

Correlation Between Grip Strength at Various Arm Orientations and Hitting Performance Metrics of Division I Collegiate Baseball Players

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ABSTRACT

Dominant and non-dominant grip strength (GS) significantly correlated with bat speed (BS) in the sport of baseball. Various arm orientations occur throughout the swing; moreover, additional metrics beyond BS are indicative of baseball hitting performance. The correlation between various GS and hitting outcomes have not been empirically examined. **PURPOSE:** The aim of the current investigation was to examine the relationship of GS at various arm angles to various hitting performance metrics. **METHODS:** Division I collegiate baseball players ($n = 17$; height: 180.92 ± 5.61 cm; weight: 82.1 ± 11.12 kg) performed dominant and non-dominant maximal GS at five different arm and forearm orientations utilizing the Jamar Hydraulic Hand Dynamometer: 90-degree elbow flexion with (1) neutral (NDN), (2) supinated (NDS), and (3) pronated (NDP) forearm placement, as well as 120-degree elbow extension with 90-degree shoulder abduction with (4) supinated (AS) and (5) neutral (AN) forearm grips. At each angle, three attempts were permitted to exert maximal force, recorded in kg. Hitting metrics were gathered via Blast Motion Bat Sensors and Yakkertek Ball-Tracking System - metrics included: BS, peak hand speed (PHS), vertical bat angle (VBA), time to contact (TTC), attack angle (AA), power (PW), on plane efficiency (OPE), plane score (PS), rotational acceleration (RA), early connection (EC), connection at impact (CAI), as well as average exit-velocity (AEV), peak exit-velocity (PEV), hard hit percentage (HHP), damage percentage (DP), and average launch angle (ALA). A Pearson product-moment correlation coefficient ($p < .05$) was employed to assess the relationship between GS and hitting performance. **RESULT:** Positive significant correlations were recognized between the following variables: dominant NDN and HHP ($r = .559, p = .02$), DP ($r = .647, p = .007$), and BS ($r = .515, p = .034$); non-dominant NDP and HHP ($r = .497, p = .042$), DP ($r = .664, p = .005$), and TTC ($r = .519, p = .033$); and non-dominant NDS and DP ($r = .770, p < .001$), PS ($r = .515, p = .035$), OPE ($r = .510, p = .036$). A negative significant relationship was identified between non-dominant NDS and EC ($r = -.629, p = -.007$), and CAI ($r = -.587, p = -.013$). **CONCLUSION:** Supporting previous investigations, these results suggest dominant NDN, non-dominant NDP, and non-dominant NDS yielded the greatest influence on hitting performance among the tested GS positions; thus, potentially providing coaches with arm orientation specific GS training recommendation for baseball hitters.