

## Performance of Female Volleyball Players in VO<sub>2</sub>max

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### Abstract

**Aims:** In volleyball the main achievement is winning the match so the tools and methods used during the training sessions are very important to achieve this goal. Purpose of the study is the identification of volleyball players in the development performance of VO<sub>2</sub>max. **Method:** Test Astrand was used to evaluate VO<sub>2</sub>max in 75 female volleyball players in the average age of 17.1 years of the Albanian championship in two different periods \_Pre and \_Post mini phase of their training in the respective teams. Anthropometric measurements BH, BW, BMI and Astrand test were developed. **Results;** showed a positive value of progress from Pre-test to Post-test of volleyball players. There was a correlation between the maximum heart rate per minute and the maximum intake O<sub>2</sub> / min, Maximum heart rate per minute and MaxVO<sub>2</sub> intake ml / kg / min in the post test, which showed a negative correlation, but the results are not significant at  $p \leq 0.05$ . The comparison of the test before and after did not mark a significant. **Conclusion:** It was noted that the training of volleyball players was aimed at strength. Strength training has made the only positive contribution to this type of improvement. Our study shows that the correlation between strength training and performance improvement of maximum VO<sub>2</sub>max results of laboratory values compared to the good part of them were significant. The impact of strength training can not be said to be a primary indicator but a secondary indicator in VO<sub>2</sub>max performance.

**Keywords:** VO<sub>2</sub> max, volleyball, performance, training, strength.

### 1. Introduction

In volleyball, the main goal is the best performance on the day of the match and for this is achieved through the methods used during the training sessions by the coaches. We will present a record of the performance of female volleyball players in the youth championship in Albania. In addition to other elements that include the training of volleyball players, the training of strength on the performance of VO<sub>2</sub>max is also important. Cardiovascular capacity is often thought to be the main limiting factor in endurance performance. Classical measures such as maximal oxygen uptake (VO<sub>2</sub> max) and lactate threshold (LT) have traditionally been used in the laboratory to predict performance potential [1]. Consequently, physical preparation for these sports generally focused on developing physiological quality. However, elite endurance athletes with similar VO<sub>2</sub> max levels may have different abilities during a match and therefore may receive maximum oxygen do not fully explain the true ability in the match. Efficiency, and estimates that include a specific component of muscle endurance

energy, such as velocity / strength during maximal oxygen uptake (VO<sub>2</sub>max), are now thought to be superior performance indicators in a sports elite [2]. Specific endurance muscle strength is the ability of the neuromuscular system to rapidly produce strength following a sustained period of high-intensity exercise (high glycolytic and / or oxidative energy demand) [3]. This ability can be a differentiating factor for elite endurance performance as successful world-class athletes can produce high elocations and energy outflows to win a race after a steady period of high-intensity exercise. Specific endurance muscle strength is the ability of the neuromuscular system to rapidly produce strength after a steady period of high-intensity exercise (high glycolytic and / or oxidative energy demand) [10]. Current research shows that there have been significant improvements in the economy from maximal strength training and reactive interventions [4, 5]. Noakes's philosophy [6] for poorly performing performance may lack musculotendinous rigidity and therefore strength training can improve the ability of the leg muscles to absorb and rapidly utilize the elastic energy produced during any contact with the ground. Recent research suggests that strength training is one of the most powerful interventions to improve athletic performance as an indicator of improved physical quality [7, 8].

## 2. Methodology

75 volleyball players from different teams in Albania were tested. The Astrand Test is used which allows coaches and athletes to monitor the progress of a VO<sub>2</sub>max maximum. 6-minute test using an ergo cycle gauge (a fixed exercise bike). The linear relationship between heart rate and VO<sub>2</sub>max has been observed. The test enjoys a standard deviation of ± 15% from a directly measured max VO<sub>2</sub>max [9]. The female volleyball players were tested before and after a mini-training phase by their coaches. The results were statistically processed with the Wilcoxon Signed - Rank test calculator and the Pearson correlation calculator.

Table1 Anthropometric Measurements (Volleyball players)

Nr;75 Volleyball players	FEMALE (F)
Mean Age	17.1
Body Height (BH) cm	172.3 cm
Body Wight (BW) kg	60.4 kg
Body Mass (BMI)%kg/m <sup>2</sup>	20.47%

## 3. Results

Table 2 shows the average data of female volleyball players taken under observation. The values obtained clearly show the level of the players in Albania.

Table2. Data obtained from Test Arstrand (volleyball players female)

VO <sub>2</sub> max TEST	Accept. heart rate	Max heartrate bpm	Vo <sub>2</sub> correlation factor	MaxO <sub>2</sub> Uptake l/min	MaxO <sub>2</sub> Uptake
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	bpm				ml/kg/min
_Pre	148.6	202	1.03	2.55	41.09
_Post	149.5	202	1.03	2.61	42.56

Results for the volleyball player's \_Pre and \_Post were taken and expressed in the average: Pre-Test Accept. Heart rate bpm 148.6/Post-Test 149.5. \_Pre-Test Max heart rate bpm 202/Post-Test 202. \_Pre- Test Vo2 correlation factor 1.03, /Post-Test 1.03. \_Pre-Test Max O2 Uptake 1/min 2.55 / Post- Test Max O2 Uptake 1/min 2.61. \_ Pre-Test Max O2 Uptake ml/kg/min 41.09 /Post-Test Max O2 Uptake ml/kg/min 42.56. Results showed positive values when pre and post tests results were compared, which are: the result is significant at  $p \leq 0.05$  to Max O2 uptake 1/min and Max O2 Uptake ml/kg/min. Results showed correlations between Max heart rate bpm and Max O2 Uptake 1/min, Max heart rate bpm and Max O2 Uptake ml/kg/min on post test, that showed negative correlation, but the results are not significant at  $p \leq 0.05$ .

#### 4. Discussion – Analysis

Strength training affects every sports program, no matter what the sport. Strength training has made for the most part the only positive contribution to this kind of improvement. According to the comparison of results show laboratory values for pre- and post-tests for most of them, there is a noticeable improvement over performance as well as a strong correlation between strength training and VO2 max. These results showed that the value of improvement was minor compared to various studies reported before. The results were not significant at  $p < 0.05$ . Important for our identification in female volleyball players was the transfer of strength performance to VO2max indicators, which is the essential component that influences sports results. Comparison of the results in the before and after test of Max O2 Uptake 1 / min was significant at  $p \leq 0.05$ . The value of Max O2 Intake ml / kg / min will be better estimated if body weight can be included. Various studies have shown correlations between body weight and VO2 max. The results showed a correlation between maximum heart rate and maximum O2 intake 1 / min, max O2 Intake ml / kg / min. Based on these results we can say that the introduction of strength training programs in volleyball season matches will not reduce the performance of VO2max. Strength impact training may not mean that it is a primary indicator but rather a secondary one on VO2max performance. Referring to the results, the performance of VO2max is more influenced by the heartbeat which leads us to the fact that the strength exercises should be adequately adjusted to the heart rate interval which on the other hand will increase the performance of the VO2max by a high-intensity workload and a certain duration which increase the heart rate and affect the transfer capacity of VO2max.

#### 5. Conclusion

This study influenced the identification of the performance status of young volleyball players in Albania. Their training turned out to be at a low level under the influence of VO2max. We will try to cooperate with their coaches to emphasize the development of VO2max to increase the sports performance of volleyball players of different age groups in Albania.

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