Throwing velocity is the most widely used measure of skill in baseball pitchers. Increased velocity decreases the time that batters have to decide about swinging and decreases the time baserunners have to advance to the next base (Escamilla et.al., 2012). Due to the violent and quick nature of the throwing motion, pitchers have very little time to generate significant amounts of force. The torque generated in the shoulder shortly before ball release has been found to contribute to 30.1% of forward ball velocity (Alderink et al., 2021). Analyzing the rate of force development in the shoulder muscles during internal and external shoulder rotation may help pitchers begin to understand which parameters describing the force-generating capabilities of the shoulder contribute most to forward velocity. Thirteen male participants to date were seated and strapped into a Biodex dynamometer with their arm braced at a 90-degree angle. Shoulder range of motion limits were set to 55 degrees of internal rotation and 40 degrees of external rotation. Participants completed maximum voluntary contractions (MVC) in each direction for 5 repetitions at 60 degrees/second (deg/s) and 10 repetitions at 180 deg/s. Upon completion, pitchers were instructed to complete their typical warm-up regime. After readiness was affirmed, pitchers threw roughly fifteen pitches from a custom pitching mound toward a target located 18 m away. Ball velocity was recorded using a standard radar gun. The top 3-4 fastest pitches were used for analysis. Biodex-generated reports provided the repetition responsible for creating the highest torque within each condition. The number of the best repetition was inputted into a custom MATLAB script plotting the torque as a function of time. The derivative was then used to calculate the rate of force development (RFD) as a function of time. The average RFD for 50 milliseconds (ms), 80 ms, and 100 ms were calculated. Pearson's product-moment correlations were performed using an alpha level of 0.05. Thus far, no statistically significant relationships with ball velocity were found for each RFD time frame and condition. RFD100ms during external rotation was found to have the highest association with velocity ($r = 0.48$; $p = 0.09$). Additional data collection to improve statistical power is underway.