



ENFORCEMENT OF NEW TECHNOLOGY IN VOLLEYBALL – ORIENTATION FOR THE IMPROVEMENT OF SELECTION AND TRAINING

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Summary:

The implementation of modern technologies in sports training is meant to render the specialty forum more sensitive regarding the need for their availability, for the simplicity of handling and for their efficiency. The training means providing an accurate assessment of the player's evolution, for different training periods or even for the same training period, facilitate the right control over the individualized training. Due to its benefits, we consider that DIRPAS-NS2006 system can be included among the means of training and evaluation of the level to which the accuracy and constancy coefficients specific to the setting, receiving serves and digging manifest.

Changes occurring within the world-wide volleyball, from the point of view of the maximization of content and structure parameters, as well as of the physical, psychical, biometrical and technical-tactical challenge level required from the players, confirm, once again, the need for most adequate ways of improving the performance capacity. The first step, in this matter, consists in reviewing the selection process and in the transition from a “quantitative” to a “qualitative” training.

Therefore, considering the selection process, among the factors whose adequate materialization constitute the main component of real progress, we may mention that of drawing up objective criteria for the psychosomatic and technical-tactical components, during all the selection steps, concerning the training, especially the technical component of training. Among the procedure orientations, we may indicate the preceding practicing under the game circumstances or other similar circumstances, even the case when, technical features are practiced analytically, and the desire for constancy, accuracy and efficiency in execution. In addition to these orientations, there is the tendency for individualization, as a strategic dominant of training, focusing on the specificity of means and applied methodologies.

Thus, new ways of achieving the quality and the efficiency of the training process were searched for, during a long process starting with setting up the objectives and being completed when they are attained. In developing the training strategy, when establishing the way of gaining the objective, meaning the method, the selection of the appropriate equipment meant to increase the efficiency of the activity may represent an advantage for a faster fulfillment of the pattern.

For this matter, technical experts have referred to different materials and auxiliary devices, currently used in practice, or sometimes, detailed by the technical literature, the description being accompanied by the “method” of their application.

The spread of modern technical ways also influenced the evolutions of these equipments meant to

activate the methods and increase the efficiency of training in volleyball game. Most of the equipments in use, even though they have preserved the “role” of their forerunners, represent sophisticated functional structures and basis. For example, the preparation of the offense and defense elements and strategies evolved from the employment of “ball-suspending device” and “hand-held ball” to “attackit” (an assembly consisting of metallic frame - ball) and “blockit”; from the “mechanic ball thrower” which replaces the action of releasing the ball or the serve, to the “AirCat” (automatic system which delivers volleyballs, with adjustable distance, tempo, height, angle and ball speed). Regarding the improvement of the accuracy and constancy coefficients of ball releasing for the attack, different metallic frames were used, assessed on supports or on the net (“PrecisionPasser”).

The presence of the electronic computer in volleyball does no longer represent a novelty for coaches, or for the researchers in this field. Its role is very evident for the image analysis (the biomechanical analysis of motion), for analyzing and working of recorded data during the game (players’ efficiency or other game parameter analysis), for scoring and classifications, for the anticipation of the team’s conduct under presumptive circumstances etc. However, considering its integration in the activity structure specific to the technical-tactical training applied for a volleyball player, the technical literature and practice include no significant information.

Thus, we may conclude that there is no training device which can be connected to an electronic calculation system in order to determine the execution accuracy for the most important technical methods, and simultaneously provide a statistical data working, as well as a database (following testing) very useful in observing the player’s evolution in time or in achieving a comparative study of several players’ evolution.

The design and the accomplishment of a particular method meant to determine the accuracy and constancy specific to the player’s actions, applicable in the his/her training and testing, require a vast accumulation of knowledge concerning the following fields: computers, informatics, electronics, mechanics and in the and the last but not less important, volleyball. As we may notice in figure 1, the structure of DIRPAS-NS2006 system includes: the testing framework which stores a matrix network in infrared (NIR) made of 20 transmitters in IR and 20 receivers in IR, the mobile support fitted with telescopic control sustaining the framing, the local electronic block used for the NIR control and for data transmission (created around a microcontroller that provides the scanning of the optical channels the identification of the area blocked by the ball) and an electronic computer which enables the data serial taking over and analysis. The software application uses an assembly language in C for the microcontroller and in Visual C, compatible with Windows, providing the network control, the communication and the interface with the user.



Figure 1. The DIRPAS-NS2006 system - the mechanical support, the testing framework, the local electronic block, PC and the interface with the user.

Used as a means of activity (exercises) or as a testing way, the user has the opportunity to explore hardware and software resources through the interface (figure 2) the set-up of testing conditions being available (test date and hour – controlled automatically by the system watch, subject’s level of training – chosen from the menu with a click, name of the tested subject – it is filled in, player’s position –area, IR barrier position –area, number of trials – pre-defined or automatic until deactivation), as well as the proper testing function and the data saving.

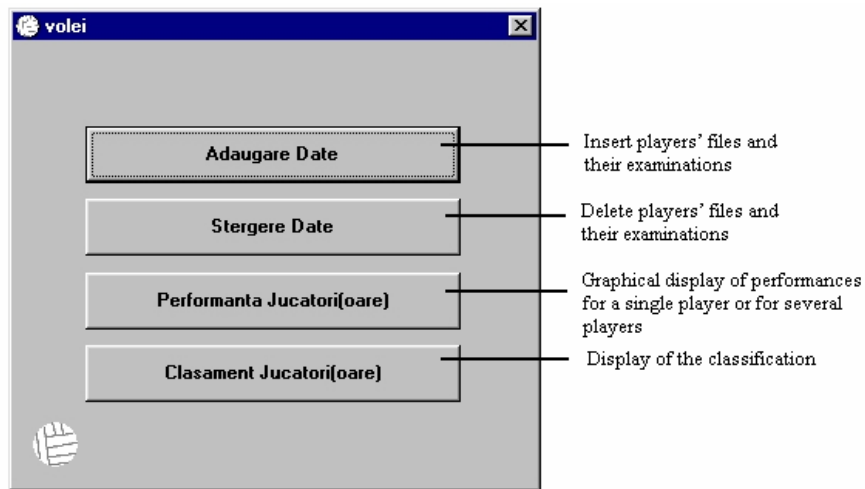


Figure 2. Main menu of the application “Volei.exe” Main menu of the application “Volei.exe”

After finishing the test, the program automatically determines the success rate of all the actions performed, and the test is saved in the database. The post-processing function allows the access to the database for selecting data, for generating a certain kind of data (for example, the classification – figure 3) and their graphical representation (figure 4).



Figure 3. The submenu “classification”



Figure 4. Comparative graphical representation of the performance evolution in time for several players

The DIRPAS-NS2006¹ system, was originally presented as the *training method* meant for the game leader, the setter, applied for improving the accuracy and constancy coefficients of the setting, but also as the *monitoring system of the testing activity* an important contribution to the sport training and evaluation system, which uses the computer. Its efficiency for this purpose is detailed in a research undertaken during 2006 - 2007 (the experiment group – the progress set between the final test and the initial one is of: 54.88%, 38.10%, 47.05%; the witness group – the progress set between the final test and the initial one is of: 28.90%, 19.96%, 20%).

Subsequently, based on the same system, significant progress of the subjects was registered according to other two scientific approaches, having as a result its validation as an improvement method for the accuracy and constancy coefficients specific to the receiving serves technique (the experiment group – the progress set between the final test and the initial one is of: 35.43%, 33.57%, 33.33%; the witness group – the progress set between the final test and the initial one is of: 17.88%, 16.05%, 15.96%), 2007 - 2008² and to the digging technique, 2008 - 2009³ (the experiment group – the progress set between the final test and the initial one is of: 40%, 38.10%, 32.84%; the witness group – the progress set between the final test and the initial one is of: 18.53%, 19.96%, 16.19%).

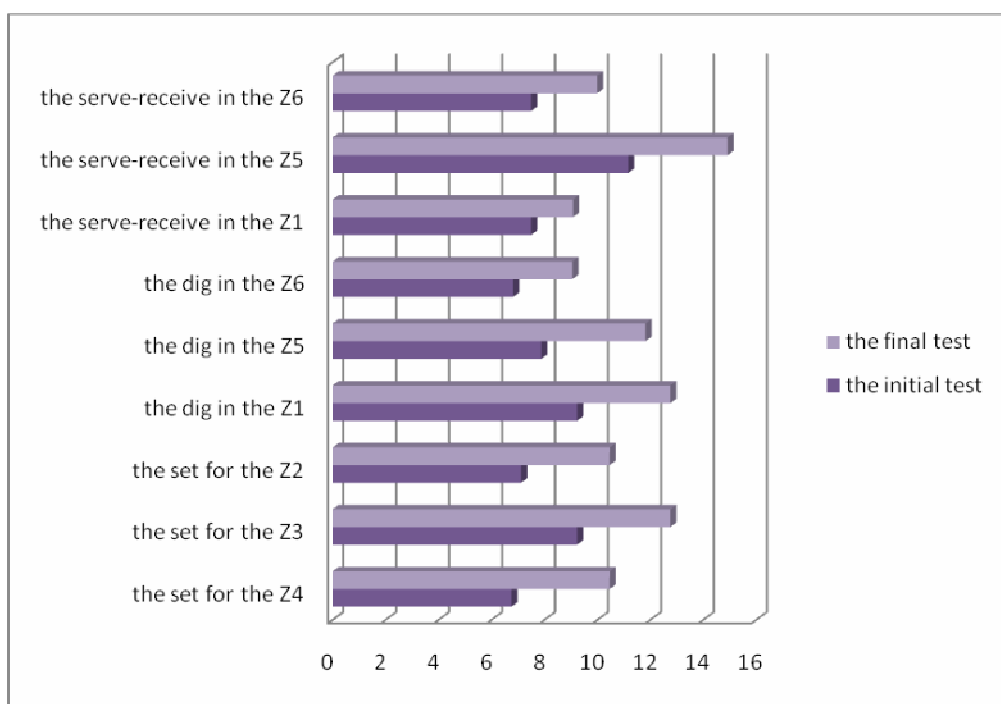


Figure 5. The progress of experiment groups in the studies carried out with the DIRPAS-NS2006 system

Our approach, based on the results deriving from the research, is also meant to render the specialty forum more sensitive to the review of control tests concerning the accuracy and constancy coefficients specific to the main technical methods, especially, in the case of junior players, by allowing its integration to the testing activity of DIRPAS-NS2006 system. Thus, the system may offer the perspective of a new way of improving the standard evaluation, providing the collection and the comparison of data (performances) resulting from the verification, using the same test and an infinite number of players.

Bibliografie

1. Colibaba-Evulet, D., Bota, I., (1998), *Sports Games – Theory and Methodics*, Aldin Publisher, Bucharest.
2. Fontani, G., Ciccarone, G., Giuliani, R., (2000), *New Game Rules and Physical Requirement in Volleyball*, Volleyball, Aperiodicals / 2004, Bucharest.

¹Published in the Scientific Report dedicated to the International Conference “Education by Sport”, Pitesti 2007.

²Results were mentioned in the Scientific Report dedicated to the International Conference “Physical, Education, Sport and Health”, Pitesti 2008.

³Results now being published.

3. Frohner, B., (1995), *Today Video and Computer-Assisted Technology Applied for Systematic Research of Technical-Tactical Actions in Volleyball from Individual and Team Point of View*, SDP 378-379/1996 – Multimedia Systematic Analysis of Technical-Tactical Characteristics of Sports Games, MTS, CCPS, Bucharest.
4. Niculescu, M., (2002), *Volleyball: from theory to training*, University of Pitesti .
5. Popa, E., Mocianu, V., Hillerin, P., (1993), *Use of Informatics and Calculation Procedure in Programming the Sports Training and Competition*, Modern Sports Training, Editis Publisher, Bucharest.
6. <http://www.aircatvolleyball.com>.
7. <http://www.mb-soft.com>. Practical Power Volleyball Strategy.
8. <http://www.precisionpasser.com>.
9. <http://www.performancecondition.com/volleyball>.
10. <http://www.volleyballequipment.biz>.

Résumé:

L'implémentation des technologies modernes au niveau de l'entraînement sportif implique la sensibilisation des cadres de spécialité en ce qui concerne le besoin pour la disponibilité, la simplicité de manipulation et leur efficacité. Les moyens d'entraînement qui permettent une évaluation exacte de l'évolution du joueur, pour différentes périodes d'entraînement ou au cadre du même entraînement, facilitent la conduite correcte de l'entraînement individualisé. Grâce à ces facilités, on considère que le système DIRPAS-NS2006 puisse s'intégrer parmi les procédés d'entraînement et évaluation au niveau où les indices de précision et constance, spécifiques au smache, à la réception au service et à la réception l'attaque, se manifestent.