Risk Factors for Pitching Related Baseball Injuries in the Youth to Collegiate Athlete

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Pitching Volume Factors Affecting Pitching Injuries [1,5,6]

- Averaging > 80 Pitches in one game = 4x greater risk of injury
- Pitching 8 months out of the year = 5x greater risk of injury
- Pitching > 100 innings in one year = 3x greater risk of injury
- Pitching despite having arm fatigue and arm pain = 36x risk of injury
- LLWS pitchers who exceeded pitching guidelines = 50% increased risk to require UCL surgery compared to 2% who did not.
- **For the youth player:** Participation in multiple sports is important for reducing injury, decreasing burnout and may increase the success in the primary sport

Pitching Velocity[5]

- Pitchers throwing > 85mph = 2.6x greater risk of injury requiring surgery
- If average velocity was decreasing = increased risk of injury (sign of arm fatigue)

PItching Technique/Type[4]

- A higher annual percentage of fastballs thrown = risk factor for injury due to increased velocity and stress on the UCL
- **Decreased injury risk** was seen with more variety of pitches thrown
- Poor Mechanics lead to increased shoulder and elbow stress

Strength[4,6]

- Participation in evidence based training and rehabilitation programs can reduce injury risk and reduce the risk of developing another throwing related injury in the future
- If External Rotation strength is ≤ 70% of non-throwing arm = Increased risk of UCL injury
- If Internal Rotation Strength is ≤ 75% of non throwing-arm = Increased risk of UCL injury
- ER to IR ratio of 66%-75%

Range of Motion[2,3,4]

- Total range of motion deficit greater than 5 degrees = 2.5x more likely to develop shoulder injury and increased risk of requiring UCL reconstruction (Tommy John)
- Shoulder flexion deficits of > 5 degrees increase risk of injury

Citations

1. Fleisig GS, Andrews JR, Cutter GR, Weber A, Loftice J, McMichael C, Hassell N, Lyman S. Risk of serious injury for young baseball pitchers: A 10-year prospective study. Am J Sports Med. 2011;39(2):253-257. doi:10.1177/0363546510384224.

2. Garrison JC, Cole MA, Conway JE, Macko MJ, Thigpen C, Shanley E. Shoulder Range of Motion Deficits in Baseball Players With an Ulnar Collateral Ligament Tear. Am J Sports Med. 2012;40(11):2597. DOI:10.1177/0363546512459175.

3. Hellem A, Shirley M, Schilaty N, Dahm D. Review of shoulder range of motion in the throwing athlete: Distinguishing normal adaptations from pathologic deficits. Curr Rev Musculoskelet Med. 2019;12(3):346-355. doi:10.1007/s12178-019-09563-5.

4. Labott JR, Leland DP, Till SE, Diamond A, Hintz C, Dines JS, Camp CL. A Number of Modifiable and Nonmodifiable Factors Increase the Risk for Elbow Medial Ulnar Collateral Ligament Injury in Baseball Players: A Systematic Review. Arthroscopy: The Journal of Arthroscopic and Related Surgery. 2023;39(8):1938-1949. DOI

5. Olsen, Samuel & Fleisig, Glenn & Dun, Shouchen & Loftice, Jeremy & Andrews, James. (2006). Risk Factors for Shoulder and Elbow Injuries in Adolescent Baseball Pitchers. The American journal of sports medicine. 34. 905-12. 10.1177/0363546505284188.

6. Zaremski JL, Zeppieri G, Tripp BL. Sport specialization and overuse injuries in adolescent throwing athletes: A narrative review. J Athl Train. 2019;54(10):1030-1039. doi:10.4085/1062-6050-333-18.