

EFFECT OF 15 WK HEART RATE CONTROLLED TRAINING IN BASKETBALL PLAYERS PERFORMANCE

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INTRODUCTION

Training studies on basketball with individual prescription and control of training intensity are rare. This study followed Finnish national league level male basketball team (n=9, mean age 22.7 yrs, weight 89.9 kg, height 187cm, BMI 25.5 kg/m²) training for 15 weeks during base training period in May-September 2004. Basketball specific performance tests were carried out for training prescription and for performance follow-up. Training program included endurance, speed, strength and basketball game training. All tests and trainings were heart rate (HR) controlled (Polar Team System and A3, Kempele Finland).

METHODS

The 20 m shuttle run tests (SRT) were done for aerobic capacity measurements (performance, maximal speed, VO_{2max}) in the beginning and at the end of training period. Similarly, strength capacity test (SCT) to 1RM, 1RM-index and to maximal repeat for different muscle groups with free weights were done. Capacity index, anaerobic index as well as mean and total power was calculated based on SCT. Based on the maximal heart rate (HRmax) during tests heart rate zones (86-92%) and recovery limits (68-72%) for basketball, strength, speed and endurance exercises for each player were defined. Strength tests (squat, sit-ups, bench press, arm curls) results were used to define resistances for strength endurance and speed-base strength trainings. Figure 1 SCT ½-squat 1RM and maximal repeat test positions at first beginning, second turn up and third front side.



Fig 1 SCT ½-squat 1RM and maximal repeat test at first beginning position, second turn up and third front side.

TRAINING

Of the training period 33-36% was aerobic training, 45-64% basketball specific and 13-8% resistance training. The HR controlled training succeeded well. According players and coaches HR control for training intensity was needed and useful. Mean HR in strength training corresponded to 81% of muscle strength specific mean HRmax, in speed training to 83%, in aerobic training to 64%, in anaerobic training to 78% and in basketball training to 82% of the mode specific HRmax.

RESULTS

During the 15 weeks period the SRT performance increased 7.4%, maximal speed during SRT 1.4% and predicted VO_{2max} 2.2% on an average. Sub-maximal HR during the constant speed in the SRT decreased. HRmax in SRT decreased 1.5%. Figure 2 The 20m shuttle run tests team means heart rate T1 and T3.

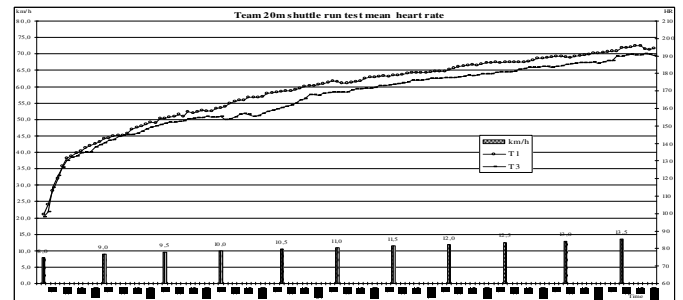


Fig 2 The 20m shuttle run tests team means heart rate T1 and T3.

All strength parameters improved: 1RM and 1RM-index 27 and 24%, capacity index 42% and anaerobic index 61%. Also mean power for all muscles increased 56% and total power in squats 33% on an average. Heart rate was lower during strength tests after training. Figure 3 The ½-squat strength maximal repeat tests team means power, heart rate and change % T1 and T3.

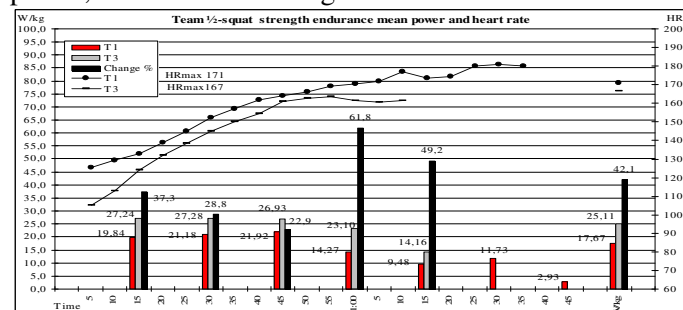


Fig 3 The ½-squat strength endurance tests team means power, heart rate and change % T1 and T3.

DISCUSSION

Based on the results of the fitness tests both aerobic and anaerobic performances of the players developed during training period. These results in performance improvements were in accordance with the content of training. Additionally, the changes in heart rate during tests did show economy improvements. Also, based on the strength test results the nerve muscle system and muscle elastic components were developed, because faster movement speed was obtained.

The results of this study show that HR based training prescription using basketball specific performance tests as well as individual HR controlled training can be recommended for basketball teams.