Abstract

Background: Hand grip strength has emerged as a significant predictor of throwing performance in athletic populations, yet its relationship with spatial throwing parameters among amateur throwers remains inadequately explored. Current literature predominantly focuses on elite athletes, creating a methodological gap for recreational populations.

Objective: To investigate the relationship between hand grip strength, anthropometric characteristics (BMI), and multiple throwing performance parameters (distance, velocity, accuracy) among amateur throwers.

Methods: A correlational study involving 23 amateur throwers aged 18-24 years from Brainware University, Kolkata, India. Participants underwent grip strength measurement using a calibrated Baseline hydraulic hand dynamometer (three trials), anthropometric measurements, and throwing performance evaluation using a standardized 1 kg spherical exercise ball. Spatial parameters measured included throwing distance, velocity (using speed gun), and accuracy (lateral deviation). Pearson correlation coefficients were calculated to determine associations between variables.

Results: Strong positive correlations were observed between hand grip strength and power-based throwing outcomes: distance ($r = 0.829$) and velocity ($r = 0.839$), explaining approximately 69-71% of performance variance. A moderate positive correlation was found between grip strength and throwing accuracy ($r = 0.492$), accounting for 24% of accuracy variance. In contrast, BMI demonstrated negligible correlations with all throwing parameters: distance ($r = 0.025$), velocity ($r = -0.138$), and accuracy ($r = 0.087$). The grip strength-BMI relationship was similarly weak ($r = 0.059$).

Conclusions: Hand grip strength serves as a robust predictor of throwing performance in amateur populations, particularly for power-based outcomes. The strong correlations mirror those found in professional athletes, indicating that fundamental biomechanical principles apply consistently across skill levels. BMI showed minimal predictive value, suggesting that functional muscle capacity supersedes general anthropometric measures. These findings support grip strength assessment as a valuable screening tool for recreational sports participation and

rehabilitation applications, while challenging current BMI-centric approaches to fitness assessment.

Keywords: *Hand grip strength, throwing performance, amateur , spatial parameters, biomechanics, anthropometry.*

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