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Effect of isolated and combined core strength training and yogic practice on selected speed and power parameter

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Abstract

The core region consists of far more than just the abdominal muscles. In fact, core strength training aims to target all the muscles groups that stabilize the spine and pelvis. It is these muscle groups that are critical for the transfer of energy from large to small body parts during many sporting activities. Purposeful core action requires understanding its function. Yogic practices are supposed to reduce the high activation level and psycho physiological disequilibrium and also contribute to steadiness, biomotor coordination and emotional stability. Such condition of high activation level and psycho physiological imbalance along with emotional instability seems to increase various disorganization of motor responses and tremors. For the purpose of the study 45 students from Government Higher Secondary School, Kumarachi, Tamil Nadu India were selected as subjects. The subjects were divided into Three (3) groups of Fifteen (15), namely core strength group, combined training group, yogic practice training group. The speed and explosive power were selected as biomotor variables. The variables were tested by using 30 m dash and sergeant jump. The experimental groups underwent their training for 12 weeks, 4 days per week, 45 to 60 minutes per day with suitable warming up and cooling down exercise. The criterion variables were tested prior to and immediately after the training programme. The collected data were analysed using ANCOVA (analysis of covariance) and Scheffes post hoc test was applied to know the paired mean differences if the optioned 'F' ratio was significant. The level of significance fixed at .05. After investigate the study, there was a significant difference among experimental groups on selected speed and power parameters. The study also shows that the core strength training group shows better improvement on criterion variables when compare with yogic group.

Keywords: Core strength, yogic practice, speed, power

Introduction

The core stabilizes and protects the spine by creating stiffness that limits excessive movement in any direction most notably extension, flexion, lateral flexion, and rotation. In lifting terms, the core's responsibility is to limit movement

Endurance is defined as the ability of muscles to maintain exercise, and without it, improving and developing of other factors of fitness are too hard to reach. Muscle adaptations because of endurance training involves an increase in mitochondrial capacity, capillary density, myoglobin, and V02max [Brooks, G. A, 2000] ^[15], whereas resistance training results in an increased muscle force, glycolytic enzyme activity, intracellular ATP, and muscle hypertrophy [Tanaka, H. and T. Swensen, 1998] ^[16] Combined training (strength and endurance training in the same session) has been commonly used by athletes to improve neuromuscular responses and energy systems [Dudley GA, Djamil R, 1985] ^[7, 14]. Several studies have shown that combined training results in a development of muscle strength or power

The endurance training leads to substantial improvements in cardiovascular fitness and that resistance training leads to substantial improvements in muscle mass and strength in people [Frontera, W. R, 1990] ^[8]. Based on the existing evidence concerning exercise prescription for young adults, it has been recommended to include both cardiovascular for developing cardio respiratory fitness and resistance training for developing muscle mass and strength [ACSM guidelines, 1993] ^[6].

As optimization of gain in physical fitness is critical for this population based on adherence

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and social cost, it is important to ascertain whether combined programs of lower weekly frequency of training will obtain significant endurance and strength development. Previous studies suggest that strength gains will be compromised when trained simultaneously with aerobic power, and this has been referred to as the interference phenomenon [Dudley, G. A, 1985] [7, 14]. Some studies have shown that combined training of strength and endurance results in compromised strength development. However, have shown that combined resistance and endurance training can result in similar strength and muscle power gains as resistance training alone in previously untrained men [Mc Carthy, 1995] [5, 9]. To date, we are unaware of any research investigating the effects of a whole body combined training program on speed and power performance in men.

In the past decade, combined strength and endurance training has received much attention as a form of training. Many of previous investigations have examined several variables during combined training [Leveritt *et al.* 1999] [14]. Moreover, they have demonstrated that the impact of combined training appears to be more determinable to potential strength gains and not to aerobic power [Rahnama *et al.* 2007] [11]. Additionally, after combined strength and endurance training, investigators have noted positive changes in body composition [Garcia-Lopez *et al.* 2007] [12].

Methodology

Selection of subjects and variables

For the purpose of the study 45 students from Government Higher Secondary School, Kumarachi, Tamil Nadu were selected as subjects. The subjects were divided into three

groups of fifteen namely core strength training group (n=15), yogic practices training group (n=15) and combined training group (n=15). The speed and explosive power were selected as bio motor variables. The variables were testes by using 30 m dash and sergeant jump.

Training programme

The experimental groups underwent there training for 12 weeks, 4 days per week, 45 to 60 minutes per day with suitable warming up and cooling down exercise. The core strength training group underwent Crunches, Sprinter Abs, Elbow to Knee Crunch, V- Sit, Bicycle Crunch, Alternative Arm Leg Raise and Leg Raises Back Extension exercises with 60 to 75% of intensity, the yogic practice group underwent Suryanamaskar, Tadasana, Trikonasana, Paschimottanasana, Virabhadrasana, Naukasana, Sedu Bandhasana, Uttanasana, Chakrasana, Dhanurasana, Halasana and Salabhasana the combined training group underwent training on both core strength training and yogic practices in alternative days. The speed and explosive power were selected as bio motor variables. The variables were testes by using 30 m dash and sergeant jump. The criterion variables were tested prior to and immediately after the training programme.

Statistical Procedure

The collected data were analyzed using ANCOVA (analysis of covariance) and scheffe’s post hoc test was applied to know the paired mean differences if the optioned ‘f’ ratio was significant. The level of significance fixed at .05.

Results

Table 1: ANCOVA on Speed and Power Parameter of Experimental Groups

Variables	Core Strength Group	Yogic Group	Combined Group	SOV	Sum of square	Df	Mean square	‘F’ Ratio
Speed	6.61	6.68	6.54	B	0.15	2	0.08	3.74*
				W	0.84	41	0.02	
Explosive Power	25.41	24.84	28.47	B	113.84	2	56.923	463.40*
				W	5.036	41	0.12	

*Significance at .05 level of confidence

The Table Value Required for Significance at 0.05 level with df 1 and 41 Is 3.22

The obtained f ratio for all the selected biomotor variables such as speed and explosive power are significance at .05 level. Hence, scheffe’s post hoc test was employed and presented in table –II

Table 2: Scheffe’s Post Hoc Test on Speed and Power Parameters

Variables	Mean Difference			Confidence Interval
	Core Strength Vs Yogic group	Core Strength Vs Combined Group	Combined Group Vs Yogic group	
Speed	0.07	0.14*	0.07	0.13
Explosive Power	0.57*	3.63*	3.06*	0.30

*Significance at .05 level of confidence

The result of post hoc test shows that combined training group was better in all selected variables then core strength and yogic practice group. There was no significance of speed on combined and core strength group & yogic practice group. The rest of the paired mean differences were found significant. Hence, it was concluded that combined training is the best training for develop speed and power.

Discussion

The findings of similar investigation (Bloomer *et al.* 2005) of the application of combined training in other sports may indirectly confirm our conclusions. Other investigations that studied simultaneous training for the development of endurance and muscle power in a long-time period (Hennessy and Watson 1994) [1] indicated the possibility of a decrease in physical abilities in athletes with a training experience.

The abilities that require demonstration of power, i.e. large muscle power and speed, are the most susceptible for large-extent and high- intensity trainings to which elite athletes. The successful combination of training depends on many factors such as the athlete’s genetic potential, length of training experience, current physical preparation form, intensity and extent of training, optimal periodization, nutrition and supplementation etc. The combinedly performed training for strength and endurance induces the increase in anaerobic power and maximal oxygen uptake.

An increase in body mass after the combined parallel endurance-resistance training probably due to anabolic responses. Glowacki *et al.* (2004) [2] reported an increase in fat mass in both resistance and combined training groups.

A number of previous studies reported the greatest reduction in body fat in the endurance training group than the combined group, whereas Park *et al.* (2003), reported the highest decrease in body fat percentage in combined training group. Therefore, combined training is an effective method in reducing body fat and improving body composition [Nader, G.A. (2006)]^[3]. The results of this study also showed that aerobic power significantly increased after training programs in both exercise groups compared with the control group. In line with this, most of the previous studies reported an increase in VO₂max in endurance and combined groups. However, some of these studies suggested significant reduction in VO₂max in the resistance-training group [Balabinis C.P, *et al.* 2003]^[4].

Nelson *et al.* (1990) reported that combined training prevents improving aerobic function, most likely due to the activity of citrate synthase enzyme that could diminish the activity of Krebs cycle enzymes and this leads to a reduction in aerobic power.

Baker D (2001) studies reported no changes in muscle strength after combined training. Moreover, many previous studies have demonstrated a positive effect of combined training on muscle strength, muscle endurance, and maximal aerobic capacity reported little increase in aerobic power (maximal aerobic capacity) in nontrained people after 12 weeks of combined resistance and endurance training, with respect to the endurance training. They also showed significant increase in lean body mass in resistance groups, but significant decrease in body fat percentage in endurance and combined groups; however, VO₂ max increases were observed only in endurance group [Glowacki SP, 2004]^[2].

Conclusion

The study concluded that the combined training was the best training method for improving speed and power parameters. This conclusion of this study may help the trainer design the optimal exercise program for adolescents.

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