STUDY ON IDENTIFYING AND CORRECTING TECHNICAL ERRORS IN THE VOLLEYBALL ATTACK HIT PROCEDURE USING VIDEO METHOD

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Abstract

The purpose of the study is to analyze the action of hitting the ball in school-level volleyball using video methods and biomechanical analysis to identify the mistakes made by adolescents. The study aims to correct these mistakes through various means and methodical exercises to guide and assist the practitioner in achieving a biomechanically correct movement, where the risk of injury is very low.

Introduction

The entire human existence is governed by error. According to the explanatory dictionary of the Romanian language, [9] error means "An act or action that constitutes a (conscious or involuntary) deviation from the truth, from what is real, right, normal, good (and which may result in harm or displeasure)." One of the most well-known representations of punishment in Greek art is the myth of Prometheus. He was a Titan who stole fire from the gods and gave it to humans, for which he was severely punished by Zeus [10]. Another instance of punishment is found at the beginning of creation, after God created Adam and Eve. After eating from the tree of the knowledge of good and evil, they were harshly punished by God due to their disobedience. Adam was condemned to hard labor to earn his living, and Eve was condemned to great pain during childbirth and to be subordinate to her husband [11].

In sports, technical errors can have significant consequences on performance. At the same time, they can also impact the health of athletes. Various factors can cause these errors, such as lack of proper training, incorrect learning of techniques, or lack of attention. Common examples of technical errors in sports activities include:

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- Improper hitting technique - The way you hit the ball is crucial for achieving satisfactory results.
- Incorrect posture - Incorrect posture affects the biomechanics of movement and can increase the risk of injury. An example would be the incorrect posture of the back or shoulders in weightlifters or tennis players.
- Lack of anticipation or timely movement to the ball.

To avoid these technical errors and to improve performance in sports, athletes should receive proper training and engage in regular practice and repetition to enhance their technical skills. Constant monitoring and correction of form by coaches and mentors are essential in preventing and correcting errors in a timely manner.

Elbert Hubbard says, "The greatest mistake a person can make is to be afraid of making mistakes." In volleyball, there can be many technical errors, but these can be corrected if they are noticed in time through hard work and dedication. At the same time, it is extremely important to identify the causes that lead to the occurrence of technical errors. By analyzing the opinions of specialists [2, 3, 5], we have compiled a series of causes that, in our opinion, favor the occurrence of technical errors:

- Psychological limitation.
- Mental-moral causes.
- Misunderstanding or incorrect representation of the technical model.
- Insufficient physical preparation.
- Coordonation, etc.

Material-methods

Hypothesis: We started from the assumption that by using the video method and analyzing frame by frame from a biomechanical point of view with the help of specialized software [12], we will be able to identify more easily the subtle errors that occur as a result of rapidly performing specialized motor acts, such as the volleyball attack hit, and it will allow us to reduce their occurrence frequency or number.

The experiment took place at Philadephia Theoretical High School in Suceava County between 2020 and 2024 with a total of 12 students who were in the seventh grade at the beginning of the study.

The following tests were applied in the study:

The sprint test

This test consists of the student executing a sprint over a certain distance in front of the net. The student will start from a standing position and will perform the sprint over a distance of up to 5 meters, ending with a vertical jump as high as possible. They will start with a light run for the first 2 meters, after which the execution of the 3 steps will be done over a distance of 2.5 meters. Evaluation will be primarily based on the performance over the 2.5-meter distance.

The Five Consecutive Hits Test

This test involves positioning the student in front of a wall with a ball in hand. The student must throw the ball against the wall and hit it, so that the ball makes contact with the ground 20 centimeters from the wall. They will have to hit the ball five times consecutively with their dominant hand. The distance between the student and the wall is approximately 4 meters. During the test, the distance can be adjusted based on the ball's rebound from the wall. It is advisable for the student to move as little as possible. The test will be performed five times for each student, and the number of consecutive hits will be noted. The purpose of the test is to observe the "grip" hit and to track reaction speed after rebound, as well as the number and nature of errors made. At the same time, it is important to anticipate the new direction the ball takes after rebounding from the wall. Raising the arms at the opportune moment and the footwork (added step) play a very important role. At the same time, the relationship between the hands and feet is observed.

Care consideraţi că sunt elementele fazei de atac?

11 răspunsuri

Aterizare — 6 (54,5 %)
Elan — 9 (81,8 %)
Lovirea mingii cu piciorul — 0 (0 %)
Bătaie — 7 (63,6 %)
Preluare — 1 (9,1 %)
Zbor — 3 (27,3 %)
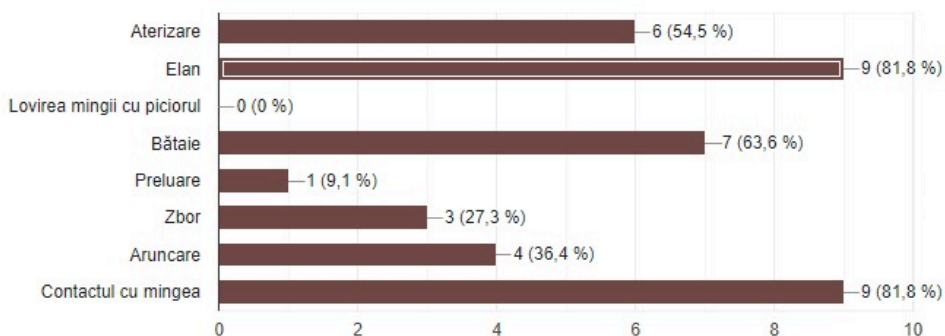Aruncare — 4 (36,4 %)
Contactul cu mingea — 9 (81,8 %)

Fig. 1 The students' responses to one of the study's questions.

During the experiment, we compiled a questionnaire [1] with mixed (closed and open-ended) questions. The questionnaire was administered to the students participating in the study, where we observed that approximately 45% had difficulty understanding certain theoretical knowledge (Fig. 1), which prompted us to adapt the teaching content according to their level of comprehension.

Results

Following the initial tests, we identified a series of execution errors [13] which were recorded, and based on these, an algorithm for corrective action systems was developed.
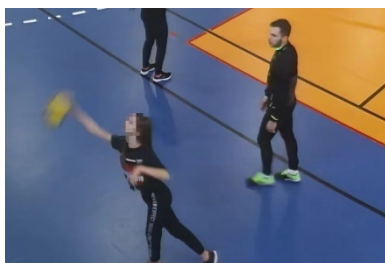
Fig. 2 Example of a mistake in hitting the ball from the ground

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Fig. 3 Examples of errors in executing the attacking hit with momentum

In the images above, a series of technical errors in the execution of procedures can be observed, such as:

- Crossing of the lower limbs
- The opposite hitting arm does not lower alongside the body
- On the first step of the momentum, the arms are brought backwards
- The second step is taken with the wrong foot
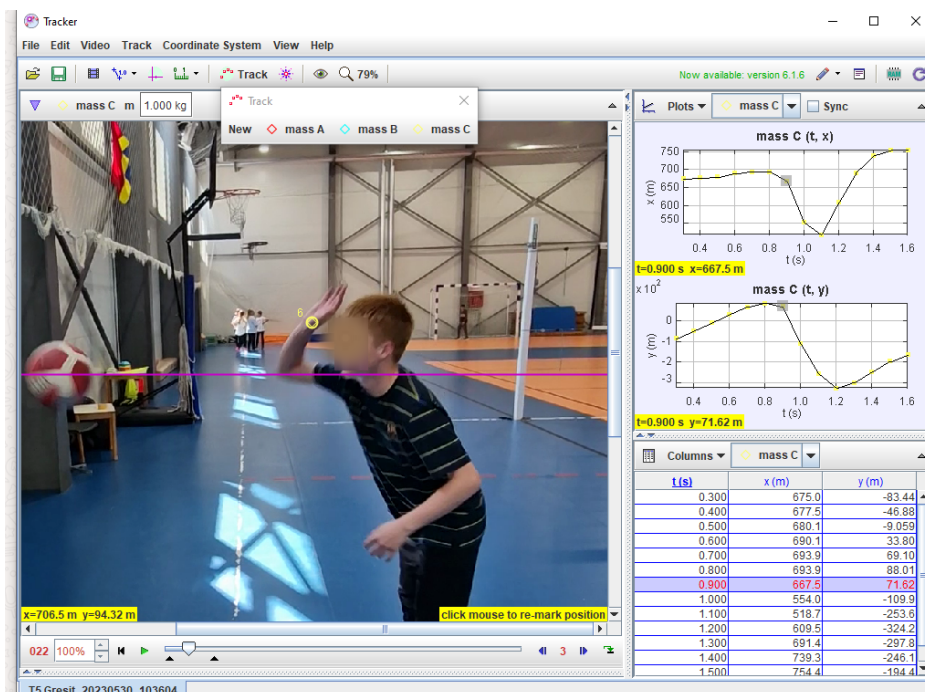- The hit is executed on one leg

Fig. 4 Biomechanical analysis of the ground attack hit using the "tracker" software

At the end of the study, we compared the students' performances, processed through the computer, with data correlated and analyzed by a specialized biomechanics program called "Tracker." This software not only allowed us to observe extremely precise, frame-by-frame errors in motor execution but also compared the students' performances with an ideal model, highlighting subtle errors that we might have overlooked under different circumstances (Fig. 5).

We consider this method, which is rarely used, to have a medium to large impact in the field's practice, constituting a highly effective tool in the struggle to reduce, and why not eliminate, execution errors. On the other hand, we acknowledge that it is an extremely slow method, consuming time and logistical resources; however, it can make a difference in the preparation of school teams for competitions, where individualization and differentiated treatment play a significant role in the training process.
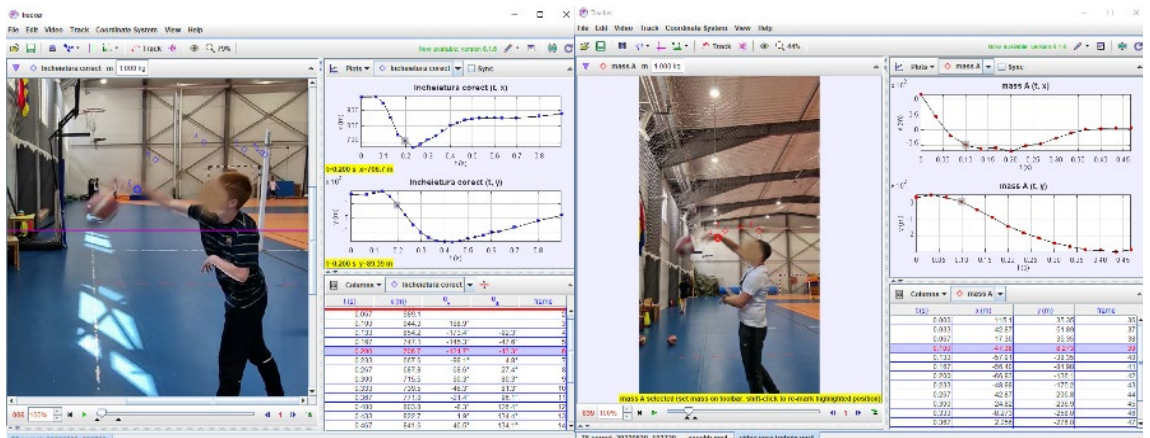

Fig. 5 A comparison of correct executions between the model and the subject

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Tabel 1 - The average initial and final errors

Tests	Initial Number of Errors (Average)	Final Number of Errors (Average)
Five Consecutive Hits Test	5	2
Sprint test	4	2

Discussion

Technical training is indispensable for improving performance in volleyball. It aims at learning and continuously perfecting the execution mechanism through a detailed analysis of the components of each individual action in the game. [4] Following the analysis of the obtained results, we devised a series of methodical algorithms that we applied in lessons with students. From Fig. 5, it can be observed that the execution of the subjects closely resembles the ideal model, identifying with it by 80%, demonstrating that the applied methodology had a positive result. Thus, the number of errors was reduced by approximately 60%, as reflected in Table 1. We noticed an increase in students' interest in their own executions when monitored through biomechanical analysis methods and video recording. Compared to observing errors without the help of a camera, the number of recorded errors was much lower, leading to an ineffective correction methodology. Contrasting executions with an ideal model serves as a regulatory vector for both specialists and subjects, who can improve their technique by a significant percentage between 5-25%. The existence of a database with ideal models for various procedures in volleyball, as well as a database of common errors, can serve as an inspirational source for coaches and specialized teachers.

Conclusions

Taking into account the age of the subjects, there may be various "surprises" where they attempt to perform technical elements on their own that exceed their capabilities in the desire to achieve them quickly. Some of them may not be aided by their physical build, and it should be considered which exercises suit them best, so they do not attempt elements they have not mastered yet, thereby learning incorrectly. Correcting incorrectly formed habits can be resource-intensive, which is why we recommend biomechanical analysis of recorded materials and timely correction of execution errors.

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