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Acute effects of a pre-season speed training program on sand vs. hard court in professional basketball players

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INTRODUCTION:

Basketball is known as a fast paced team sport, characterized by constant changes of direction as well as speed with acceleration and deceleration. Recently, sand as a training surface has gained in importance and an increasing amount of research is focused on the beneficial long-term effects on speed related training on sand [1; 2]. Considering that long-term effects are based on the acute internal and external loads, little research investigated the short-term effects of sand training. Therefore, the aim of this study was to compare the acute effects of a pre-season speed training on sand versus hard court on physiological load and neuromuscular performance in professional basketball players.

METHODS:

Twenty-two healthy competitive male basketball players (age 24.8 ± 3.9 years; height 193.3 ± 8.7 cm; weight 93.5 ± 12.9 kg) completed one training session on sand ($n=7$) or on hard court ($n=15$). Training sessions were part of a seven week pre-season training intervention and were realized during the sixth week of this intervention. Sessions were identically applied on both surfaces, lasted 40 min and consisted of four different speed related drills, including sprint and jumping exercises. Pre-training (PT), post warm-up (PW) and post exercise (PE) measurements were taken for counter movement jump performance (CMJ), blood lactate concentrations (LA), heart rate (HR) and ratings of perceived exertion (RPE). Data are presented with mean \pm SD. T-tests for independent samples were used to verify surface depending differences. Significant levels were set at $p < 0.05$.

RESULTS:

LA was significantly higher on sand compared to hard court PW (2.6 ± 1.2 vs. 0.9 ± 0.3 mmol/l, $p < 0.001$) as well as PE (3.7 ± 1.8 vs. 1.5 ± 0.6 mmol/l, $p < 0.001$). RPE values and HR were correspondingly higher on sand PW (139 ± 7 vs. 121 ± 12 b·min⁻¹, $p = 0.002$) as well as PE (153 ± 12 vs. 137 ± 15 b·min⁻¹, $p = 0.021$). No significant differences were found in CMJ performance on sand compared to hard court at PE (41.8 ± 5.41 vs. 40.9 ± 7.60 cm, $p = 0.769$).

CONCLUSION:

Training on sand comes along with a higher metabolic and cardiorespiratory load compared to hard court which can be attributed to a longer coupling time between eccentric and concentric muscular action, a longer foot contact time and a less efficient power output. This might have caused an increased energy demand on sand compared to hard court. Under this conditions a reduction in the elastic energy potentiation and muscle tendon can be expected but interestingly, neuromuscular performance is not affected. Future studies should investigate if these acute effects might be helpful to have positive long-term effects.

1 Binnie et al, 2014, J sports sci., 32 (11), 1001—1012.

2 Impellizzeri et al, 2008, Br j sports med., 42 (1), 42—46.

Topic: Training and Testing

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