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Components of Physiological Variables of National Level Volleyball Players

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Abstract – The Purpose of this paper was to find out the relationship of selected physiological variables with playing ability among national Level Volleyball Players. For this purpose Volleyball players, who had participated the mini National tournament in 2013-2014 seasons, were selected as subjects. Among the physiological parameters only Resting Pulse Rate and Respiratory Rate were selected as criterion variables. Resting pulse rate and Respiratory Rate were assessed through Manuel methods. Volleyball playing ability was assessed through subjective rating by three experts during the mini national Volleyball tournaments and the average was taken as criterion score. Person's product moment correlation (zero order) was used as a statistical tool to find out the result and it revealed that the physiological variables of resting pulse rate and respiratory rate were having significant relationship with Volleyball performance.

Keywords: Physiological Variables, National Level, Volleyball Players, etc.

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INTRODUCTION

Sports form an inspirable part of the system of physical education. The term motor ability is used synonymously with general athletic ability. There are many factors that contribute to successful performance in athletic skill. In most of the advanced and developed countries, the awareness for motor learning and skill development among children is very much scientific and prolonged which perhaps helped them to level of general fitness with motor abilities like power, speed, agility, balance, reaction time etc. are essential qualities required to be developed in the players. Volleyball is played by millions of people around the world. In many countries, it has been ranked as top-level competitive sports. It is a fascinating game, which everybody will accept. It is a well-known fact that volleyball is a thrilling game. It is one of the recreational games with in a small area. It is a game where not only the hands are engaged in receiving and spiking the ball, but the whole body and mind are engaged in this game. Volleyball is probably the leading ball game in the world as far as action and accuracy are concerned.

REVIEW OF LITERATURE:

Volleyball is a complex game of simple skills. It has also shown in recent years that there is a trend that volleyball payers adopt the technique, tactics and physical performance. Volleyball Game requires comprehensive ability including physical, technical, mental and tactical abilities. Among them physical abilities of players exert marked effects on the skills of the players themselves and the tactics of the team. The skills like higher attack, powerful.

Jumping-serve, attack from the back row and aggressive blocking are now widely used by volleyball players. All these bring forward greater demand for specific physical fitness and physique of volleyball players. In volleyball, technical and tactical skills, anthropometric characteristics and individual physical performance capacities are most important factors that contribute to the success of a team in competitions (Hakkinen, 1993).

Different sports have distinct physical and physiological characteristics which contribute to the success of sports persons, in that particular sports discipline. The measurement of player's physiological characteristics has high lightened position specific attributes. The physiological efficiency of various organs is helpful in doing the activity with vigor and more enthusiasm. More and more training is helpful to be stronger physiological efficiency. The most important muscle that adapts to training is the heart. During exercise, it pumps blood containing oxygen, fluids and nutrients to the active muscles. Blood flow then drains the metabolic waste products away. The more blood pumped, the more oxygen is available to the exercising muscles. More and more the muscles

train, they're better able to extract and use the oxygen to produce more work. The heart adapts to aerobic exercise over time so it can pump more blood per stroke. Physiological efficiency of various organs plays a vital role in the performance Volleyball (Jeyaraj & Gopinathan, 2014).

Playing abilities or specific skills are very important aspect in every game and sports and play a vital role in the performance of individual. Skill is often defined as "knowledge or expertise, but in physical education it is the ability to perform certain activities or movements with control and consistency, to bring about a desired results." It takes a long time to acquire a skill because it involves a high level co-ordination and control. The game of volleyball comprises manifold of quick actions and reactions such as arm pass, fore arm pass, blocking, smashing and defending in the playing situation.

STUDIES RELATED TO PHYSICAL CHARACTERISTICS:

Lehance, Binet, Bury and Croisier (2008) compared pre-season muscular strength and power profiles in professional and junior elite soccer players throughout the developmental years of 15-21. One original aspect of our study was that isokinetic data were considered alongside the past history of injury in these players. Fifty-seven elite and junior elite male soccer players were assigned to three groups: PRO, n=19; U-21, n=20 and U-17, n=18. Functional performance was evaluated throughout a squat jump and 10 m sprint. New trends in rational training could focus more on the risk of imbalance and implement antagonist strengthening aimed at injury prevention. Such an intervention would benefit not only athletes recovering from injury, but also uninjured players.

Rousanoglou, Georgiadis and Boudolos (2008) determined the relationships between muscular strength and vertical jumping performance were examined in young players (14-19 years) track and field jumpers (n = 20) and volleyball players (n = 21). Results indicate the dissimilarity in the relationships between the knee extensor muscular strength and jumping performance in the young female track and field jumpers and volleyball players.

Chaouachi et al., (2009) examined the relationship between squat 1 repetition maximum (1RM) and volleyball-relevant tests and the variables that influence agility in elite male professional volleyball players. In light of the present study's findings, agility should be regarded as a per se physiological ability for elite volleyball players. Consequently, volleyball-specific agility drills should be stressed in elite volleyball training. Given the association between squat 1RM performance and short sprint times, squat exercises should be a major component of volleyball conditioning.

Harrison and Bourke (2009) investigated whether an RS training intervention would enhance the running speed and dynamic strength measures in male rugby players. Fifteen male rugby players aged 20.5 (+/- 2.8) years who were proficient in resisted sledge training took part in the study. The subjects were randomly assigned to control or RS groups. The RS group performed two sessions per week of RS training for 6 weeks, and the control group did no RS training. Pre- and post-intervention tests were carried out for 30-m sprint, drop, squat, and rebound jumps on a force sledge system. The results suggest that it may be beneficial to employ an RS training intervention with the aim of increasing initial acceleration from a static start for sprinting.

Nesser, Huxel, Tincher and Okada (2010) identified the relationships between core stability and various strength and power variables in strength and power athletes. National Collegiate Athletic Association Division I football players completed strength and performance testing before off-season conditioning. Subjects were tested on three strength variables, four performance variables, and core stability. The results of this study suggest that core stability is moderately related to strength and performance. Thus, increases in core strength are not going to contribute significantly to strength and power and should not be the focus of strength and conditioning.

Cortis et al., (2011): aimed to verify whether volleyball players are able to maintain strength (handgrip), jump (countermovement jump [CMJ]), sprint (10 m and 10 m bouncing the ball [10 mBB]), and interlimb coordination (i.e., synchronized hand and foot flexions and extensions at 80, 120, and 180 bpm) performances at the end of their game. Ten young (age 15.7 ± 0.2 years) male volleyball players volunteered for this study. During the friendly game, heart rate (HR), rate of perceived exertion (RPE), and rate of muscle pain (RMP) were assessed to evaluate the exercise intensity. These findings indicate that the heavy load of the game exerts beneficial effects on the efficiency of executive and attentive control functions involved in complex motor behaviors.

STUDIES RELATED TO PHYSICAL AND PHYSIOLOGICAL CHARACTERISTICS:

Ooi et al., (2009) established the physical and physiological attributes of elite and sub-elite Indian male volleyball players and to determine whether these attributes discriminate elite players from sub-elite players. Measurements and tests of basic anthropometry, explosive power, anaerobic recovery capacity, volleyball -specific movement agility, maximum strength, and aerobic capacity were conducted on two occasions, separated by at least one day. Our results show that elite Indian male volleyball players are taller, heavier, and stronger than their sub-elite counterparts. The test battery, however, did not allow us to discriminate between the elite and sub-elite players, suggesting that at the elite

level tactical knowledge, technical skills, and psychological readiness could be of greater importance.

Ziv and Lidor (2009) reviewed a series of studies examining physical attributes, physiological characteristics, on-court performances and nutritional strategies of female and male elite volleyball players. These studies included relevant information on physical and physiological variables, such as height, weight, somatotype, relative size, aerobic profile, strength, anaerobic power, agility and speed. It is concluded that the data emerging from these studies, combined with the knowledge already obtained from the studies on physical and physiological characteristics of elite volleyball players, should be applied by volleyball and strength and conditioning coaches when planning training programmes for elite volleyball players.

Casamichana and Castellano (2010) examined physical, physiological, and motor responses and perceived exertion during different soccer drills. In small-sided games, the individual playing area was varied while the number of players per team was kept constant: Participants were ten male youth soccer players. A range of variables was recorded and analysed for the three drills performed over three training sessions: (a) physiological, measured using Polar Team devices; (b) physical, using GPS SPI elite devices; (c) perceived exertion, rated using the CR-10 scale; and (d) motor response, evaluated using an observational tool that was specially designed for this study. The results show that the size of the pitch should be taken into account when planning training drills, as it influences the intensity of the task and the motor response of players.

Lidor and Ziv (2010) reviewed a series of studies on physical attributes, physiological attributes, and on-court performances of male volleyball players. Empirical and practical knowledge emerging from studies on training-related issues in volleyball, such as body mass, fat-free mass, aerobic profile, strength, and agility and speed, should be integrated and applied when planning annual training programs for volleyball players. Based on our review, it was found that **(a)** players of a higher skill level are taller, somewhat heavier, and have higher vertical jump values than players of a lower level; **(b)** the aerobic profile of female volleyball players is similar to that of female volleyball players; **(c)** ballistic resistance training can increase vertical jump values in female volleyball players; and **(d)** preseason conditioning should be conducted to prevent fatigue and reduced performance at the beginning of the season.

STUDIES RELATED TO PHYSIOLOGICAL CHARACTERISTICS:

Wells, Elmi and Thomas (2009) identified physiological correlates of golf performance in elite golfers under laboratory (ball speed and distance) and tournament conditions. The correlation analysis revealed significant associations between mass, heights, body mass index, sit height, arm length, and predicted VO2max and golf measures. Results suggest that core strength and stability, flexibility, balance, and peripheral muscle strength are correlated with golf performance and should be included in golf training programs.

Hill-Haas, Coutts, Dawson and Rowsell (2010): examined acute physiological responses and time-motion characteristics associated with 4 soccer specific small-sided game (SSG) formats. The major practical findings are that subtle changes in SSGs playing rules can influence the physiological, perceptual, and time-motion responses in young elite soccer players. Rules that are related to a team's chances of scoring may improve player motivation and thereby increase training intensity during SSGs. There were no differences between fixed and variable formats in terms of physiological and perceptual responses, although both may provide useful technical-tactical training. Coaches should take care in designing different soccer SSGs as each rule or game format change may influence exercise intensity independently.

Hill-Haas, Dawson, Impellizzeri and Coutts (2011) discussed the physiology of small sided games. The variations of exercise intensity measures are lower in smaller game formats (e.g. three vs three) and have acceptable reproducibility when the same game is repeated between different training sessions or within the same session. The variation in exercise intensity during SSGs can also be improved with consistent coach encouragement but it is still more variable than traditional generic training methods. Other studies have also shown that SSGs containing fewer players can exceed match intensity and elicit similar intensities to both long- and short-duration high-intensity intervals running. It also appears that fitness and football-specific performance can be improved equally with SSG and generic training drills.

CONCLUSION

From the above results and discussions the following conclusions were drawn: In the selected physiological variables resting pulse rate and respiratory rate having significant relationship with Volleyball playing ability. There were significant differences in somatic traits and body composition between the volleyball players and controls. The volleyball players were significantly taller and had less amount of subcutaneous tissue with more Ectomorphic component than the controls. The volleyball players also had higher lean body mass than the controls.

The % body fat and total body fat were also lesser in volleyball players. More data would be helpful on the above studied variables along with fitness and physiological variables to assess relationship among them and with performance in volleyball.

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