Impact of Draft Order on Stress Sonography of the Ulnar Collateral Ligament of the Elbow in Professional Baseball Pitchers: An 18-Year Study

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INTRODUCTION

The MLB draft is a common route for players to enter professional baseball in the United States. Individuals taken in earlier rounds are typically higher-performing players.

When looking at pitchers specifically, higher performance at the amateur level may be associated with increased frequency of adaptive change in the throwing elbow. To determine if players taken in earlier rounds of the MLB draft have a greater frequency or extent of pathological change in the elbow, as measured by dynamic stress ultrasound.

MATERIALS & METHODS

Dynamic stress ultrasounds (SUS) were performed over an 18-year period on the dominant and nondominant arms of 651 professional pitchers. The 383 players who were drafted were grouped according to which round they were drafted in (rounds 1-5, 6-10, 11-20, 21+).

Groups were compared with respect to "relative" ulnar collateral ligament thickness (dominant – nondominant), "relative" ulnohumeral joint laxity (joint space distance under stress – distance at rest), and the presence of pathology (calcifications, tears, hypoechoic foci, osteophytes).

Additionally, a subgroup analysis was done to compare progression of SUS findings over a 3-year period in players for which data was available.

FIGURES and TABLES

	Round 1 – 5 (n=74)	Round 6 – 10 (n=58)	Round 11 – 20 (n=107)	Round 21+ (n=144)	P Value
Relative UCL Thickness (mm)	1.48 (1.63)	1.29 (1.76)	1.43 (1.55)	1.46 (1.65)	.932
Relative Laxity (mm)	0.41 (1.02)	0.38 (1.16)	0.36 (0.82)	0.34 (0.88)	.996
Dominant Arm Pathologies					
Any Pathologies Present	29 (39.2%)	25 (43.1%)	49 (45.8%)	55 (38.2%)	.642
Calcification Present	14 (18.9%)	11 (19.0%)	27 (25.2%)	26 (18.1%)	.531
Calcification Size (mm)	4.70 (3.04)	3.15 (1.88)	5.35 (1.89)	3.19 (1.48)	**.013***
Tear Present	1 (1.35%)	0 (0.00%)	1 (0.93%)	2 (1.39%)	1
Hypoechoic Foci Present	21 (28.4%)	18 (31.0%)	28 (26.2%)	27 (18.8%)	.198
Osteophyte Present	5 (6.76%)	6 (10.3%)	12 (11.2%)	16 (11.1%)	.75

Table 1. Side to side comparison of dominant and nondominant arm initial ultrasound measurements. UCL = Ulnar Collateral Ligament. No (%), Mean (SD), Bold Indicates significance

	Round 1 – 5 (n=10)	Round 6 – 10 (n=9)	Round 11 – 20 (n=8)	Round 21+ (n=10)	P Value
Progression of SUS findings Over Time					
Progression of Relative UCL Thickness (mm)	0.30 (1.46)	0.93 (1.37)	1.85 (2.16)	-0.37 (1.10)	.057
Progression of Relative Laxity (mm)	-0.47 (1.47)	0.46 (1.22)	0.26 (0.98)	-0.01 (0.81)	.345
Progression of Pathologies in Dominant arm					
Calcification:					.202
Never Present	6 (60.0%)	6 (66.7%)	3 (37.5%)	9 (90.0%)	
Developed	1 (10.0%)	1 (11.1%)	1 (12.5%)	0 (0.00%)	
Resolved	2 (20.0%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	
Present at both times	1 (10.0%)	2 (22.2%)	4 (50.0%)	1 (10.0%)	
Change in Calcification Size (mm)	1.30 (.)	2.05 (1.34)	0.80 (1.27)	1.40 (.)	.823
Tear					.216
Never Present	10 (100%)	9 (100%)	7 (87.5%)	10 (100%)	
Developed	0 (0.00%)	0 (0.00%)	1 (12.5%)	0 (0.00%)	
Hypoechoice foci:					.083
Never Present	5 (50.0%)	5 (55.6%)	1 (12.5%)	9 (90.0%)	
Developed	3 (30.0%)	1 (11.1%)	4 (50.0%)	1 (10.0%)	
Resolved	1 (10.0%)	2 (22.2%)	2 (25.0%)	0 (0.00%)	
Present at both times	1 (10.0%)	1 (11.1%)	1 (12.5%)	0 (0.00%)	
Osteophyte:					.619
Never Present	7 (70.0%)	6 (66.7%)	6 (75.0%)	9 (90.0%)	
Developed	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (10.0%)	
Resolved	2 (20.0%)	2 (22.2%)	2 (25.0%)	0 (0.00%)	
Present at both times	1 (10.0%)	1 (11.1%)	0 (0.00%)	0 (0.00%)	

Table 2. Comparison of dominant and nondominant arm stress ultrasound measurements over 3-year period. SUS= Stress Ultrasound, UCL = Ulnar Collateral Ligament. For relative UCL thickness, a positive value indicates that the dominant arm UCL saw a relative increase in thickness during the study period compared to the non-dominant arm. For laxity, a positive result indicates a relative increase in laxity in the dominant arm over time. Mean (SD), No (%).

RESULTS

Draft round groups did not differ by age, number of prior spring trainings, or handedness. Comparing baseline measurements, there was no significant relationship between draft round and relative UCL thickness (P = .932), relative laxity (P = .996), or presence of pathology detectable on SUS (P = .642). However, increased relative UCL thickness was significantly associated with the presence of pathology on SUS (OR: 1.45, 95% CI [1.26-1.69], P < .001). Longitudinally, there was no significant relationship between draft round and 3-year progression of relative laxity, relative UCL thickness, or clinical progression of pathology.

DISCUSSION

Higher-performing pitchers are drafted earlier in the MLB draft. This may be attributable to peak pitch velocity, in-game performance, visibility gained during player showcases, or any number of other sport-specific variables. However, despite this, there was no significant relationship between draft round and adaptive changes to the elbow on SUS.

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