

Supplemental Appendix I

Table S1. Summary statistics for kinematic variables.

Variable	Position	Time Point (in the Throwing Motion)			
		FC	MER	BR	MIR
Torso Flexion (°)	Catchers	11.18 (9.18)	9.58 (8.77)	−1.07 (10.53)	−8.15 (12.17)
	Pitchers	12.19 (10.88)	−2.17 (11.21)	−16.12 (13.80)	−28.96 (17.78)
Torso Lateral Flexion (°)	Catchers	5.42 (12.33)	−12.21 (10.84)	−24.01 (12.62)	−33.98 (14.21)
	Pitchers	−3.46 (11.41)	−22.70 (11.88)	−34.97 (11.27)	−44.11 (9.59)
Torso Rotation (°)	Catchers	−93.28 (20.77)	2.00 (15.98)	20.01 (12.98)	20.67 (15.34)
	Pitchers	−88.83 (25.21)	−0.58 (15.75)	14.84 (15.14)	13.59 (18.48)
Pelvic Lateral Flexion (°)	Catchers	5.68 (7.82)	−0.40 (6.04)	−3.23 (7.85)	−3.84 (8.35)
	Pitchers	−2.90 (8.32)	−2.96 (5.64)	−5.10 (6.38)	−6.69 (7.19)
Pelvic Rotation (°)	Catchers	−73.13 (13.40)	−0.57 (16.35)	9.04 (14.52)	8.44 (13.63)
	Pitchers	−70.68 (12.41)	−5.91 (13.51)	4.38 (13.80)	2.51 (14.15)
Elbow Flexion (°)	Catchers	102.16 (73.17)	103.63 (72.42)	54.65 (38.00)	43.22 (30.10)
	Pitchers	102.13 (57.90)	62.88 (79.21)	43.32 (37.56)	34.76 (27.70)
Plane of Elevation (°)	Catchers	−17.39 (20.91)	15.50 (14.29)	14.74 (14.36)	30.34 (14.75)
	Pitchers	−21.41 (24.42)	11.87 (18.57)	11.49 (16.13)	26.00 (20.65)
Humeral Elevation (°)	Catchers	−90.85 (11.09)	−84.66 (12.82)	−77.92 (10.50)	−78.04 (9.41)
	Pitchers	−88.57 (14.98)	−87.95 (16.71)	−81.28 (16.15)	−83.27 (17.37)
Humeral External Rotation (°)	Catchers	−34.56 (18.12)	−86.56 (17.40)	−54.64 (15.91)	−4.69 (20.09)
	Pitchers	−41.25 (28.04)	−88.74 (20.79)	−57.93 (19.59)	−2.53 (24.37)
Hip Velocity (°/sec)	Catchers	288.55 (128.66)	404.59 (139.66)	143.78 (56.54)	126.16 (46.34)
	Pitchers	425.78 (165.27)	431.77 (136.08)	156.56 (65.88)	133.05 (60.67)
Torso Velocity (°/sec)	Catchers	297.78 (114.61)	775.11 (109.66)	403.67 (117.62)	253.02 (88.48)
	Pitchers	451.70 (226.04)	791.32 (112.13)	467.56 (72.74)	293.93 (64.56)
Humerus Velocity (°/sec)	Catchers	421.57 (174.04)	963.33 (209.63)	1666.09 (359.71)	956.62 (243.76)
	Pitchers	659.55 (249.79)	929.62 (134.93)	1713.41 (329.47)	1027.22 (262.57)
Forearm Velocity (°/sec)	Catchers	548.45 (267.28)	1392.36 (134.75)	2852.70 (372.33)	1044.38 (403.25)
	Pitchers	906.64 (347.18)	1376.41 (185.36)	2876.71 (257.13)	1005.61 (417.39)

All variables are shown as the mean (and standard deviation) calculated at that time point. For catchers, $n = 26$. For pitchers, $n = 24$. FC = foot contact; MER = Maximum external rotation; BR = ball release; MIR = maximum internal rotation.

Table S2. Summary statistics for kinetic variables.

Variable	Position	Time Point (in the Throwing Motion)		
		Phase 1	Phase 2	Phase 3
Shoulder Y Force (N/m)	Catchers	84.20 (43.89)	2.04 (89.44)	−83.87 (111.37)
	Pitchers	70.64 (31.36)	−57.51 (61.98)	−106.35 (41.21)
Elbow Y Force (N/m)	Catchers	37.97 (29.90)	−5.25 (86.14)	−36.89 (83.64)
	Pitchers	30.34 (21.71)	−39.63 (40.47)	−63.00 (31.54)
Shoulder Z Moment (N/m)	Catchers	−13.17 (11.09)	−8.59 (9.17)	−7.73 (10.56)
	Pitchers	−12.27 (7.02)	−9.16 (6.53)	−4.75 (13.30)
Elbow Z Moment (N/m)	Catchers	1.89 (6.15)	12.22 (12.36)	16.66 (17.20)
	Pitchers	1.55 (4.28)	9.14 (7.69)	12.83 (9.34)

All variables are shown as the mean (and standard deviation) calculated at that time point. For catchers, $n = 26$. For pitchers, $n = 24$. FC = foot contact; MER = Maximum external rotation; BR = ball release; MIR = maximum internal rotation.