

# THORNE – RRD 2023

## Elbow Torque Study

### Purpose:

On June 15<sup>th</sup>, 2021 Major League Baseball announced stricter enforcement of rules that prohibit the application of foreign substances (i.e. sunscreen, hair gel, pine tar, spidertak) to baseballs. Immediate concern arose from players and player advocates that an abrupt increase in the slickness of the baseball would lead to increased throwing arm injuries due to a need to tighten and deepen the grip on the baseball. Our preliminary research with retrospective data obtained from Major League Baseball shows that there was an increase in the number of total upper extremity injuries and number of Tommy John/ulnar collateral ligament (UCL) reconstruction surgeries performed from 2019 (pre stricter rule enforcement) to 2021 (post stricter rule enforcement). This trend continued in 2022. The aim of this study is to determine if increased stress is placed across the elbow, more specifically the UCL, when a baseball is thrown “out of the box” versus a baseball with a foreign substance applied.

### Methods:

Pitchers with collegiate or professional baseball experience will participate in the study. Power analysis indicated 40 pitchers would be required to detect a statistically significant difference in measured parameters. Pitchers will participate in a single pitching session which will be preceded by a questionnaire and an appropriate warm-up. The questionnaire will take 5-10 minutes to complete and will include questions regarding age, injury history, presence or absence of current injury/arm pain, and preferences for baseball preparation. All information will be de-identified. No information will be shared with a player’s teammates, coaching staff, training staff, or personnel associated with the team. The answers to these questions will not affect the player’s ability to participate in future game play. Players will conduct a warm-up as they would prior to an actual game. There will be no limit to the pitch number or type that can be thrown in the warm-up. Following warm-up, players will be asked to wear a compression sleeve with a lightweight sensor on their throwing arm. The sleeve is designed by Motus (<https://motusglobal.com/motusbaseball.html>). The sleeve will measure elbow valgus torque a correlate for elbow UCL strain, as well as arm slot, and arm acceleration. Players will be asked to throw fastballs only and no breaking or off-speed pitches. Players will be asked to throw two sets of baseballs for 20 pitches each. One set of baseballs will be “out of the box” meaning that they have no substance applied to the baseball aside from that which it was manufactured with, and dirt per MLB guidelines. Players will also be able to use rosin if they so choose. The second set of baseballs can be prepared with whatever substance the player desires. For instance, if a player typically threw the ball after applying pine tar or scuffing the ball, then they will throw it this way. If they typically did nothing to the ball prior to throwing, they will throw it this way. Players will be instructed to throw at maximum effort. They will be given 30 to 60 seconds of rest between pitches to reduce fatigue and prevent variation in pitching mechanics. Players are encouraged to report if they are experiencing pain or fatigue at any point in the study protocol and can stop participation.

### Results/Conclusions:

Throwing sessions and data collection are currently in progress. An analysis of the elbow valgus torque, arm slot, and arm acceleration between the two sets of baseballs thrown will be evaluated.