

## Impact of strength exercises in indicators of VO<sub>2</sub>max and improvement through various exercise programs of weight circuit training.

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### **Abstract**

In this literature review it has been provided very interesting data on numerous studies focusing on strength exercises affecting the optimal level in improving VO<sub>2</sub>max. It was used Jab Ref program, as a tool searching on Google Scholar, Inspire and Medline database to scientific articles that will serve to conduct the study predicted using. Different authors selected literature of particular importance to training with weights, resulting in improvement of VO<sub>2</sub>max, the cardio-vascular and respiratory, lower the heart rate at rest and increases performance in general fitness. These positive effects have more impact on people aged second and third ones especially, since the fall of maximal aerobic power and muscle strength are examples of functional decline of the body that cause aging, which can severely limit physical performance and negatively correlated with all cases of mortality.

The studies presented in the literature indicate that aerobic performance can't be improved unilaterally just from running, but in this case can improved and by circuit weight exercises training, as two 2 ways of systems, which are tightly intertwined in the function of one other.

If runs do or alpine walking impact the majority of oxygen by increasing vital lung capacity, weight training sessions scheduled for this purpose, impact absorption and oxygen consumption in a very efficient, through muscle in every cell of the body.

**Keywords:** VO<sub>2</sub>max, resistance training, circuit weight training, cardio-vascular, aerobic fitness, strength training

### **Introduction**

According to the author Ozaki, is an undeniable fact, that training with weights is a powerful stimulus for muscle hypertrophy and strength gain, but this is less understandable if the weight training can increase maximal (VO<sub>2</sub>max) aerobic capacity (Ozaki et al., 2013). To see more clearly the effect of exercise training with weights circuit have that initial indicators of VO<sub>2</sub>max to old age subjects are below 25 ml / kg / min and young subjects less than 40 ml / kg / min. So in subjects younger and older, who have low levels of physical performance, after attending the training program is expected to improve at the same time and within a single order of two fitness: muscular and cardiovascular. (Ozaki et al., 2013)

An another experimental study in order to determine whether 16 weeks of training exercises with weights circuit, can reduce blood pressure and improve cardiovascular function in men aged 70-80 years. (Lovell et al., 2009) Twenty-four men aged 70 to 80 years were randomly assigned to a group to be trained in

circuit system of exercises with weights (n = 12) and control group (n = 12). The training consisted of three groups squat exercises 5 series x 6-10 repetitions at 70-90% of maximum repetitions, three times a week, 16 weeks. Blood pressure and cardiovascular function were assessed during exercise cycle sub-maximum in 40W and 50-70% of maximal oxygen consumption (VO<sub>2</sub>max) before training and after 16 weeks of training.

### **Methods**

The purpose of this short review is to discuss whether circuit system training exercises with weights increases VO<sub>2</sub>max among the youth (20-40 years), while in older subjects (> 60 years) has shown significant increase VO<sub>2</sub>max. Only 3 of 17 studies involving young subjects following training with weights, have shown significant increase VO<sub>2</sub>max, while six

out of nine studies in subjects in old age, have reported significant improvements in VO<sub>2</sub>max. It is a significant negative correlation between initial VO<sub>2</sub>max and exercise with weights that promotes change in VO<sub>2</sub>max, because the increase in VO<sub>2</sub>max through exercises with weights is dependent on the initial VO<sub>2</sub>max subject.

## Literature Review

The strength of the legs and VO<sub>2</sub>max were assessed every 4 weeks to study 16 weeks. In 40W, heart rate, systolic blood pressure, were lower and working volume was significantly higher after 16 weeks of training. In 50% VO<sub>2</sub>max heart rhythm and rate were lower pressure after 16 weeks of training and 70% VO<sub>2</sub>max, power in ergometric bicycle, VO<sub>2</sub> and arterio-venous difference of oxygen were higher. Also the strength of the legs was significantly increased after 16 weeks of training. Sixteen weeks of training significantly reduces blood pressure and improves cardiovascular function of elderly people during submaximum aerobic exercise. Therefore, exercises with weights not only increases strength and muscle mass, but provides significant cardiovascular benefits for individuals older. (Lovell et al., 2009)

The author Arenas considers, that the decline maximal aerobic power and muscle strength with advancing age, are examples of functional decline of the body that cause aging, which can severely limit physical performance and negatively correlated with all cases of mortality. (Arenas et al., 2013) As we all know, exercises on stability and resistance can significantly improve physical performance and health factors in elderly individuals. Circuit system based on resistance training with light weights setting and minimum vacation during the series and repetition, can be a very effective strategy for increasing oxygen consumption, pulmonary ventilation, strength and functional capacity by improving body composition (body composition). In addition, the circuit system exercises with weights exercise have efficiency in time and training modalities that can bring significant improvements to health and physical performance. It is therefore a need to develop training programs with the most effective combination of intensity, volume, work in relation to the termination, weekly frequency and order of exercises to activate the neuromuscular system, cardiorespirator and body composition adapted for seniors. Thus, the aim of this study was to summarize contemporary knowledge about the positive effects of weights circuit exercises, for ages the second and third, as a

starting point for the design of future interventions that contain a higher quality of life people throughout their lives. (Arenas et al., 2013)

The study was designed to observe high impact resistance training (RT) according to weights exercises circuit system in aerobic maximum effect. (Petersen et al., 1988) Twenty-seven men took part to be divided into two groups, where (n = 16) underwent the training program and Circuit RT (n = 11) was singled out as the control group. The training group was trained with two series from 20 seconds to 6 different exercises hydraulic tools of strength performed on three circuit in all exercises. Subjects were trained four times a week over 5 weeks. Resistance to any gadget force was fixed to maintain steady speed of approximately 3.2 rad / sec. VO<sub>2</sub>max training group increased (p <0.001) with 9.5%. No changes observed for control subjects. Responses measured oxygen consumption during two circuits in six subjects of training group had increased on average 57 to 61% of VO<sub>2</sub>max for each interval workout. It is suggested that resistance training (RT) in weights circuit exercises as described above, will draw a sufficient metabolic intensity to improve aerobic power. (Petersen et al., 1988)

According Shaw. B, arterio-coronary disease (CAD) is a major medical problem in Western society and is a significant cause of morbidity and mortality in South Africa. (Shaw et al., 2005) In recent years, epidemiologists have made numerous attempts to determine the common factors of risk for CAD by precautions to limit the spread of the disease. Despite the importance of resistance training (RT), literature has focused primarily on ways to impact aerobic exercises to reduce risk of CAD. The purpose of this study is to determine whether resistance training can change the sustainability cardiorespiratory (VO<sub>2</sub>max), to reduce the riskiness of CAD in this way. Twenty-eight untrained male volunteers, aged up to 28 years, were randomly assigned to the experiment being split in the control group (n = 15) and Resistance Training group (n = 13). The study showed no statistical difference VO<sub>2</sub>max important for the control group pre-test them (25,097ml / kg / min) and the post-test (23,778ml / kg / min) (p = 0.201). As to resistance training group had significant increase (p = 0.01), VO<sub>2</sub>max of 26.674 ml / kg / min in 30,981ml / kg / min (p = 0.004). In addition, the difference between before and after the test to both groups, showed that the average VO<sub>2</sub>max in the control group was significantly lower than the resistance training group (p = 0.001). Although not all studies have shown sig-

nificant increases in VO<sub>2</sub>max after resistance training, the results of this study showed that eight weeks of resistance training were insufficient to result in a significant improvement in VO<sub>2</sub>max. Therefore the design of training programs with weight training circuit system resistance is important for the positive effects it brings to improving the physical and physiological body to prevent disease in general, and particularly in coronary arterio- diseases. (Shaw et al., 2005)

The purpose of this survey is to determine the level of cardiovascular stress derived from continuous training and extended the (CRT) Circuit Resistance Training (Gotshack et al., 2004) Each of the 11 subjects were tested to determine oxygen consumption and response the pro motion of the heart under sub-maximal and maximal protocol routine work to a CRT session consisting of 10 exercises x 10 repetitions at 40% of 1 repetition maximum (1RM) for each station with 4.6 circuit perform. Physiological stress caused by CRT in heart rate was significantly more than 70% of maximum for 16.6 minutes and more than 80%. in the last 12 minutes.

Despite the huge anaerobic component in CRT, Vo<sub>2</sub> max was stable at 50% or more than the maximum in the final 12 minutes. In the car runners including major muscle groups, increased Vo<sub>2</sub> max faster than CRT, which are used in alternating larger groups and smaller muscle. In addition, at the same Vo<sub>2</sub> max heart rate differed significantly between the 2 modes of operation. Heart rate in CRT (165) was higher than the rate of heart in car runner (150) in the same measure 50% Vo<sub>2</sub> max. These exercises can be used in a training cycle of the classical period linear or non-linear stability program targeting local daily strain on intensive cardio-respiratory conditions, which can help individuals develop tolerance to expand physiological environments, where high demands cardiovascular and high lactate concentrations are present. (Gotshack et al., 2004)

## Discussion

Improved cardiovascular system by training with strength exercises is so much important as the positive effects that come from running and this is not a joke. (Baye et al., 1998). Even running in itself is a poor and deficient activity, sometimes dangerous, limited and slow to improve cardiovascular benefits. Any number of positive effects that can be produced by running can be duplicated and overcome with proper use, according to special training programs in circuit system of exercises with weights to cardio-

vascular benefits. There are hundreds of thousands, perhaps millions of people around, who do not understand or do not believe or do not accept this phenomenon, but they are simply uninformed. It should be clear that just as there is no useful jogging without benefits, and weight-lifting is harmful and without benefits. I'm talking about the proper use of weight lifting and properly applied so that the exercises with weight training to serve for the benefit of cardiovascular positive effects on a scale that is impossible to achieve in jogging. (Baye et al., 1998).

Recent studies have shown that different types of exercise with weights circuit system can improve aerobic fitness. (Garrison. Ph). To outdoor aerobic exercise with weights should be quite intense with very short periods of rest between series and transition from one exercise to another, in order to keep up consistently pro motion of the heart. Studies have shown that short breaks, exercise regularly and correctly according to the system circuit of exercises with weights, lowers heart rate at rest, increased VO<sub>2</sub> max, and improves aerobic power, unlike traditional cardiovascular training. It is necessary that these types of exercises with weights programs are implemented in training processes through fitness gyms run by professional trainer and besides we talked about above benefits will be significant improvements in muscular strength, durability and bone mineral density. (Garrison. Ph).

Circuit system of exercises with weight training is a kind of resistance, which has undoubtedly cardiovascular benefits. (Clark. M) In this way, exercise, weight exercises performed one after another, quickly, with few-second short vacation or without break, to keep the charging stress cardio respiratory system with the aim of gaining positive effects of resistance training and cardiovascular training at the same time. An example of circuit training exercises with weights includes 4 exercises: 1-push ups, single leg 2 squad, 3-standing cable row, 4-abscesses to overhead press 3 x series 12 to 20 repetitions, quickly and without pauses as shown above. This routine keeps up the rate of heart by absorbing more oxygen and thus burn more calories for weight loss for those who want formed muscles and thus improving the performance quality of fitness. (Clark. M).

In conclusion lifting weights can be considered as training and cardio. (Burdette. K). One of the most effective body weight loss comes from circuit training with weights, which as defined by NASM, is; performing some exercises one after another several -second minimum vacation in several series, where a circuit is 1 series. As far as cardio training through resistance training (RT) exercises with weights cir-

circuit system, can be considered one of the most useful ways to improve cardiovascular and physiological systems of the body. When cardiovascular exercise carried out by strength exercises heart rate is elevated, using more oxygen and for an extended period of time until the completion of exercises throughout the circuit series. It also brings a considerable expense calories and significantly improves muscular sustainability. Many of my clients have to results in loss of weight and feel very comfortable in this style of training. Each is capable of working on the balance of his body in maximizing caloric expenditure in achieving the overall goal of losing weight and increasing physical performance. (Burdette. K)

Activity.

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