DOCTORAL DISSERTATION

ABSTRACT

Lidia Stanisz – Guzik

Doctoral thesis, topic: *"The type and effectiveness of activities during the game and their relationship with the time structure of the match, sports level, somatic structure, functional and psychomotor efficiency of a volleyball player"*

The dissertation discusses the issues of structure, size and interrelationships between indicators of somatic structure, motor skills and the effectiveness of volleyball activities in the annual training cycle of volleyball players at a high level of specialization. The aim of the study was to determine the differences in the somatic structure and motor preparation of volleyball players in different positions. At the same time, the relationship between the indicators of these areas and the effectiveness of the game as well as the changes that occurred during the annual training cycle was sought.

To achieve the research goals, the following were used:

a) review of available literature and analysis methods used in science

on physical culture to solve the research issues undertaken;

b) the aim of the work was achieved using research methods; a research calendar, research structure was developed, and a detailed analysis of the test team's play was carried out.

In part I of the work - *Volleyball – game characteristics and physical effort specifics*, a comprehensive theoretical analysis of the work issue was presented. The first part of this chapter presents the characteristics of the volleyball game from the point of view of the theory of team games. Then, a broad review of the literature on the topic of motor preparation of female volleyball players was performed. The last part of this chapter contains an overview of research works in the area of analyzing the structure and effectiveness of the game.

In part II of the work - *Research methodology*, the aim of the work, the research hypothesis was discussed, and six research questions were asked - to resolve the research hypothesis.

The characteristics of the respondents (SMS PZPS Szczyrk team) as well as research methods and tools were presented in detail. Research methods were assigned to three groups:

a) A collection of somatic data and data recorded in tests and trials of general motor and volleyball skills,

b) A set of data recorded using an original game observation sheet,

c) A collection of data recorded using a game sheet integrated with the Data Volley program.

The obtained research material was processed using descriptive statistics methods. Identification of the distribution of quantitative variables was assessed using the W. Shapiro–Wilk normality test. The analysis of the significance of differences test was carried out to reveal whether there was a change in the values of given variables occurring during two measurements - the first and second research period.

Part III is divided into five subchapters, which present the effects of descriptive statistics analyzes and the significance of differences in the following areas: changes in height and body weight as well as the somatotype of the players. The level of motor preparation was characterized in terms of motor efficiency, aerobic capacity, the value of the 1RM index during strength tests, the height of jumps and the level of power of the lower limbs, and psychomotor reaction time. A detailed analysis of the game's effectiveness was carried out according to the author's observation sheet and the game's effectiveness according to the "Data Volley" software and their mutual dependencies. The collection of information from the Data Volley software and your own observation sheet is the basis for formulating recommendations for training modeling in the annual training cycle.

Chapter IV of the work *Discussion* presents the level of usefulness of fitness tests in the assessment of volleyball players. It has also been shown that many authors use various methods to assess both fitness tests and game effectiveness.

The work ends with a chapter - *Conclusions*, which constitute answers to the research questions:

1. Somatic structure differentiates volleyball players depending on their position and tasks undertaken on the pitch. All subjects were characterized by ecto-endomorphic somatotype.

2. The structure of motor activities undertaken by volleyball players during the game is an integral part of the tasks performed in team tactics. The attackers participate in blocking from the spot and after reaching, attacking from the spot, situational attack from the spot, fielding from the spot and serving. Outisde hitter's most often participate in reception the service, blocking from the spot and after reaching, attacking from the spot, situational display from the spot and serving. Setters participate most often in jumping, standing, blocking and after reaching, attacking from the place of service. The central players participate in blocking from the spot and after reaching, attacking after playing, serving and situational activities: attacking from the spot, displaying from the spot, receiving the serve. Liberos most often participate in receiving a serve, standing position, jumping, and moving a distance of 3-9 m.

3. There are differences in the motor preparation of volleyball players, but it is impossible to create strictly defined profiles of physical preparation. Attackers are characterized by high strength values in the pushing and squatting movement patterns. However, in this position there is no force to power transfer. The setter is characterized by a high level of aerobic endurance determined by the power (VO_2max) and efficiency (%VO_2MAXAT) of aerobic metabolism. The recipient is characterized by a high level of aerobic power (VO_2max) and strength in the pulling movement pattern and squat. The middle one is characterized by a high level of strength in the squat movement pattern, an average level of power, and a low level of aerobic capacity. Libero is characterized by a very high level of power (VO_2max) and aerobic efficiency (%VO_2maxAT), a high level of strength in the squat movement pattern and the highest power level in the team in the jump.

4. Changes in the levels of motor fitness indicators between the first and second periods of the annual training cycle were found at the level of 15% reduction in power aerobic metabolism and 7% reduction in the efficiency of aerobic metabolism. At the same time, there is a statistically significant increase in the level of strength in all movement patterns the power in the CMJ jump decreases, but the reach in the jump also progresses significantly. Psychomotor reaction time decreases statistically significantly in three out of four directions.

5. The dependence of the play leading to scoring a point on three elements of the game performed by the team was demonstrated: service, block, attack after own play. At a high sports level

in women's volleyball aged 17-18, the result is determined by the effective use of two elements of the game: serve and block. Another important relationship between activities and in-game effectiveness concerns the increase in attack effectiveness in response to an increasing number of serves.

6. Observations of the team's game effectiveness assessed using the Data Volley software are justified by the observed changes in the level of motor preparation during the one-year training period. The analysis of the number of activities carried out using the Data Volley sheet indicates a significant decrease in most of the game indicators between the first and second round of the league games. It was found that the players "played" less but with significantly greater effectiveness. Increase in strength while retained the power level of the lower limbs and the increase in the height of the jump reach were influenced to increase the effectiveness of activities performed in the attack. Research results indicate that at the analyzed level of sports development, increased strength training can have a significant impact on improving the quality of the game, which is reflected in the increase in attack effectiveness indicators. A decrease in the level of aerobic capacity may result in a reduction in the team's ability to undertake volleyball activities, which in the case of our own research was compensated by an increase in the quality of these activities.

The work includes a List of References in the Vancouver System. The literature includes 204 items.