

Relationship Between Injury History and Pitching Biomechanics in Adolescent Baseball Pitchers

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Introduction

- Injuries to the elbow and shoulder are common among adolescent baseball players and are associated with extrinsic and intrinsic factors, including poor biomechanics and sports specialization
- Traditional motion analysis was used to identify relationships among pitching biomechanics, pitching history, and injury patterns within a group of adolescent pitchers

Methods

- Data collected from 21 health adolescent (aged 15-17) pitchers
- Subjects underwent one testing session to obtain health and injury history, playing experience, and motion analysis
- Subjects were stratified into groups based on pain and specialization status
- Motion analysis variables were statistically analyzed and compared with health and playing information

Hypothesis

- Pitchers with higher elbow torque will be more likely to report elbow pain
- Pitchers with higher humeral internal rotation torque will be more likely to report shoulder pain
- Pitchers with presence of either elbow or shoulder pain will be more likely to be classified as specialized

Results

- No significant differences between groups in playing experience, injury history, biometrics or peak pitch velocity
- Lead foot position at foot contact significantly different between NS (-8.5±9.4 cm) and S (6.8±11.0 cm) ($p = 0.007$)
- Timing of max hip-to-shoulder separation angle during pitch cycle (PC) significantly different between the NS (3.4 %PC) and S (12.0 %PC) groups ($p = 0.027$)

Table 1. T-Test between no pain and pain groups for elbow valgus torque and shoulder internal rotation torque

	NP (n = 4)	P (n = 15)	p-value
EVT (Nm)	61.9 ± 9.0	56.8 ± 11.0	0.409
SIRT (Nm)	58.7 ± 11.9	54.6 ± 11.3	0.538
nEVT	0.45 ± 0.08	0.41 ± 0.06	0.309
nSIRT	0.44 ± 0.11	0.40 ± 0.07	0.433

Table 2. T-Test between non-specialized and specialized groups for elbow valgus torque and shoulder internal rotation torque

	NS (n = 7)	S (n = 12)	p-value
EVT	59.7 ± 8.9	56.8 ± 11.6	0.575
SIRT	60.5 ± 8.7	52.6 ± 11.8	0.141
nEVT	0.42 ± 0.05	0.42 ± 0.08	0.986
nSIRT	0.43 ± 0.06	0.39 ± 0.09	0.308

Conclusion and Next Steps

- Few significant differences demonstrated between pain vs. no pain and specialized vs. non-specialized groups
- Data adds to the growing body of literature describing adolescent pitching biomechanics
- Goal: increase sample size to better characterize injury risk factors and prevent future adolescent pitching injuries

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