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Relationship of Dynamic Balance with Kinematic Pitching Parameters in Collegiate Baseball Pitchers

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Pitching injuries in baseball are prevalent and pitchers have a higher rate of arm injury than fielders. Poor dynamic balance in pitchers may affect kinetic chain efficiency, thus altering forces on joints, increasing potential for injury. Previously, Y balance test (YBT) results have been found to be related to arm health in pitchers. **PURPOSE:** To investigate the relationship between dynamic balance and several pitching kinematic parameters. **METHODS:** Participants (N=10) were Division 1 college baseball pitchers (age=20.4±1.2; weight=84.4±6.02kg; height=186.5±6.29cm). They completed the YBT, dynamic balance testing [forward lunge test (FLT), unilateral stance test (UST), weight bearing squat test (WBST)], and a full body motion capture analysis of their pitching as part of pre-participation performance assessments. Several key kinematic variables associated with the pitching motion were extracted for analysis. We ran Pearson's r test to assess relationships of the pitching parameters and the dynamic balance data using SPSS. **RESULTS:** Correlations were found between YBT composite scores of both the lead and drive legs and max shoulder velocity (r=0.96, p=0.04 and r=0.97, p=0.03, respectively). The lead leg YBT anterior reach score was correlated to shoulder external rotation (SER) (r=0.99, p=0.006) and YBT posteromedial and posterolateral reach scores were both correlated with knee flexion at ball release (r=0.99, p=0.01 and r=0.99, p=0.007, respectively). The drive leg YBT posteromedial reach score was correlated with both elbow flexion at foot contact (r=0.98, p=0.02) and lateral trunk lean at max SER (r=0.96, p=0.04). On the UST, the lead leg with eyes open and the drive leg with eyes closed were both correlated with max SER (r=0.87, p=0.001 and r=0.71, 0.02, respectively) and the lead leg with eyes closed was negatively correlated with shoulder abduction at max SER (r=-0.73, p=0.02). With the FLT, lunge percent weight of the drive leg was correlated to SER at foot contact (r=0.78, p=0.007).

CONCLUSIONS: Our results confirm the relationship between dynamic balance and pitching kinematic parameters. Our findings infer the value of using dynamic balance tests (YBT, UST, and FLT) for potentially helping to predict and prevent injury in collegiate pitchers.