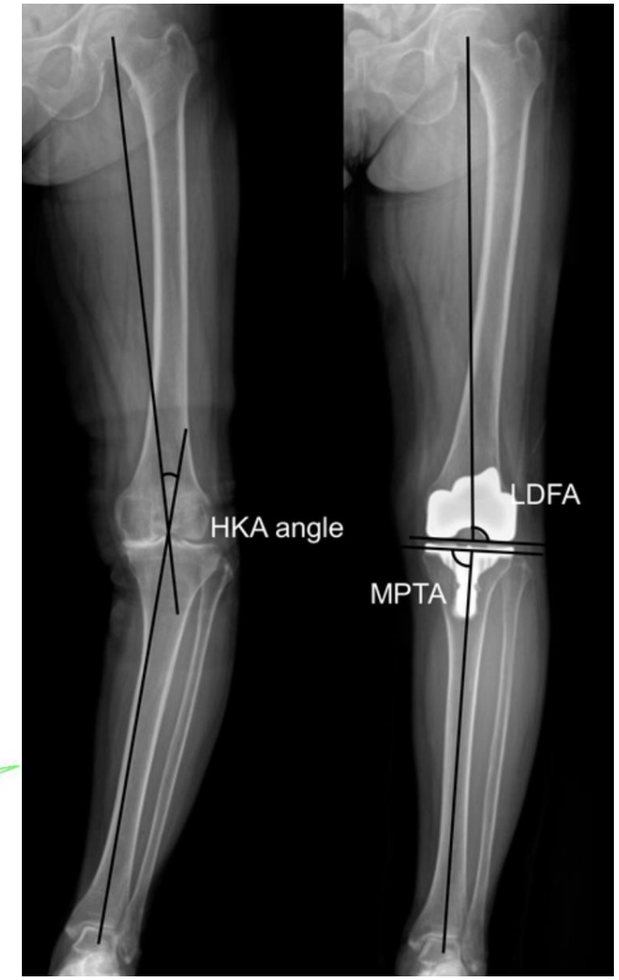
- Retrospective Cohort Study

- Total of 238 Patients (264 knees) from September 2018 to April 2024
  - Inclusion Criteria
    - Planned for unilateral knee arthroplasty (UKA) or total knee arthroplasty (TKA) for KOA
    - X-ray and CT images obtained pre-operatively for surgical planning
  - Exclusion Criteria
    - Patients with previous lower limb procedures or underlying morphology (previous fractures, bone tumors, innate bone metabolic diseases)

Materials & Methods

- Data extraction
  - HKA, LDFA and MPTA
    - Anteroposterior long leg films were obtained using a standardized protocol, with patients standing full weight-bearing, with knees in full extension.
  - Tibial and Femoral Torsion
    - Whole leg CT images were obtained with patients lying in supine position.





Materials & Methods

- Statistical analysis (SPSS)
  - The Pearson correlation coefficient was used to analyse the relationship between tibial or femoral torsion and HKA, LDFA or MPTA.
  - Inter- and Intra-observer reliability was evaluated by calculating intraclass correlation coefficient (ICC) and Cronabach alpha respectively for 30 knees selected at random.

Results

- Demographics Data (n=264)
  - Age Range: 60s-70s
  - Mean BMI: 25.9
  - Balanced Gender Ratio
  - KOA Kellgren-Lawrence Grade II-IV
- Rotational Deformities Measurement Data
  - Femoral Torsion: 21.7°
  - Tibial Torsion: 22.6°

	Femoral Torsion	Tibial Torsion
Intra-observer ICC	0.85	0.83
Inter-observer ICC	0.82	0.78

Results

- CPAK Measurement Data
  - Mean HKA: 6.89°
  - Mean LDFA: 88.6°
  - Mean MPTA: 85.6°

	HKA	LDFA	MPTA
Intra-observer ICC	0.91	0.98	0.95
Inter-observer ICC	0.89	0.95	0.91

- Correlation between Torsional Deformities and CPAK

	HKA	LDFA	MPTA
Tibial torsion	r=-0.7824, p=0.206	r=-0.0303, p=0.625	r=-0.0305, r=0.623
Femoral torsion	r=-0.774, p=0.210	r=-0.0806, p=0.193	r=0.00916, p=0.882

Discussion

- Overall, there is a **high incidence of femoral anteversion and tibial external rotation** in KOA in the Asian population
- However, there was no significant relationship between both torsions with the coronal alignment
- The presence of lower limb torsion will lead to inaccuracies in knee arthroplasty
  - Rotational deformities should be considered while performing TKA to avoid unsatisfactory alignment and poor outcomes

Study Limitations

- Findings mainly relevant to Asian population
- Femoral and tibial torsions were measured supine, whereas HKA, LDFA, and MPTA were measured standing
  - Anteroposterior standing radiographs could increase joint line convergence angle and affect HKA
  - LDFA and MPTA might be less affected by anteroposterior standing radiographs

Conclusion

- There is a high incidence of femoral internal and tibial external torsion with no correlation between femoral or tibial torsion and HKA, LDFA or MPTA in the Asian population.

- Further studies evaluating various populations, relationships between both torsional morphologies and effect on the meniscus should be conducted
  - This could guide surgeons during their pre-operative planning on whether to anticipate a damaged meniscus for repair intra-operatively

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