

VALIDATION OF ULTRASOUND USE FOR EVALUATION OF THE FEMORAL TROCHLEA

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Background: Patellar dislocations are a common knee disorder in the pediatric population. While there are many factors that play a role in patellar instability, trochlear dysplasia is a well-recognized contributor. The objective assessment of trochlear dysplasia with axial MRI has previously been found to be reliable in skeletally immature patients; however, MRI is costly, can require sedation in young patients, and is not always easily accessible in the ambulatory setting. The purpose of our study was to develop a method to evaluate the morphology of the femoral trochlea using ultrasonography (US) and to validate this method in comparison to magnetic resonance imaging (MRI) of the knee.

Materials/Methods: We recruited 10 patients undergoing MRI of the knee for knee pain. These patients underwent ultrasound evaluation of the same knee during the clinical encounter for their MRI. The knee ultrasound was performed by a pediatric fellowship trained radiologist. We performed transverse imaging of the knee, imaging the knee in three positions: in extension and viewed from an infrapatellar view, seated with the knee flexed 90 degrees, and seated with the knee flexed 135 degrees. At a later date, the radiologist evaluated the blinded ultrasound images, measuring the sulcus angle, facet asymmetry, trochlear depth, and lateral facet inclination. The same radiologist subsequently evaluated the blinded MRI images and measured the sulcus angle, facet asymmetry, trochlear depth, and traditional and modified lateral facet inclination. We compared the ultrasound and MRI measurements to determine the level of correlation between methods.

Results: There was excellent correlation between MRI and US measurements of trochlear morphology for all variables evaluated (Table 1).

Conclusions: Ultrasound guided evaluation of trochlear morphology correlates well with traditional objective measurements of trochlear morphology performed on MRI. This represents an affordable and accessible diagnostic modality to evaluate dysplasia of the patellofemoral joint.

Images / Graph / Table

Table 1 – Correlation of US and MRI Measurements of Trochlear Morphology

Compared Measurement Variables		R Coefficient
Ultrasound	MRI	
Sulcus Angle Knee Flexed 135°	Sulcus Angle	0.90
Facet Asymmetry	Facet Asymmetry	0.71
Trochlear Depth	Trochlear Depth	0.83
Lateral Facet Inclination	Modified Lateral Facet Inclination	0.86

US = Ultrasound; MRI = Magnetic Resonance Imaging