

APPLICATIONS OF THE INNOVATIVE DIGITAL WALL SYSTEM IN THE TRAINING OF SENIOR HANDBALL PLAYERS

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INTRODUCTION

This document shows us that we live in an era of digitization and information, digital transformation dominates all technological developments having significant impact in all economic and social fields. In this context, of the ever-evolving digital age, the field of performance sports is witnessing a fundamental change in the way training and preparation processes are approached. The aim is to use a training model as effective as possible, which leads to the improvement of athletes' performances in the shortest possible time.

It is important for coaches to determine the level of physical fitness of athletes as informative and accurate as possible. (Vyacheslav, L., Valeria, T., Fedir, T., Pavlo, P., Stanislav, I., Natalia, P., 2021) Emerging digital technologies allow us to record and see in real time concrete and accurate data about the athletes we train. Certainly, the connection with digital computers and the online analysis of trainings represent the greatest progress." (Fister, I., Rauter, S., Yang, X.S., Ljubič, K., Fister, I. Jr., 2014)

Handball is a team sport, played at a high intensity, where explosive actions involving strength, such as: jumps, sprints, goal kicks, changes of direction, are fundamental to achieving performances. (Chirosa-Ríos, L., Chirosa-Ríos, I., Martínez-Marín, I., Román-Montoya, Y., Vera-Vera, J.F., 2023) The sports game is in full development, the speed of the game is constantly increasing, the specialists in the field are constantly looking for an increase in spectacularity. In addition to technical and tactical skills,

appropriate anthropometric characteristics and high levels of strength, muscle power and throwing ability of the athlete are important for success in performance handball. (Hermassi, S., Van den Tillaar, R., Khelifa, R., Chelly, M. S., Chamari, K., 2015).

The progress of world handball currently requires significant adjustments and innovations in the training model of athletes to meet the increasingly complex demands and challenges of contemporary competitions. The very nature of the game implies that players must be physically trained to maintain the speed and intensity of play throughout a match. (Carmen M., Martínez, J.T., Pueo, B., Cortell Tormo, J.M., Vila H. , Ferragut, C., Sánchez, F., Busquier, S., Amat, S., Chiroso Ríos, L.J., 2020) The modernization of the training concept was and is permanently in the attention of specialists, as a definite possibility of increasing sports performances. Digital transformation brings to the fore a series of innovative devices, technologies and solutions that can revolutionize the way we approach training. From training and monitoring devices to data collection and analysis platforms and applications for training plan management, digitization brings increased accessibility to information and streamlining sports performance. A key feature of this transformation is individualization. Every athlete has different needs and characteristics, and these technologies help us give them the particularities they need to improve strength and speed.

To develop to their full potential, players must be provided with appropriate learning environments that include well-designed physical development programs that include strength, speed and endurance exercises. (Claude, K., Martin, B., 2014) In the context of improving strength and speed, this change to training means that training is not approached in general and is configured for each individual athlete. These innovative systems that combine reality with virtual reality can provide the athlete with different specific training programs.

In performance sports, the use of digital technologies to monitor progress and adjust training in real time is essential to improve the effectiveness of athlete training. By taking a digital and individualized approach to training senior handball players, we can maximize their strength and speed, benefiting athletes and coaches alike. This digital transformation in performance sports allows the delivery of more precise, efficient and

tailored training programs to individual needs, opening up new possibilities in improving motor skills.

II. Brief description of the corpus (of the elements that will be analysed)

The main objectives of the proposed research can be summarized as follows:

- Conducting studies to obtain data and sound scientific evidence regarding the effectiveness and digital technologies in sports performance training
- Studying the impact and effectiveness of digital technologies: digital wall (the complex system of assessment, training and recovery using virtual reality technology) in performance sports training. Analysis of how these technologies influence the efficiency of strength and speed.
- Investigating ways to individualize training for each individual athlete. Researching methods of collecting and analysing individual data to provide tailored training programs for each athlete.
- Investigating the possibilities of real-time monitoring of athletes during training. Examining how digital technology can help adjust your training plan immediately based on data collected in real time.
- Evaluation of the impact of digital transformation on the performances of athletes in official matches.

The hypothesis on which the development of the proposed study and experiment is based is the following: by regularly carrying out tailored training programs with the help of devices that use digital technologies, such as the digital wall system, the athletes of the men's handball team, seniors, CSM Constanța will improve their motor skills, strength and speed. It is assumed that by regularly training with the help of digital technologies, athletes will improve their performance during official matches. The tests considered in the proposed experiment refer to: the evaluation of the strength and speed of each athlete.

The corpus is structured in two parts: a preliminary study and a fundamental research that will ultimately provide a broad perspective on how the innovative digital wall system as well as other monitoring and data collection systems influence the approach to training processes regarding the efficiency of strength and speed of senior handball players and how these aspects can improve athletes' performance during matches.

The Digital Wall system is a complex system that combines reality with virtual reality and is able to capture real-time data about each athlete, the coach receiving this information can adapt the means of training to the individual requirements of the athletes. This is a state-of-the-art innovative system consisting of a "digital mirror", a wooden panel and a platform (classic or digital), with the help of which evaluation, sports, training and recovery activities can be carried out.

Tests performed to evaluate strength and speed using the Digital Wall system:

- Rehab Test: It is made up of seven exercises that provide information on eight aspects of physical fitness: BMI (due to the video camera and platform), balance, lower limb strength and endurance, upper limb strength and endurance, mobility/flexibility, agility.
- Digital wall reaction test: Measure the players' reaction time to various stimuli displayed on the digital wall. This assessment can highlight not only strength, but also agility and the ability to respond quickly in game situations.
- Jumping test: Jumps will be performed on two feet and on the kicking leg. The time between take-off and landing will be measured. With the help of the digital wall platform, the athlete will be able to receive real-time data about the exercises performed.
- Sit-up test: The athlete lies on his back with his knees bent. Lifts the torso off the floor, then returns to the starting position.

The number of correct sit-ups performed in a time interval determines the abdominal strength. The test will be performed in front of the digital wall system.

- Push-up test: The athlete rests on the hands and the tips of the legs, keeping the body straight. Perform push-ups at a steady pace. The number of correctly performed push-ups indicates the strength of the arm muscles. The test will be performed in front of the digital wall system.

Tests performed to evaluate strength and speed in the gym:

- 10 m sprint: This exercise involves running a distance of 10 meters as fast as possible, emphasizing acceleration and explosive power in the legs.
- 20m sprint, with changes of direction at poles every 5m: This type of test aims to measure and improve acceleration and deceleration skills, essential in handball.

In the actual experiment, the athletes will be grouped in pairs of specific positions in the field: left wing, inter left, centre, pivot, inter right, and right wing. All participants will

undergo identical initial and final tests. Some of them will follow the regular training regime of the team, while the others, constituted in the experimental group, will carry out the same trainings, but will benefit from three additional sessions per week using the digital wall system. These additional sessions will involve an individualized training model adapted to each individual athlete. Our goal is to investigate the effectiveness of this digitally assisted training model in the context of sports training.

III. Estimated results

Our objective is to provide a conclusive demonstration of the following aspects from this research:

- Efficiency of digital technology: The analysis will reveal to what extent digital technology, such as the digital wall system, contributes to the efficiency of strength and speed of senior handball players and to the improvement of performances in official matches.
- Improving the quality of training: The effects that digital technology induces on the quality of training in performance handball will be evaluated.
- Improving the athletes' performances: It will be appreciated to what extent the athletes' percentages improve following the training carried out with the help of digital technology.
- Effectiveness of individual training: The research will demonstrate how effective the individual approach is in performance sports training and to what extent it reduces the time in which the athlete will improve strength and speed.
- Future research trends and directions: Research can provide insight into the directions in which the field can further develop, highlighting new opportunities for innovation and research. The estimated results of this research may bring to the fore new perspectives and useful information for the development of training in performance handball.

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