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Accelerated Recovery of Muscle Function in Baseball Pitchers Using Post-Game Phase Change Material Cooling

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Abstract:

PURPOSE: No studies have documented recovery of strength in baseball pitchers nor interventions to accelerate strength recovery on the days after a pitching performance. The objectives of this study were to (1) document indices of recovery following a pitching performance, and (2) determine if recovery can be accelerated by providing prolonged post-game phase change material (PCM) cooling to the shoulder.

METHODS: Shoulder strength, pain and plasma creatine kinase (CK) levels were measured in 11 college baseball pitchers 48 h prior to a game, and 12 h and 36 h afterwards. Players were randomized to wearing PCM cooling packs (15°C) within a compression shirt for 3 h post game (PCM treatment), versus no treatment (control) and received the opposite post-game treatment one week later (randomized crossover design). Strength in internal rotation (IR), external rotation (ER) and empty can test (EC) was assessed using a hand-held dynamometer. Pitchers threw 45 pitches on each occasion. Effect of PCM cooling on strength, pain and CK was assessed with repeated measures analysis of variance.

RESULTS: There was IR strength loss in the control condition (18% at 12 h, 11% at 36 h, $P < .01$) but no strength loss in the PCM condition ($< 1\%$ at 12 h and 36 h; Treatment effect $P = .06$, Treatment by Time $P = .03$). Similarly, there was ER strength loss in the control condition (14% at 12 h, 11% at 36 h, $P < .01$) but less strength loss in the PCM condition (8% at 12 h, 7% at 36 h; Treatment effect $P < .01$, Treatment by Time $P = .58$).

Pitching had no effect on EC strength (Time effect $P = .97$). CK and pain were elevated on the days after the game (Time effects $P < .01$) with no difference between treatments (Treatment effect: CK $P = .79$, pain $P = .73$; Time by Treatment: CK $P = .92$; pain $P = .70$).

CONCLUSIONS: Strength loss, pain and elevated CK were evident 12-36 h post game. PCM cooling protected against strength loss but not pain or CK. Pain (peak 3 out of 10) may have been too low to have been affected by the intervention. This is the first study to document impairments in muscle function on the days after a baseball pitching performance. PCM cooling packs provides a practical means of delivering prolonged post-game cooling after pitchers have departed the training room.

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M.J. Mullaney: None.

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