

Clinical Anatomy of the Ligament of the Head of the Femur

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INTRODUCTION

- LHF is an intra-articular structure of the hip that is now believed to act as a secondary stabiliser.
- LHF morphometry and its specific attachment sites informs appropriate graft size and ideal fixation sites during reconstruction surgeries.

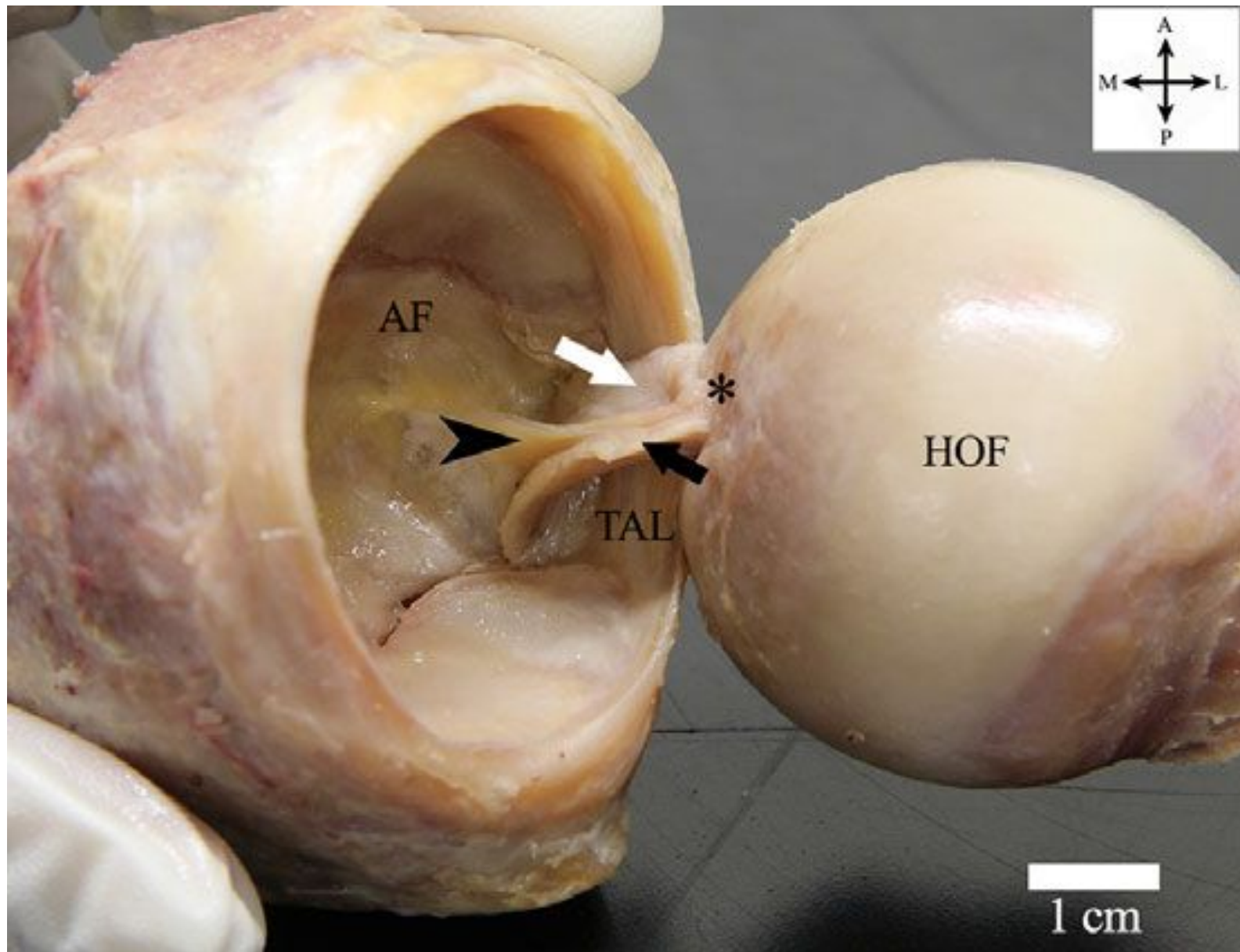


Figure 1: Anterior band (white arrow) and posterior band (black arrow) of LHF.

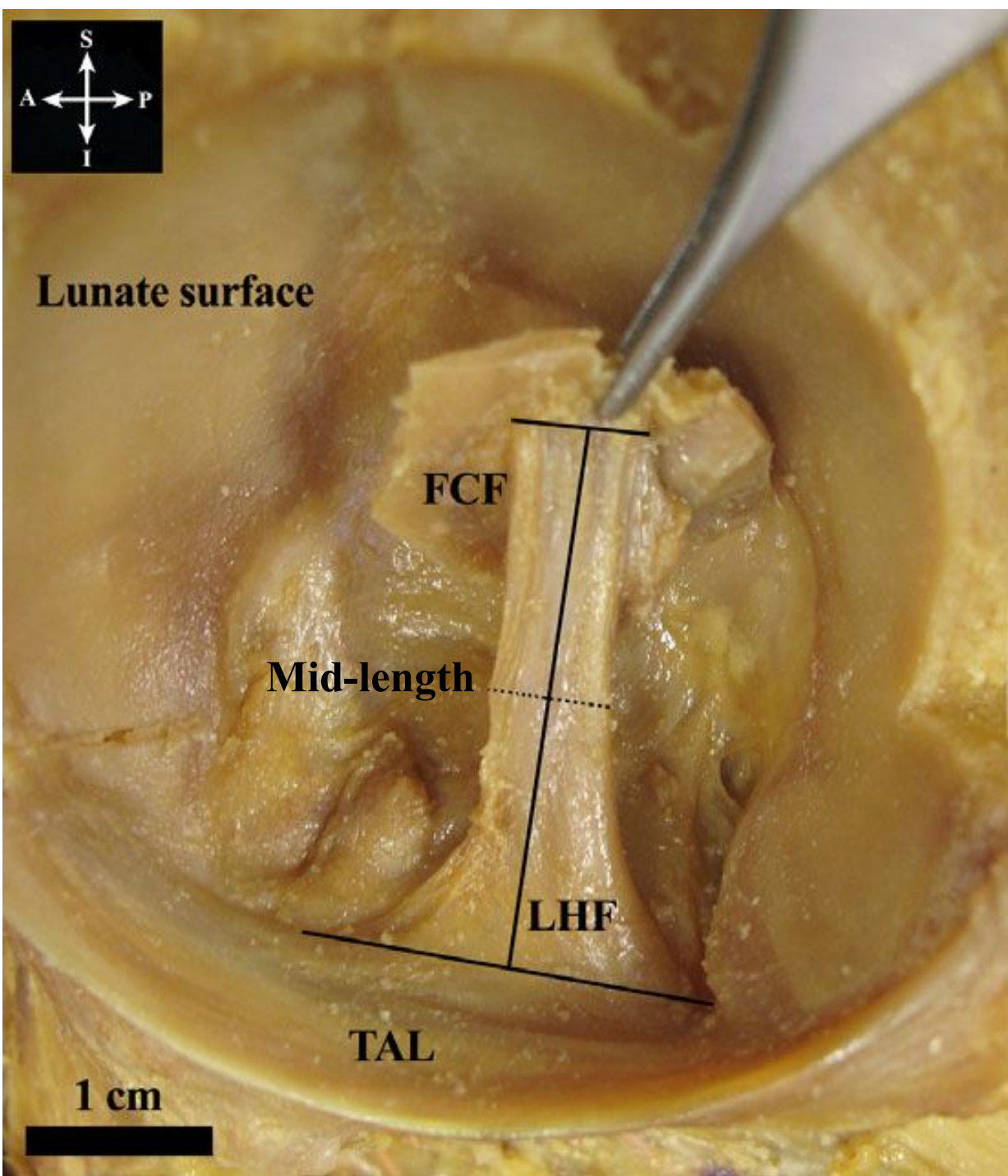


Figure 2: Measurement technique for the LHF morphometry. FCF, fovea capitis femoris; TAL, transverse acetabular ligament.

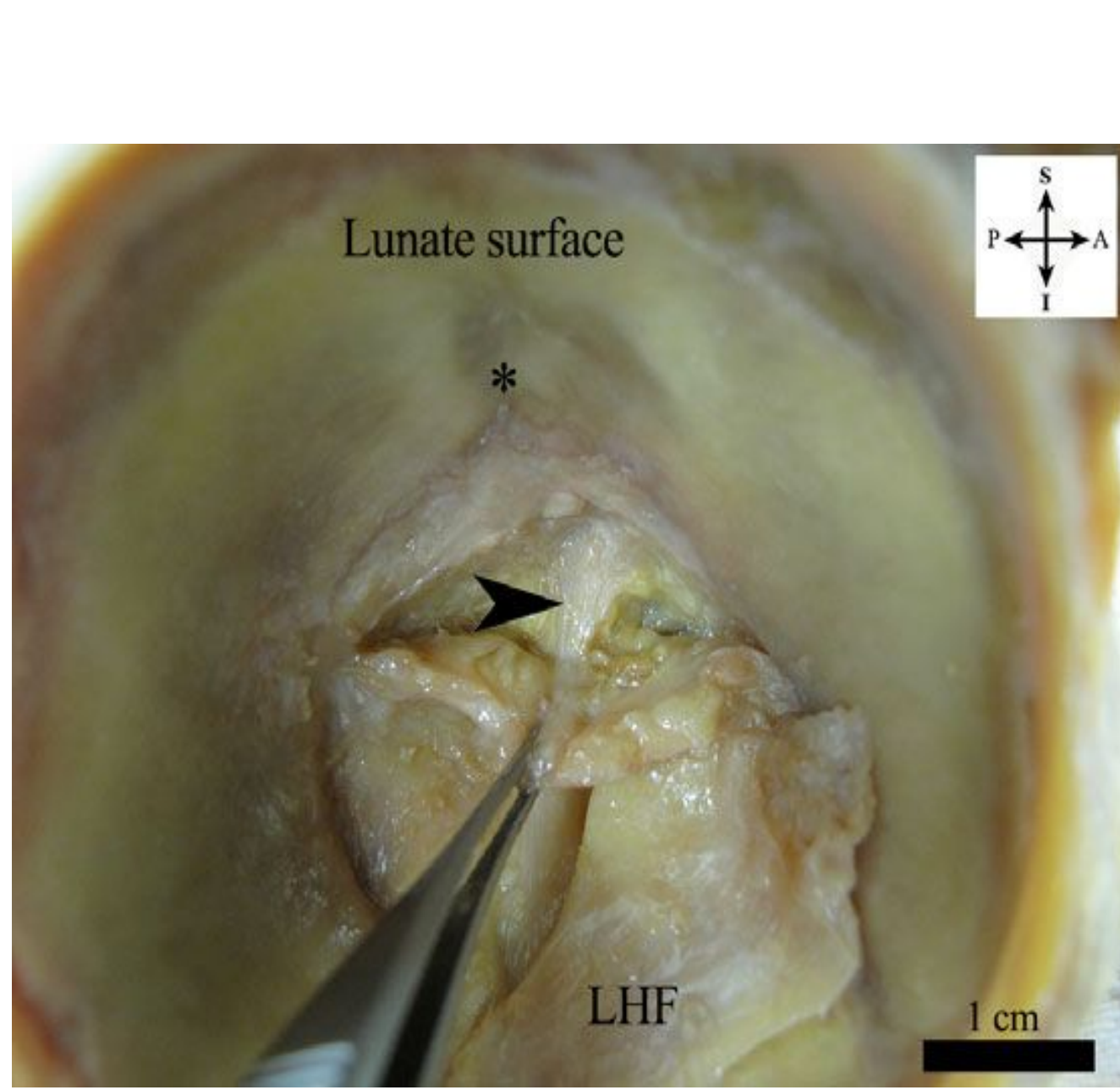


Figure 4: LHF fibres originating from the floor of the acetabular fossa (arrow head),

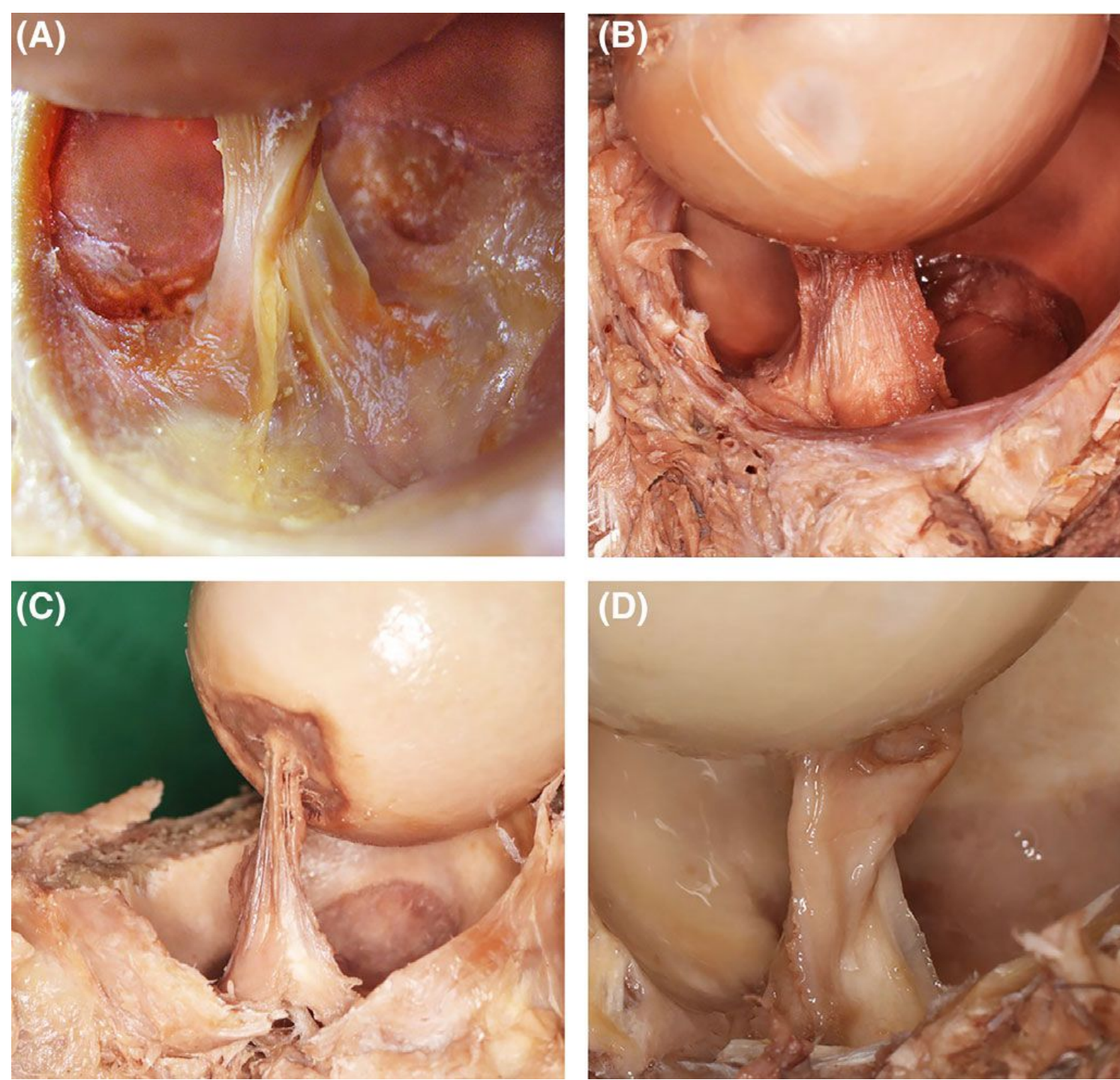


Figure 5: Morphologies of LHF observed: pyramidal (A), quadrangular (B), triangular (C), rod-shaped (D).

Morphology of LHF (Fig. 5):

- All New Zealand hips observed to have pyramidal shape.
- Asian hips were quadrangular (60.2%), triangular (33.3%) or rod-shaped (3.7%).
- Flat (81.9%) or oval (19.1%) toward foveal attachment (81.9%).
- Single distal attachment site (FCF) - 13.9 ± 4.3 mm transversely, 18.1 ± 4.6 mm longitudinally.

Morphometry of LHF (Table 1):

- Wider ($p=0.0011$), thicker ($p=0.0003$) at FCF insertion versus mid-zone.
- No significant difference in dimensions between sides (length $p=0.92$; width $p=0.25$; thickness $p=0.79$) or between sexes (length $p=0.34$; width $p=0.44$; thickness, $p=0.3$).
- No significant correlation between longitudinal ($r=0.34$, $R^2=0.12$) and transverse ($r=0.26$, $R^2=0.07$) foveal diameters and size at FCF insertion.

Table 1: Measurements of LHF, expressed as mean values in mm $\pm$ SD.

Length	Width (base)	Width (mid-zone)	Width (apex)	Thickness (mid-zone)	Thickness (apex)
22.3 ± 4.4	14.3 ± 5.4	10.2 ± 4.2	12.2 ± 4.4	1.8 ± 1.0	2.4 ± 1.4

DISCUSSION

- Extra-ligamental vascular supply and intra-articular fat pad suggest a potential protective role of the LHF.
- Floor of acetabular fossa and distal FCF attachment can be considered as sites for graft fixation during ligament reconstructions.
- LHF showed consistent shape in New Zealanders, but had varying morphology in Asians. LHF length was consistent and appeared to be smaller than the acetabular fossa despite morphometric variations.
- Future Work:** As the superior synovial fold at the base of the LHF might be a confounding factor in radiological diagnosis, a follow-up study of its structure in healthy subjects can help differentiate partial LHF tears from normal variation of the superior synovial fold more precisely.

REFERENCES

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AIM

- To examine the morphology and morphometry of the ligament of the head of the femur (LHF), and identify its precise attachment sites.
- To compare the LHF morphology between sexes, sides, and between European and Asian individuals to identify anatomical differences.

METHODS

Embalmed bilateral hip joints of New Zealand and Thai cadavers were dissected to systematically study the LHF.

- Morphological features of LHF: shape, extent, profile, proximal and distal attachments, arteries, synovial perforations and plicae.
- Morphometrical features of LHF: length, width and thickness, measured at base (compared to acetabular notch), mid-zone and apex (compared to fovea capitis of femur [FCF]).

RESULTS

Key features of LHF:

- Synovial membrane invests LHF and inserts at FCF.
- Main proximal attachments (Fig. 4): central (acetabular) margin of TAL, and posterior (ischial) and anterior (pubic) edges of acetabular notch.
- Fibrous bands converge towards FCF, with posterior band larger than anterior band (Fig. 1). LHF has firm fibrous attachment to floor of acetabular fossa and anterior edge of acetabular notch.
- Ligamental vessels originate from obturator artery, entering hip joint through inferomedial quadrant of acetabular foramen below the TAL before entering LHF at its middle third.

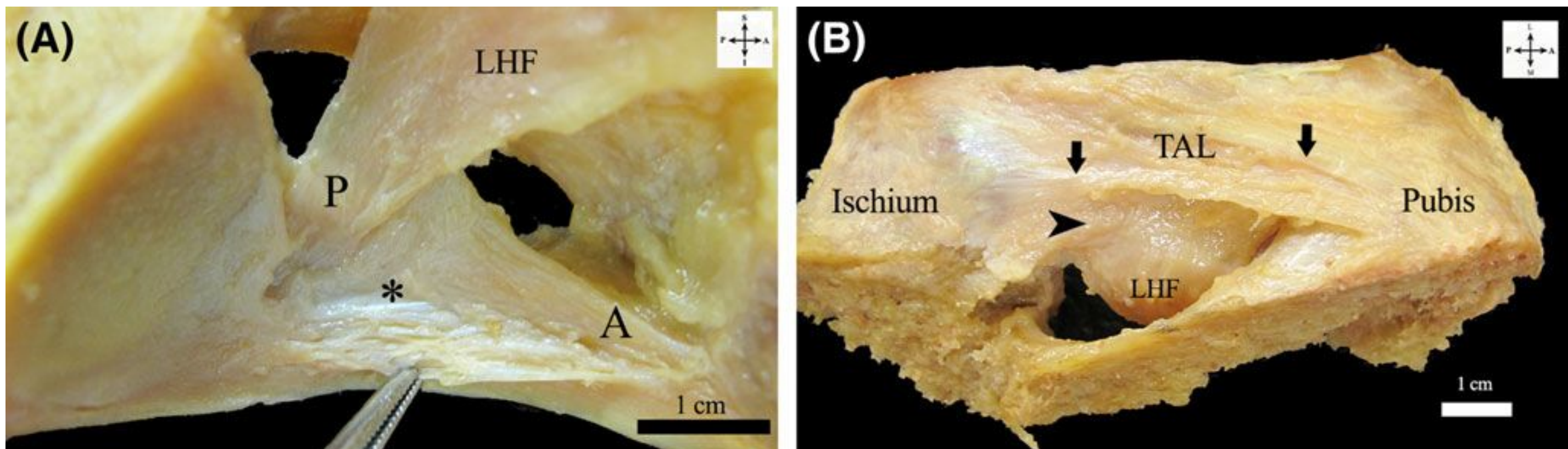


Figure 3: Superior (A) and inferior (B) view of hip joint. Anterior and posterior parts of the deep fibres of TAL (arrow head) originated from periosteum of pubis and ischium respectively, and decussated to blend with anterior (A) and posterior (P) bands of LHF.

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