The effects of a resistance training program on strength, eccentric capacity, and front foot bowling kinetics in fast bowlers

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Introduction: Fast bowlers (FBs) will often attempt to maximise ball release velocity (BRV) in assisting in dismissing opposing batsman. The ground reaction force (GRF) generated during front foot contact (FFC) can contribute to increased BRV. Consequently, FBs must ensure they have the necessary lower-limb strength and eccentric capacity to appropriately attenuate and utilise the forces experienced during FFC. Despite this link between physical capacity (strength) and expression of force (GRF at FFC), there has been limited analysis of training interventions in FBs.

Methods: Ten healthy male (age = 21.2 ± 4.64 years; mass = 83.18 ± 7.43 kg; height = 1.85 ± 0.05 m) FBs who were currently or previously involved in an Australian state cricket development pathway were recruited. The participants completed a six-week resistance training intervention during the off-season. Pre- and post-testing measures included: vertical force in double (DLDL) and single leg (SLDL) drop landings; peak force in the isometric mid-thigh pull (IMTP); and fast bowling performance (two-over bowling spell) measuring BRV and FFC kinetics (peak vertical and braking GRF, and vertical and braking impulse) from FFC to ball release. Changes from pre-to post-testing were assessed with paired sample t-tests (p < 0.01), effects sizes and one-dimensional (1D) statistical parametrical mapping (SPM).

Results: A significant 19% in DLDL vertical force, and ~15–16% decrease in vertical force for each leg in the SLDL, was demonstrated following the training intervention. IMTP peak force significantly increased by 10%. There was no significant difference in BRV between pre- and post-testing. There were no significant differences in any of the body weight normalised kinetic variables following training, with only trivial and small effects found. 1D SPM curve analysis also revealed no significant difference in either vertical or horizontal GRF during FFC normalised time between pre- and post-testing.

Discussion: The results reinforced that a well-designed strength training intervention can improve measures of strength and eccentric capacity. However, this translated to no detectable changes in FFC GRF in FBs, which may explain the lack of improvement in BRV. The lack of significant change in assessed measures may suggest that an eight-week strength training program may not be sufficient time to elicit increase in BRV among FBs, or that general resistance training methods may require exercises to assist transfer to learning for changes in physical capacity to manifest into skilled performance. However, increases in lower-limb strength and eccentric capacity are beneficial for other aspects of cricket match-play, and changes in these qualities do not negatively influence fast bowling performance.

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Predictive ability of selected pace bowling kinematics and physical capacities to ball release speed in club-standard cricketers.

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Introduction: Bowling speed is a critical skill for pace bowlers in cricket. Previous studies have focused on the relationships between bowling kinematics and ball release speed (BRS) in elite cricketers, and have typically neglected to include physical capacity assessment. The few studies exploring physical capacity assessment have usually reported simple correlations to BRS, instead of using modelling techniques, which is useful for providing coaches with a framework to develop pace bowling skill. Such a framework is absent for club-standard bowlers.

Methods: Seventeen club-standard pace bowlers (age 21.5 ± 3.8 years) completed three separate testing sessions. The first session comprised an eight-over pace bowling test, involving assessment of BRS with a Stalker Pro radar gun, and selected bowling kinematics: approach speed, delivery step length, stride phase duration (back foot contact to front foot contact), power phase duration (front foot contact to ball release), and front leg knee angle at ball release. These kinematic variables were captured with a video camera (25 Hz) and analysed with Dartfish Connect software. Approach speed was measured with a dual-beam electronic timing system.

Regression analysis indicated that 48.0% of the variance in mean BRS was explained by greater 1-RM pull-up strength.

Discussion: Pull-up and eccentric muscle strength, which is useful for providing coaches with a framework to develop pace bowling skill, such as strength training, is absent for club-standard bowlers.