TACSM Abstract

Basic Measurements of Division 1 Collegiate Baseball Pitchers to Predict Grip Strength and Spin Rate

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ABSTRACT

Basic measurements such as range of motion (ROM), grip strength (GS), height, and arm length have been associated with the rate that the ball spins. Increased spin rate along with the axis of rotation of a baseball is linked to the movement that a pitch experiences during its delivery. This spin rate gives a batter difficulty when trying to contact the ball. Plainly, the more spin the more likely the chance the batter will miss. **PURPOSE**: The purpose of this study was to use external range of motion (EROM), GS, height, weight, forearm length, and forearm circumference to predict spin rate. **METHODS**: Thirteen right-handed division 1 collegiate baseball pitchers (height 183.2cm± 6.9cm, weight 90kg ± 12kg, forearm length 27.5cm ± 1.3cm, forearm circumference 29.8cm ± 2.1cm, EROM 111.3° ± 9.0°, GS 57.3kg ± 8.4kg, spin rate 2057.2rpm ±160.5rpm) were recruited for this study. Height and weight measurements were recorded using a Doran physician's scale. Measurements of the right forearm were taken from the medial epicondyle of the humerus to the styloid process of the ulna. Forearm circumference was taken from the thickest portion of the forearm. External rotation was measured using a goniometer from a lying position. Spin rate was calculated using a Yakkertech which uses visual imaging technology to calculate spin rate and eliminates the gyro spin of the ball. Ipsilateral hand grip strength was assessed using a Delsys handgrip dynamometer at 90-degree elbow flexion with the elbow unsupported and hand in a neutral grip. The participant was given three attempts to exert as much force as possible and the maximum force in kg was recorded. External rotation of the glenohumeral joint was measured using a goniometer from a lying position with the humerus abducted 90 degrees the subjects were instructed to start with their forearm in a vertical position then slowly drop the back of their hand toward the table. **RESULTS**: Data were assessed using a forward stepwise multiple regression to identify a statistically significant ($p < 0.05$) prediction model of spin rate using basic measurements described above. Forearm length was the only variable that was a statistically significant predictor and accounted for 41.8% of the variance in predicting spin rate. The resulting prediction equation was as follows: Spin rate= -165.655rpm - (80.945x FL; R^2.418; SEE=127.8). **CONCLUSION**: Increased forearm length allows for the moment arm to produce more torque on the ball thus increasing the spin rate allowing increased movement on the ball.