Abstract: **Professional Pitchers Display Differences in Ulnar Collateral Ligament Morphology and Elbow Gapping Following UCLR Compared to Uninjured Pitchers**

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Background: Ulnar collateral ligament (UCL) reconstruction of the elbow is a common in pitchers. While ultrasound has been used to evaluate the uninjured elbow, there is limited evidence characterizing the elbow joint and UCL following UCL reconstruction.
Purpose: To describe the characteristics and morphology of the UCL and ulnohumeral joint post UCLR and compare these structures to uninjured elbows in professional baseball pitchers.
Design and Setting: Clinical study utilizing a case control design
Participants: 70 asymptomatic professional baseball pitchers (6 with a history of UCL reconstruction)
Methods: Ultrasound imaging was used to assess the medial joint laxity of both arms of the professional pitchers during spring training. Medial joint laxity and UCL morphology was assessed using OsiriX Imaging Software under 2 conditions: (1) gravity valgus load and (2) 10 lbs of valgus load using a handheld dynamometer with the shoulder in the maximal cocking position and the elbow in 90° of flexion. Two trials of resting position, loaded elbow gapping, UCL thickness were collected, measured and averaged for data analysis. Intra and inter rater reliability was established and maintained with ICC's in the acceptable range for all measures (.84-.99). Separate mixed model ANOVAs(side X UCL) were used to compare pitchers' dominant and non-dominant arm variables between those with an UCL injury to those who never had a UCL injury.(α=0.05)
Results: Players with a history of UCL injury presented with significantly narrower (mm) D arm resting joint opening (2.6±2.9vs4.2±1.2;P=0.002), less loaded gapping (3.5±4.1vs5.6±1.2; P=0.001) and greater ligament thickness (.17±.07vs.11 ±.08;P=0.03) when compared to pitchers without UCL injury history(Figure 1). There was a significant interaction effect (P=0.001) for (resting and gapped joint opening). Post hoc testing revealed pitchers with a history of an UCL reconstruction demonstrated narrower joint space at rest and loaded as well as a thicker UCL.
Conclusion: Our data suggests that the UCL following UCLR represents a thicker, more stiff construct detectable on ultrasound in professional pitchers. Future studies may consider this approach to evaluate surgical techniques and graft types for UCL reconstruction.
Clinical Relevance: The ultrasound technique as described appears to provide a clinically feasible method to assess UCL thickness, loaded joint gapping, and stiffness post-UCL reconstruction. The use of common, inexpensive clinical tools to access the status of the UCL can assist clinicians in determining readiness for participation.