Evaluating Active, Passive, and Electromuscular Recovery Methods on Pitching Performance and Fatigue in High School Athletes

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The purpose of this study was to explore the efficacy of three between-inning recovery methods [Active recovery (AR), passive recovery (PR), and electromuscular stimulation (EMS)] among high school pitchers. Four indicators were used to evaluate effectiveness: blood lactate (BLa) clearance, average pitcher velocity, perceived pitch intensity, and a subjective recovery rating. The study hypothesized that as pitchers progress through three innings of play, EMS is the most effective method for between-inning recovery. Four high school pitchers, aged 16, underwent three testing days, each separated by four days of rest. Testing days consisted of warm-ups, bullpen sessions, three innings pitched (15 per inning), and a post-inning protocol that included 6 minutes of recovery, measurements of blood lactate, and subjective effort ratings. Statistical analyses identified a significant main effect of recovery method on BLa clearance ($p<0.001$) and an interaction between recovery method and inning ($p = 0.003$). Simple planned, Bonferroni corrected comparisons suggest that EMS and PR conditions outperformed the AR condition across all innings. The simple planned Bonferroni corrected comparisons indicate the average per-inning difference in BLa clearance between AR with EMS and between AR with PR was significant, while PR with EMS was not significant. These findings suggest that using EMS or PR between innings optimizes BLa clearance, which may improve pitching performance and reduce the risk of arm injury in high school pitchers.

Awards Won:

Third Award of $1,200