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Effect of complex training on physical parameters of volleyball players

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Abstract
Chronic Low Back Pain (CLBP) is defined as mechanical musculoskeletal pain in the lower back that has no known cause and lasts for more than 12 weeks. It is one of the four most common health problems in the world with huge socio-economic consequences. Various interventions are used for its physiotherapy treatment, such as electrotherapy methods that seem to have a positive effect on reducing pain and improving the functioning of these patients. The aim of this review was to evaluate the efficacy of interferential current (IFC) in the treatment of patients with CLBP. The following databases were searched in English: MED line, Science Direct and Scopus; with the following keywords: Efficacy, chronic low back pain, interferential current electrotherapy, physiotherapy, rehabilitation. The review included 11 studies of which 10 were randomized control trials and one pilot study. Electrotherapy protocols were applied that included both the individual application of IFC protocols and combinations with other therapies**.** Discussion – results: The results of these clinical trials reinforce data on the positive effect of IFC on pain and quality of life in patients with CLBP. Their immediate analgesic effect has been shown to be effective both when applied as a single treatment and when combined with other natural means such as TENS or other physiotherapy interventions such as massage, stretching, Pilates and manual therapy techniques.

Keywords: Chronic low back pain, Interferential current electrotherapy, physiotherapy, rehabilitation

Introduction
Volleyball is a very dynamic sport which is characterized by short period of exercise alternating with rest. The long duration of the game makes the athlete's aerobic energy demand to increase. In contrast, the explosive nature of the game comprised of blocks, attacks and fast court movements requires an increased anaerobic capacity (Kustlinger, Ludwig & Stegemann, 1987). Throughout the game, volleyball players need to perform a lot of maximal vertical jumps and thus they must have very well trained leg extensor muscles. Body composition (BC) is an important indicator of the physical fitness and health of volleyball players. Excess adipose tissue acts as dead weight in activities during which the body mass must be repeatedly lifted against gravity during locomotion and jumping (Reilly, 1996). This, in turn, deceases performance and increases the energy demands of the activity in contrast, fat - free mass contributes to the production of power during high - intensity activities and provides greater absolute strength for resistance to high dynamic and static loads.
Complex training is a popular teaching method widely used in practical conditions and has been tested in a number of studies. Although most sports scientists and trainers agree that both resistance training (RT) and plyometric training (PT) should be included in athlete modes to develop higher muscle strength, data on the effectiveness of complex training as an appropriate training method remains doubtful. Previous literature exploring complex workouts has shown improved athletic performance, although the opposite has been reported. A possible explanation for these conflicting results may be the role of variables, such as the magnitude and mode of exercise with preload, the interval of rest between resistance and plyometric components of a complex workout. In addition, gender, training status, age, level of strength of participants can also affect the benefits of comprehensive training. (Kamran, 2017).
A Complex workout is a workout consisting of an exercise with weights, followed by a coordinated plyometric exercise, such as squats followed by squats jumps, bench press followed by plyometric bench press up.

The logic behind these coordinated pairs of exercises is that working with weights brings the nervous system into full action, so that more type II fibers are available for explosive exercises, therefore, the best general advantage of a comprehensive training program can be used in general, special and competitive stage of training. Ebbon (2002) [33] stated in a recent literature review that complex training explored both the acute and long-term effects of this conditioning approach. Comprehensive training describes strength training, which combines weights and plyometric exercises. About 10 years ago, these workouts were highly appreciated, since studies have shown that they can significantly increase the strength of muscle fibers and, accordingly, dynamic athletic performance. Two benefits of traditional strength work are increased nervous activity and increased muscle mass (hypertrophy).

Methods

Experimental Approach to the Problem

In study 30 women volleyball players were randomly selected from affiliated colleges of the Bharathiar University, Coimbatore, Tamil Nadu, their age ranged from 18 to 25 years. The subjects were randomly assigned to two equal groups (n=15). Group- I underwent complex training group (YTG) and group - II was acted as control group (CG). Yoga training was given to the experimental group for 3 days per week (Monday, Wednesday and Friday) for the period of twelve weeks. The control group was not given any sort of training except their routine work.

Design

Pre and post random group design was employed. The evaluated physical parameters were explosive power was assessed by sargent jump and the unit of measurement was in In Centimeters and cardio respiratory endurance was assessed by 12 Minutes Run and Walk Test the unit of measurement was in Meters. The parameters were measured at baseline and after 12 weeks of yoga training were examined.

Training programme

The training programme was lasted for 45 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. The equivalent in complex training is the length of the time each action in total 3 day per weeks (Monday, Wednesday and Friday).

Statistical Analysis

The collected data before and after training period of 12 weeks on the selected variables due to the effect of complex training was statistically analyzed with‘t’ test to find out the significant improvement between pre and post-test. In all cases the criterion for statistical significance was set at 0.05 level of confidence. ($P< 0.05$)

Table 1: Computation of ‘t’ ratio on selected physical parameters of volleyball players on experimental group and control group (Scores in numbers)

Group	Variables		Mean	N	Std. Deviation	Std. Error Mean	‘t’ ratio
Experimental Group	EP	Pre test	47.33	15	2.89	0.18	10.64*
		Post test	49.26	15	2.94		
	CRE	Pre test	1334.00	15	140.24	5.45	9.54*
		Post test	1386.00	15	146.86		
Control group	EP	Pre test	47.20	15	1.56	0.10	1.87
		Post test	47.40	15	1.76		
	CRE	Pre test	1316.00	15	92.64	1.06	1.80
		Post test	1318.00	15	92.59		

*significant level 0.05 level degree of freedom (2.14, 1 and 14)
EP – Explosive power, CRE – Cardio respiratory endurance

Table I reveals the computation of mean, standard deviation and ‘t’ ratio on selected physical parameters namely Explosive power and Cardio respiratory endurance of experimental group. The obtained‘t’ ratio on Explosive power and Cardio respiratory endurance were 10.64 and 9.54 respectively. The required table value was 2.14 for the degrees of freedom 1and 14 at the 0.05 level of significance. Since the obtained‘t’ values were greater than the table value it was found to be statistically significant. Further the table the computation of mean, standard deviation and‘t’ ratio on selected physical parameters namely Explosive power and Cardio respiratory endurance of experimental group. The obtained‘t’ ratio on Explosive power and Cardio respiratory endurance were 1.87 and 1.80 respectively. The required table value was 2.14 for the degrees of freedom 1and 14 at the 0.05 level of significance. Since the obtained‘t’ values were lesser than the table value it was found to be statistically not significant.

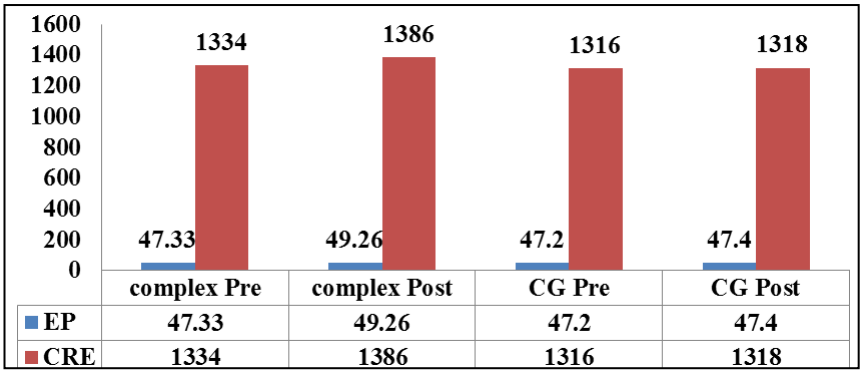

Fig 1: Bar diagram showing the mean value on selected physical parameters of volleyball players on experimental group and control group (Scores in numbers)

Conclusions

It was concluded that twelve weeks complex training showed significantly improved the explosive power and cardio respiratory endurance of volleyball player.

A was one among the most appropriate means to bring about the desirable changes over selected physical parameters of volleyball players. Hence, suggested that trainers and the experts deal with working women to incorporate complex training as a component in their training programme.

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