FACTORS DETERMINING BALL RELEASE VELOCITY OF WOMEN PACE BOWLERS IN CRICKET

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Abstract

Background: In the game of cricket, ball release velocity is a key determinant of performance for pace bowlers. For female cricketers in particular, understanding how biomechanical, physical, and anatomical factors influence this velocity can guide effective coaching and talent development programs.

Objectives: The primary objective of this study was to investigate the relationship between selected anthropometric, kinematic, and physical fitness parameters and ball release velocity in female pace bowlers.

Methods: A purposive sample of twelve (12) state-level female pace bowlers, age ranging from 18 to 28 years, were assessed using a combination of motion analysis and physical performance testing. Anthropometric parameters included upper arm length, forearm length, hand length, arm span, upper and lower leg length, foot length, and standing reach height. Kinematic analysis focused on variables such as run-up velocity, bound height, stride length, ball release angle and height, joint angles at front foot contact (FFC) and ball release (BR) and joint flexions from FFC to BR. Physical fitness measures included arm, back, and leg strength; upper and lower body power; core stability; speed; and flexibility. Pearson's correlation coefficient and regression analysis were conducted to identify significant predictors of ball release velocity.

Results: Anthropometric variables showed no significant relationship with ball release velocity. However, several kinematic parameters demonstrated significant associations: positive relationships were found with final run-up velocity, ball release angle, knee

joint angles at ball release, ankle and hip joint angle at ball release, ankle plantar flexion, hip and shoulder flexion from front foot contact to ball release. In contrast, negative relationships were observed for bound height, ball release height, shoulder joint angle at release, and knee flexion from front foot contact to ball release. Regarding physical fitness, arm strength, leg strength, core stability, running speed, and flexibility all showed positive relationships with ball release velocity.

Conclusions: Ball release velocity in female pace bowling is significantly influenced by both biomechanical movement patterns and physical fitness components. Optimizing kinematic execution and developing specific strength, flexibility, and speed capacities can lead to improved bowling performance.

Keywords: Female Pace Bowlers, Ball Release Velocity, Kinematic Variables, Physical Fitness, Cricket Bowling