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The effect of different Active Soccer Re-warm ups on muscle power, lower limb stability and markers of hamstring injury

Carter, D.A., Barrett, S., Small, K., Lovell, R.

Department of Sport, Health and Exercise Science, University of Hull, UK Affiliated Institutions

Background and Purpose

Previous research using soccer-specific fatigue and half-time interventions has focused on maintaining core and muscle temperature and its effect on sprint and soccer specific endurance performance in the second half. Furthermore research has looked at the effect of soccer-specific fatigue has on the hamstring muscles and on lower limb stability however the use of interventions to try and reduce the effect of fatigue on these factors has not been studied. Therefore the purpose of this study is to examine the effect of different half-time interventions on the hamstring muscles and lower limb stability

Method

Ten male semi-professional soccer players (Mean ± Standard Deviation,Age: 20 ± 1 yrs; Height: 1.83 ± 0.08 cm; Weight: 79.9 ± 7.0 kg; VO_{2max}: 60.5 ± 4.2 ml·kg^{-1}·min^{-1}) completed a 25 minute soccer-specific warm up followed by SAFT^{90}, a multi-directional, intermittent, 90 minute exercise protocol replicating soccer match-play based on data from the English Championship. During the half-time interval the players completed two different interventions between 9 and 14 minutes: a soccer-specific re-warm up comprising of intermittent agility drills (ACT) and whole body vibrations(WBV) (4Hz, amplitude of 2, partial squat held for 3x 1min, with 1 min rest in between) and a control trial (passive seated rest for 15 minutes). Prior to the start of the simulation, and every 15 minutes thereafter subjects completed a hop on the dominant limb for stability and three maximal dominant limb isokinetic contractions at 120° .s^{-1} through a 90° range for concentric (conH) and eccentric knee flexors (eccH) and concentric knee extensors (conQ). The variables being analysed are eccH PT, conH PT,conQ PT and Time To Stabilization(TTS).

Results

The TTS% change was significantly reduced in the WBV trial at 46 min compared with CON (WBV: 95.42 ± 34.09 %; CON: 133.98 ± 42.04 %; $P < 0.05$). The eccH PT% change was significantly reduced in the WBV trial at 90 min compared with CON (CON: 81.04 ± 13.75 %; WBV: 92.67 ± 15.84 %; $P<0.05$). The conH PT was significantly higher at 46 mins in ACT trial than CON (ACT: 152.06 ± 19.71; CON: 132.85 ± 18.7; $P<0.01$) and at 90 mins for the WBV trial (WBV: 154.59 ± 29.83; CON: 132.62 ± 15.71; $P<0.01$). The conQ% change was significantly reduced in the ACT trial at 46 mins compared to the CON (CON: 87.45 ± 11.12%; ACT: 95.46 ± 7.48%; $P<0.05$) and in the WBV trial at 90 mins (CON: 84.89 ± 10.1%; WBV: 94.1 ± 9.52%; $P<0.05$).

Discussion and Conclusions

The WBV trial affected markers of hamstring injury at 90 mins suggesting it may be used to decrease the fatigue in the hamstring muscles seen in previous research and possibly reduce the risk of injury. The ACT trials affected the concentric muscle contractions at 46 minutes possibly increasing the player's power output at the start of the second half but also reducing the risk of injury. Furthermore the WBV trials affected lower limb stability at 46 mins suggesting it may be useful in decreasing injury risk at the onset of the second half.