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A Comparison of Some Strength Parameters in Crossfit Training and Resistance Training

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Abstract

Crossfit is an exercise method that includes high-intensity functional training, resistance exercises, gymnastics, and aerobic exercises and creates variations between them daily. As it gets popular with its time-efficient workouts, the long and time-consuming traditional training began to lose its popularity. Still, it's unclear if Crossfit training is advantageous in terms of various fitness attributes compared to traditional resistance training. So this study aims to examine whether there is a difference in strength, muscle endurance, and vertical jump parameters between individuals who apply Crossfit training and those who apply traditional strength training. 10 Crossfit-trained individuals formed the Crossfit group (CrG) and 9 resistance-trained individuals formed the Traditional group (TG). Countermovement jump (CMJ), Handgrip strength, Leg, and Back strengths, 30s Sit-ups, and maximum Push-ups tests were applied. There was no significant difference for all measured parameters between groups. In conclusion, the present study found no significant difference between the groups that performed Crossfit training and traditional resistance training in terms of strength, muscular endurance, and vertical jump performances. Due to similar results between groups, Crossfit training can be recommended as an alternative method for strength development.

Keywords: Crossfit, resistance training, functional training

Introduction

In today's lifestyle, people reduced their physical activities drastically. Therefore, excess weight and disorders in the musculoskeletal, circulatory, and respiratory systems are increased. For adults, 150-300 minutes of moderate-intensity, 75-150 minutes of vigorous-intensity per week, or a combination of those with similar intensity exercise is recommended (Yang, 2019). Traditional resistance training and aerobic training support this kind of exercise with muscle development in the long term. However, the body adapts quickly to these same repeated exercises. It can slow down development. Motivation and the desire to continue training decrease over time. Time constraints, lack of variety in exercise programs, complexity, monotony, or fear of injury are the reasons for discontinuation of training in the first months. For this reason, it is important to find methods that will eliminate these disadvantages but also enable us to reach the desired goals in a shorter time. High-intensity interval training (HIIT), bodyweight training, and functional training are at the top of European fitness trends in 2020 (Chukhlantseva, Cherednychenko, & Kemkina, 2020). It is stated that functional training contributes to the protection and improvement of health by improving muscle endurance, body composition, and aerobic fitness (Mcweeny et al., 2020). One of these popular workouts is Crossfit. It is a type of training that every participant can enjoy, regardless of training background, age, lifestyle, or fitness level (Mangine et al., 2020).

Crossfit is an exercise method that includes high-intensity functional training, resistance exercises, gymnastics, and aerobic exercises and creates variations between them daily (Mangine et al., 2020). It aims to improve 10 fitness domains which are accuracy, agility, balance, coordination, cardiovascular and respiratory endurance, flexibility, power, speed, stamina, and strength (Cazayoux and DeBeliso, 2019). The daily workouts are created by using metabolic exercises such as free weights, body weight, running, and cycling under the name of workout of the day (WOD). The WODs are performed repetitively or for a certain period with short rest intervals or no rest (Faelli et al., 2020). Thus, a single training session can save time compared to traditional training. In addition, Crossfit can improve several physiological and performance parameters in a single session (Gavanda, et al., 2022). Studies are showing that traditional strength training (Doğru et al., 2018) and Crossfit training (Dilber and Doğru, 2018) improve strength values. However, it is still unclear if Crossfit training is advantageous in terms of various fitness attributes compared to traditional resistance training (Mangine et al., 2020; (Gavanda et al., 2022). So this study aims to examine whether there is a difference in strength, muscle endurance, and vertical jump parameters between individuals who apply Crossfit training and those who apply traditional strength training.

Material and Method

19 healthy men participated in the study. Two groups were formed. 10 Crossfit trained individuals (23,80±4,91 years; 180,8±6,74cm; 78,73±10,35kg) formed the Crossfit group (CrG) and 9 resistance-trained individuals (21,55±2,12years; 184,33±10,51cm; 83,5±10,93kg) formed the Traditional training group (TG). Participants were informed about the content of the study and written informed consent was obtained from them.

Handgrip strength measurement was made with the Takei A5001 Hand Grip Dynamometer (Japan), using the best of two trials with the dominant hand.

Back strength and leg strength measurements were made with Takei A5002 (Japan) Back and leg dynamometer, using the best of two trials. For the back strength test, the participant stands

upright on the platform with the feet shoulder-width apart. He holds the bar with both hands and palms facing toward the body. He pulls the bar with his upper body strength.

For the leg strength test, the chain was adjusted and the knees bent at approximately 110 degrees. In this position participant's back should be bent slightly forward at the hips, the head should be held upright, and he should look straight ahead. Then without bending his back, he pulls as hard as possible on the chain and tries to straighten his legs, keeping his arms straight (Eyuboglu et al., 2019).

30sec Sit-up Test

The participant lies on his back with his knees bent and the soles of his feet are on the floor. The arms are placed crosswise on the chest. The feet are supported by being held by a partner. The movement is applied by lifting the body 90 degrees upwards. The maximum number of sit-ups made in 30 seconds is recorded.

Maximum Push-ups Test

The participant gets in a push-up position with hands shoulder-width apart and elbows extended. Partner puts his fist on the ground at chest level. With each push-up move, the subject's chest will touch the partner's fist. The participant does as many push-ups as he can without resting. The total number is recorded.

Countermovement Jump Test

On the jumping mat, the subject makes a maximal single jump with hands on the hips. After 3 repetitions the highest number is recorded.

Statistical analyzes were performed with SPSS 21.0 program. The significance level was accepted as $p<0.05$. The normality of the distribution was determined by the Shapiro-Wilk test. The "T-Test" for parametric data and the "Mann Whitney U Test" for non-parametric data was used.

Findings

Table 1. Performance Measurements Of The Participants

	Group	Mean±Sd.	P value
CMJ (cm)	CrG n=10	33,73±2,61	0,278
	TG n=9	35,95±6,58	
Handgrip strength (kg)	CrG n=10	48,99±6,55	0,827
	TG n=9	48,30±7,00	
Leg strength (kg)	CrG n=10	144,26±22,65	0,505
	TG n=9	137,77±18,22	
Back strength (kg)	CrG n=10	160,86±39,09	0,968
	TG n=9	161,55±24,54	
30s Sit-up (reps)	CrG n=10	24,70±4,83	0,975
	TG n=9	24,78±5,67	
Max. Push-ups (reps)	CrG n=10	27,70±12,74	0,549
	TG n=9	28,44±10,63	

CrG: *Crossfit Group,* ***TG:*** *Traditional Training Group,* ***CMJ:*** *Countermovement Jump*

There was no significant difference for all measured parameters between CrG and TG (p>0,05) (Table 1).

Discussion and Conclusion

In the present study, there was no significant difference between the CrG and TG in handgrip strength, muscular endurance, and vertical jump performances.

Similar to the present study, de Sousa et al. (2016) found no significant difference in CMJ and upper body strengths between the Crossfit and resistance-trained individuals. In another study, between the traditional resistance and Crossfit training groups no significant difference was found in handgrip strength, push-ups, squats, and vertical jumps, similar to this study (Hollerbach et al., 2021). Barfield and Anderson (2014) also found no difference between the two groups in vertical jump values, which is another strength parameter. Another study that compared Crossfit training to traditional strength training, found similar improvements in both groups for muscle endurance, maximal strength, and explosive strength. But, in line with the present study, there wasn't any difference in values of vertical jump, muscle endurance, and maximal strength after the training intervention for both groups (Costa, Feye & Magallanes, 2021). Özbay (2019) also found similar strength parameters between Crossfit and resistance-trained groups. These results show that Crossfit training can be as effective as traditional resistance training for strength development. Experience can also be a factor in these results. The beginners in Crossfit may develop less aerobic capacity and anaerobic power than experienced athletes. The changes in the body also may not be seen in early sessions of Crossfit (Meyer et al., 2017).

In a study women, participants of Crossfit training had a higher upper limb strength when compared to concurrent training (Bahremand et al., 2020). Gender may have a role in this different outcome. Contrary to the present study, Mcweeny et al. (2020), stated that functional training improves aerobic power and upper body muscular endurance more than traditional training. It is thought that the similarity of the measurement method and the exercises they perform in functional training may cause this effect. In another study comparing Crossfit and traditional resistance training, muscular endurance increased by 22% with Crossfit training which is contrary to our findings (Barfield and Anderson, 2014). Another research on Crossfit vs traditional training found that maximal strength improved significantly in favor of the Crossfit training group which is also different from our findings (Gerhart and Pasternostro Bayles, 2014). Differences such as training content, location, and trainer may affect these results.

In conclusion, the present study found no significant difference between the groups that performed Crossfit training and traditional strength training in terms of strength, muscular endurance, and vertical jump performances. Due to similar results, Crossfit training can be recommended as an alternative method for strength development.

With longer-term planning, the effects of training on development can be examined. Also, a control group can be added. The metabolic effects of Crossfit can be examined for aerobic performance improvements. Upper and lower body strength developments can be measured separately for future studies.

Conflict of Interest

The authors declared no conflicts of interest to authorship and/or publication of the article.

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