TACSM Abstract

The Influence of Various Grip Strength Orientations on Throwing Velocity of Division I Baseball Pitchers

CHEYENNE LAVENDER, ANDY WOLFE, BADMAEV ZANE, ANDY WOLFE, CHAD AGOR, JACKSON MAYNARD, & MICHAEL LUERA

Kinetic Performance Laboratory; Kinesiology; Tarleton State University; Stephenville, TX

Category: Undergraduate

Advisor / Mentor: Wolfe, Andy (awolfe@tarleton.edu)

ABSTRACT

Baseball specific testing battery includes various assessments designed to produce a performance profile of baseball players. Among these tests, the grip strength (GS) assessment has shown reliability in predicting one aspect of pitching performance, pitch velocity. However, various arm orientations occur throughout the pitch, and to the best of our knowledge, no study has investigated the relationship between various grip strength arm orientations and pitch velocity. **PURPOSE**: Therefore, the purpose of this study was to examine the influence of grip strength at various arm orientations on baseball pitching velocity. **METHODS**: Twenty-one collegiate Division I baseball pitchers (mean ± *SD*, age = 21.1 ± 1.8, height = 187.3 ± 5.0 cm, weight = 92.6 ± 8.9 kg) volunteered as participants for this investigation. Using the Jamar Hydraulic Hand Dynamometer, pitchers completed three attempts to exert maximal GS in kilograms (kg) at the following dominate arm position: 90-degree elbow flexion with neutral (NDN), supinated (NDS), and pronated (NDP) forearm placement, as well as 120-degree elbow extension with 90-degree shoulder abduction with supinated (AS) and neutral (AN) forearm grips. Average pitching velocity (APV) was collected via Yakkertek Ball-Tracking System across the fall intersquad season consisting of 20 games. Participant inclusion criteria required a minimum of five pitched innings or 100 total pitches. A backwards multiple linear regression ($p < .05$) was run to assess the influence of GS on APV. **RESULTS**: The regression results recognized AS to statistically influence APV, $f(1,21) = 8.178$, $p < .05$, $r^2 = .280$. These results suggest AS accounts for 28% of the variance in APV, yielding the following predictive equation: APV = 70.251 + 0.253(NDP). **CONCLUSION**: The result of this investigation supports previous investigation - GS significantly influences pitching velocity. Moreover, specifically, as 120-degree elbow extension with 90-degree shoulder abduction with supinated GS contributes the greatest influence on APV over other arm orientations. At pitch release and throughout the follow-through phase of the pitching motion, shoulder abduction, elbow angle, and forearm supination appear constant within all pitch variations (i.e. fastball, curveball, change-up) with slight variance between pitchers, respectively. These stride phase through arm acceleration phase biomechanics may explain the influence of AS strength on pitch velocity. Furthermore, strength and conditioning specialist, sport scientists, and coaches should greatly considerate AS GS when testing, training, and tracking baseball pitchers.