



PEDIATRIC OSSEOUS AND CARTILAGINOUS TROCHLEAR DEVELOPMENT – IMPLICATIONS FOR TROCHLEA DYSPLASIA AND TROCHLEAPLASTY



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INTRODUCTION

- The developmental anatomy of the trochlea and its relationship to patella stability remains poorly understood.
- Trochlear dysplasia is a major risk factor for patellofemoral instability.

PURPOSE

- To describe the developmental changes of the osseous and cartilage trochlear morphology in skeletally immature specimens.

METHODS

- Using computed tomography in patients aged 2 months to 11 years in the axial plane, measurements include osseous and cartilaginous condylar heights, osseous and cartilaginous sulcus angles, condylar height asymmetry, and trochlear depth.
- In the sagittal plane, measurements included curvilinear trochlear length, direct trochlear length, condylar height, and patellar sulcus angle.

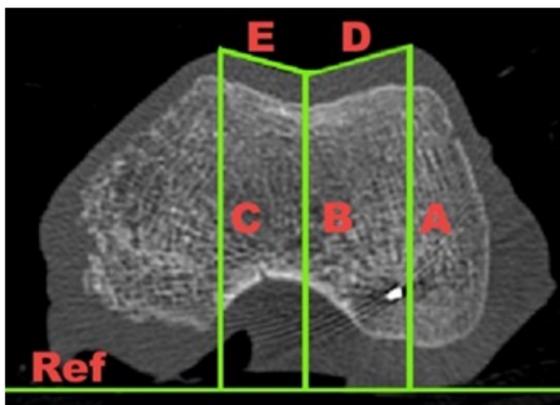


Figure 1: Axial CT with examples of Cartilaginous measures of lateral (A), central (B), and medial (C); as well as medial (E) and lateral (D) facet lengths.

RESULTS

- Condylar height in the axial and sagittal planes, condylar height asymmetry, and trochlear depth demonstrated an increase in size as age increased.
- Osseous condylar asymmetry increased with age but flipped from a larger medial condyle to a larger lateral condyle around age 8.
- PSA, OSA, and CSA all decreased with age until about the age of 8 with OSA changing the most.

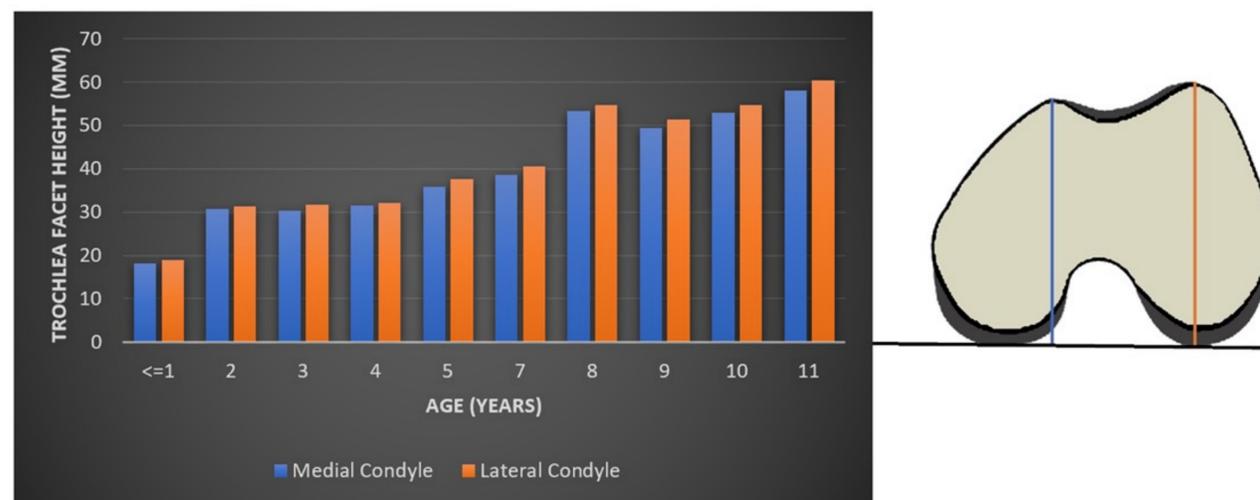


Figure 2: The mean medial and lateral cartilaginous trochlear height are identified with respect to age and a corresponding diagram of measurement locations.

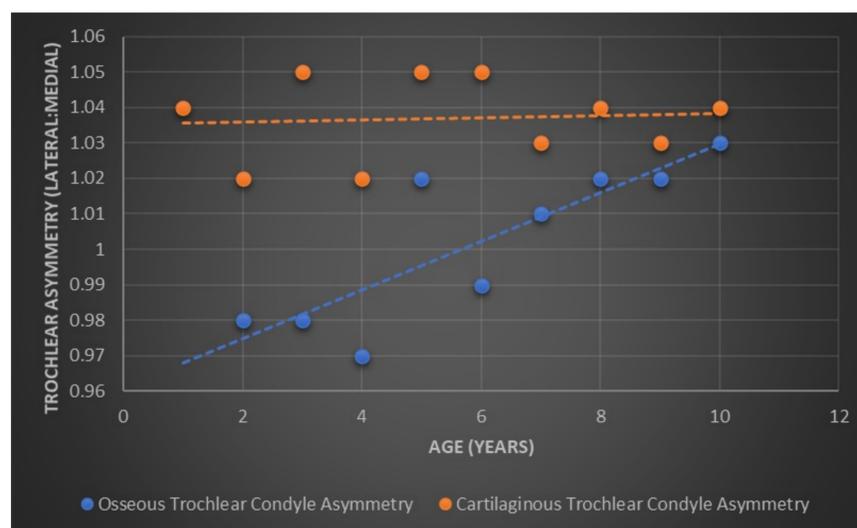


Figure 3: The mean osseous and cartilaginous trochlear condyle asymmetries are identified with respect to age. Values <1 signify a larger medial trochlear condyle and values >1 signify a larger lateral trochlear condyle.

LIMITATIONS

- The evaluation of when trochlear development is completed was limited by a population with a maximum age of 11 years.

CONCLUSIONS

- An increase in trochlear height as age increased by all measurements analyzed through the age of 11 suggests a still developing trochlea past this age.
- By age 8, a plateau in sulcus angle and sulcus depth suggests more proportionate growth after this point.
- Similar changes in trochlea and patella shape with age; using measures of OSA, CSA, and PSA, suggests that the two structures may affect each other during development.

FUTURE DIRECTIONS

- This information can help design, develop, and determine timing of procedures that may alter the anatomy and stabilize the trochlear and patella-femoral joint.

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