 INTRODUCTION

• The medial patellofemoral ligament (MPFL) is the primary passive soft-tissue restraint to lateral patellar displacement. 1, 2
• Patella alta contributes to patellofemoral instability in that it leads to a loss of joint congruity, causing the patella to travel unconstrained into deeper degrees of flexion. 3-7
• The effects of patella alta, as measured by the Caton-Deschamps Index (CDI), on MPFL isometry have yet to be elucidated.

OBJECTIVES

1. Creation of a cadaveric biomechanical model to investigate MPFL isometry while manipulating the CDI & MPFL femoral attachment.
2. Assess MPFL length change characteristics associated with various degrees of patella alta.
3. Assess MPFL length change characteristics associated with various MPFL femoral attachment sites with various degrees of patella alta.

METHODS

• 10 fresh frozen cadaver knees
  • Fixed femur and tibia mobile through 120° of flexion
  • Linear array of 4 candidate femoral attachment sites
  • Suture anchor at the upper 40% of the medial border of the patella
  • Retroreflective markers attached to the femur, tibia, patella, and suture
  • Flat TT osteotomy and transfer to create patella alta with CDIs of 1.3, 1.4 and 1.5
• MPFL length change measured
  • 3D motion capture system through a range of motion between 0° - 110°
  • All candidate femoral attachment sites
  • All CDIs

RESULTS

Fig 1. MPFL length change throughout Range Of Motion in the setting of Native tibial tubercle location. CDI 0.99 Std dev 0.09. Schottlie’s area was more isometric through 10-70° range of motion than any other candidate femoral attachment location.

Fig 2. MPFL length change throughout ROM with CDI 1.3. p05 was more isometric through 10-70° range of motion than any other candidate femoral attachment location.

Fig 3. MPFL length change throughout ROM with CDI 1.4. p05 was more isometric through 10-70° range of motion than any other candidate femoral attachment location.

Fig 4. MPFL length change throughout ROM with CDI 1.5. p10 was more isometric through 10-70° range of motion than any other candidate femoral attachment location.

CONCLUSIONS

• With native tubercle anatomy and normal patellar height, CDI ~1, Schottlie’s point, p00, demonstrated the greatest MPFL isometry.
• With increasing patellar height, more proximal candidate femoral insertion sites more closely approximated MPFL isometry compared to p00.
• Patients with patella alta may natively have a more proximal femoral MPFL attachment than previously described
• Previous cadaveric investigations of the MPFL have been in knees with normal patellar height
• None of the varied femoral insertions produced isometry over the entirety of the flexion range from 0 - 110°
• A tibial tubercle distalization may be necessary in order to achieve a maximally isometric MPFL reconstruction.

REFERENCES


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