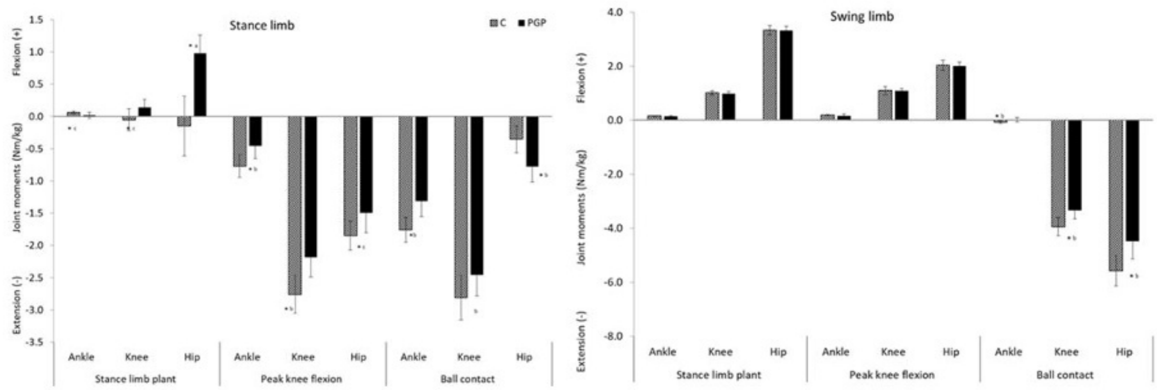

Figure 1. Graphs of joint moments of the limbs during the phases of the kick for C (black) and PGP (gray) groups. * indicates P<0.05. [a] indicate D>0.8, [b] indicate 0.5>D>0.8, and [c] indicate D<0.5

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Using Isokinetic Strength Assessment to Predict Performance and Prevent Injuries in Indian Cricket Fast Bowlers

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(No relationships reported)

Cricket is the most commonly played & followed sport in India. It demands a high level of performance from the fast bowler. The fast bowling action involves a run up, leap and landing onto the lower limbs, followed by ball release. The large ground reaction forces generated during landing put fast bowlers at high risk of lower limb and lumbar spine injury. Precise dynamic coordination of lower body segments is needed to absorb these forces and transfer the energy via the core to the upper limb to propel the ball at faster speeds. Thus, knowledge of lower quadrant strength can be very useful for injury prevention and better performance in fast bowlers. Dynamic Knee Strength in the front limb is critical during the leap phase of bowling for optimal performance. There is a lack of literature in this subject in Indian fast bowlers despite the popularity of the sport.

PURPOSE: To evaluate the Isokinetic knee strength, determine the relevant asymmetries and strength imbalances & their relationship with performance and injury risk in Cricket Fast Bowlers.

METHODS: 42 male Indian State Level fast bowlers underwent Isokinetic knee strength testing. Quadriceps concentric (Qconc), Quadriceps eccentric (Qecc), Hamstring concentric (Hconc) & Hamstring eccentric (Hecc) Peak Torques normalized to body weight (PT/BW) were obtained. Bilateral Strength Asymmetries (BSA) and Dynamic Control Ratios (Hamstring DCR= Hecc/Qconc & Quadriceps DCR=Qecc/Hconc) were evaluated. Vertical Jump Height (VJ) & Standing Broad Jump (SBJ) distance were used as indicators of jump performance. Descriptive statistical analysis of data & Pearson correlation was done to obtain relationship between Isokinetic parameters & jump performance.

RESULTS: A significant correlation was found between Qconc Strength and VJ (r=0.67, p=0.04) & SBJ (r=0.39, p=0.04). 67% of bowlers had significant Qecc strength asymmetry. 40% had poor Hamstrings DCR & 19% had poor Quadriceps DCR on the front limb.

CONCLUSION: A significant proportion of fast bowlers have unfavorable strength asymmetry & DCR and thus are at risk of injury. Improving Dynamic Knee Strength through plyometric training could help optimize performance and reduce injury risk.

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Biceps and Triceps Contribute to Pitching Performance in College Baseball

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(No relationships reported)

Training for pitching traditionally focuses on core and leg work, but there may be justification for isolated arm muscle training to enhance performance.

PURPOSE: To evaluate the influence of biceps and triceps function during pitching.

METHODS: Pitchers (n=10) from a Division-1 collegiate team were recruited. Throwing mechanics and isolated arm movements were assessed using Proteus technology (Boston Biomotion Inc). A single set of biceps and triceps movements (with 12 and 10 lbs respective resistance) and biomechanical assessment of a throwing movement were collected. All movements completed on Proteus result in seven variables: power, explosiveness, braking, consistency, endurance, velocity, and range of motion (ROM). Pearson correlation coefficients were employed to analyze relationships between the Proteus variables for biceps curls and triceps extensions, throw mechanics, and statistics from in-game performances from the 2017 season.

RESULTS: The strongest relationship among all comparisons was biceps curl endurance and ERA (r=-0.959; p=0.001). The biceps curl ROM was also weakly related to throw power (r=0.429; p=0.076). Throw endurance corresponded with positive trends for biceps curl power (r=0.419; p=0.089), explosiveness (r=0.452; p=0.060), velocity (r=0.417; p=0.085), and ROM (r=0.429; p=0.075). A strong positive relationship was observed between throw endurance and biceps curl braking (r=0.535; p=0.022) and a positive trend between biceps curl ROM and throw velocity (r=0.429; p=0.075). Triceps extensions corresponded closely with throwing mechanics and in-game statistics; trends were found between triceps explosiveness and strikeouts per nine innings (r=0.728; p=0.064) and Proteus throw velocity (r=0.462; p=0.053). Throw endurance was related to triceps extension braking (r=0.496; p=0.037) and it displayed a trend with triceps extension endurance (r=0.435; p=0.071).

CONCLUSIONS: New technology permits advanced biomechanical analysis of baseball pitching. Preliminary testing reveals the importance of arm conditioning for a pitcher's ability to maintain power output. As more players are tested, we may further our understanding of the role of biceps and triceps function in throwing mechanics.

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Biomechanical Predictors of Fastball Velocity in Collegiate Pitching

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(No relationships reported)

Recent pitching analyses indicate development programs should emphasize ball speed to optimize performance on the mound. Proper training is likely to increase velocity, but pitch delivery involves complex motions in all cardinal planes. Until recently, accurate analyses were encumbered by technological limitations. For example, isokinetic torque assessment measures fundamentally different phenomena from isotonic pitch delivery. New technology permits more accurate analysis.