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EFFECT OF INTENSIVE SPORTS SPECIFIC ENDURANCE CIRCUIT TRAINING ON EXPLOSIVE POWER AND PEAK ANAEROBIC POWER OF MALE HANDBALL PLAYERS

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Abstract

The aim of the study is to assess the effect of 12 weeks intensive sports specific endurance training on explosive power and peak anaerobic power of male handball players. Twenty four (30) male handball players were recruited and randomly classified into two groups as intensive sports specific endurance circuit training group (ISSECTG) and control group (CG) of 15 subjects each. The intensive sports specific endurance circuit training was administered 3 days a week for twelve weeks. The result showed that twelve weeks of intensive sports specific endurance circuit training and control group failed to show significant improvement in explosive power (t = 0.078, p = 0.939) and peak anaerobic power (t = 0.080, p = 0.945). It is concluded that ISSECTG maintained explosive power and peak anaerobic power after 12 weeks of training. However, explosive power of handball players was not affected by intensive sports specific endurance circuit training.

Keywords: Handball, training, players, explosive power, peak anaerobic power

Introduction

Handball is a fast intermittent body contact team sport which requires speed, power, agility, strength, endurance, coordination and flexibility[1]. A handball player requires explosive power to execute jump shot high and jump high to block jump shot. Resistance training administered for ten weeks showed significant improvement in vertical jump by 2.5 centimetre[2]. Elite handball players also displayed improvement in strength and power after 12 weeks of strength training[3].

Aerobic capacity is an important physical attribute for handball players. To improve aerobic capacity of handball players interval training was administered traditionally. The athletes speed and explosive power development largely depends on the ability to recruit fast twitch motor units. Earlier it was identified that high intensity intermittent endurance training maintains sprinting performance[4-6] and explosive power[7-11] which suggest that high intensity training recruits and trains fast twitch motor units. Chittibabu and Akilan[12] assessed effectiveness of basketball specific endurance circuit training (3 days per week for six weeks) impact on peak anaerobic power and aerobic capacity of high school male basketball players. It revealed that aerobic capacity improved and peak anaerobic power maintained. The maintenance of the speed and power agrees with previous finding of Mohr *et al.*[13]. Therefore the aim of study was to assess the effect of intensive sports specific endurance training on explosive power and peak anaerobic power of male handball players.

Methods

Subjects and variables

Twenty four (30) male handball players were recruited from Annamalai University as subjects after obtaining their written informed consent to take part in the study. The study was approved by the Institutions Human Ethics Committee, Rajah Muthiah Medical College, Annamalai University, Chidambaram, Tamilnadu, India. All the subjects were medically examined and declared fit to take part in the study by registered medical practitioners. Thereafter the subjects were randomly classified into two groups as ISSECTG and CG of 15 subjects each. In the study there was no dropout. The selected handball players have the average (±SD) age of 24.35 ± 4.05 years; height 178.75 ± 8.18 cm and weight 72.59 ± 9.70 kg.

Explosive power was measured using vertical jump and peak anaerobic power was calculated using Sayers Equation[14]. Formula used is PAPw (Watts) = 60.7 × Jump height (cm) + 45.3 × Body mass (kg) – 2055.

Training

The intensive sports specific endurance circuit training (ISSECT) was administered 3 days a week for twelve weeks. The ISSECTG performed 2 minutes of work bout at 90 to 95% of maximum heart rate and followed by 2 minutes of active recovery of walking. The 2 minutes duration work contributes to 50% of aerobic and 50% of anaerobic energy source during maximal work[15]. In this study 1:1 work rest ratio was followed. This training protocol was adapted from Helgerud et al.[16]. They

performed 6 repetitions during first four weeks, followed by 7 repetitions during next four weeks and 8 repetitions during last four weeks of training.

Statistical technique

In the present study pre to post test changes are tested using paired *t* test in both ISSECTG and CG. All the statistical tests were calculated using the statistical package for the social science (SPSS) for windows (Version 16). The level of statistical significance was set at $p < 0.05$.

Results

The twelve weeks of intensive sports specific endurance circuit training and control group failed to show significant improvement in explosive power and peak anaerobic power (Table 1).

Table 1

Changes obtained on ISSECTG and CG

Variables	Groups	Pre test	Post test	t value	*p* value
Explosive power (cm)	ISSECTG	47.13 ± 6.76	47.20 ± 4.46	0.078	.939
	CG	41.33 ± 5.92	41.60 ± 5.87	0.200	.844
Peak anaerobic power (watts)	ISSECTG	3841.09± 560.02	3845.13± 513.90	0.080	.945
	CG	3772.91± 634.73	3773.99± 782.62	0.014	.989

Discussion

In the present study explosive power was measured by vertical jump test. Using the vertical jump score peak anaerobic power was calculated using Sayers equation[14]. ISSECTG showed no changes in explosive power and peak anaerobic power as a result of twelve weeks of training on male handball players. Previous research suggests that aerobic endurance training can interfere with the development of strength and this could potentially limit improvements in explosive power[4,17,18]. In the present study sports specific endurance circuit training did not reduce power related performance as the circuits possessed anaerobic activity which was sufficient enough to maintain peak anaerobic power. This observation of no interference effect parallels the results of similar aerobic endurance training studies involving in soccer players[19-20].

Conclusion

It is concluded that intensive sports specific endurance circuit training is not effective enough to enhance players explosive power and peak anaerobic power of handball players. It is necessary to investigate further the physiological cause for not enhancing explosive power of handball players.

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