

Softball: Training in Redcord improves throwing performance of NCAA Division I Softball players

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Closed-kinetic chain upper-body training improves throwing performance of NCAA Division I Softball players. Journal of Strength and conditioning 22(6): 1790-1798, 2008

Summary:

12 softball players were divided into two groups where one group trained exercises for upper-body with the use of free weights and dumbbells (open kinetic chain), and one group trained upper-body exercise with Redcord (closed kinetic chain). Both groups trained 3 times per week for 12 weeks. Training intensity was equal in the two groups. Pre and post training the subjects were tested for: throwing velocity, bench-press (1RM), dynamic balance and isokinetic peak torque and power for shoulder flexion, extension, internal rotation and external rotation. The group that trained exercises in closed kinetic chain significantly increased (3,4%) throwing velocity compared to the group that trained exercises in open kinetic chain (0,5%). Several of the strength tests trended towards significant improvements with closed kinetic chain training but low subject numbers limited significant group differences to be observed. The authors conclude that neural adaptations may be the cause of the improvement observed in the group that trained exercises in closed kinetic chain.

Abstract:

Closed-kinetic chain resistance training (CKCRT) of the lower body is superior to open-kinetic chain resistance training (OKCRT) to improve performance parameters (e.g., vertical jump), but the effects of upper-body CKCRT on throwing performance remain unknown.

This study compared shoulder strength, power, and throwing velocity changes in athletes training the upper body exclusively with either CKCRT (using a system of ropes and slings) or OKCRT. Fourteen female National Collegiate Athletic Association Division I softball player volunteers were blocked and randomly placed into two groups: CKCRT and OKCRT. Blocking ensured the same number of veteran players and rookies in each training group. Training occurred three times weekly for 12 weeks during the team's supervised off-season program. Olympic, lower-body, core training, and upper-body intensity and volume in OKCRT and CKCRT were equalized between groups. Criterion variables pre- and posttraining included throwing velocity, bench press one-repetition maximum (1RM), dynamic single-leg balance, and isokinetic peak torque and power (PWR) (at 180°) for shoulder flexion, extension, internal rotation, and external rotation (ER).

The CKCRT group significantly improved throwing velocity by 2.0 mph (3.4%, $p < 0.05$), and the OKCRT group improved 0.3 mph (0.5%, NS). A significant interaction was observed ($p < 0.05$). The CKCRT group improved its 1RM bench press to the same degree (1.9 kg) as the OKCRT group ($p < 0.05$ within each group). The CKCRT group improved all measures of shoulder strength and power, whereas OKCRT conferred little change in shoulder torque and power scores.

Although throwing is an open-chain movement, adaptations from CKCRT may confer benefits to subsequent performance. Strength coaches can incorporate upper-body CKCRT without sacrificing gains in maximal strength or performance criteria associated with an athletic open-chain movement such as throwing.