STUDY ON TECHNIQUE ERRORS IDENTIFICATION IN VOLLEYBALL'S TWO-HANDED PASS FROM BELOW BY VIDEO ANALYSIS

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Abstract
This article is part of a larger study aimed at identifying technical errors by video analysis.
In the initial stage of learning a new technical procedure, the formation of the psycho-motor representation is accompanied by important deviations from the model occurring in the biomechanics of actions. Many experts in the field have tried to prevent and correct even the most serious deviations that are harmful to the motor act by distorting its form and content.
Keywords: *technique, volleyball, video analysis, errors, evaluation*

INTRODUCTION

Execution errors are part of the learning process. In the absence of errors, learning cannot be said to take place, the same as teaching. This is due to the fact that teaching, in its complexity, takes errors as a conscious or unconscious underlayer. The process of knowledge acquisition cannot be complete without the error awareness occurring in learning, brought to light by the initial, intermediary and final assessments, increasing the effect of explanations and means, making these complementary and not unique, to the situations familiar, known and understood by the subject. Everyone knows the phrase "to learn from one's mistakes", even from other people's mistakes; that is why pointing out the errors in groups has a strong revealing and mobilising role, helping the teacher disseminate information to the subjects and increasing the latter's interest.

CONTENT

The subjects that were included in the experiment (level of training - beginners) were organised into an experimental group and a control group.

During the training sessions, two video cameras were used, filming the player from two different angles, to provide a clear image of all the bodily segments involved in the technical procedure.

The videos were processed by means of a specialised program whose software is available online at http://www.physicstoolkit.com/, thus enabling the follow-up of all bodily segments during the game sequence.

The program calculates the angles of the bodily segments during the execution of the technical procedure; moreover, the possibility to run the film forwards and backwards provides a detailed view of the errors made by the player.

METHODS

When putting together the execution errors, the following steps were completed:

- in order to identify execution errors, the video images were put into AVI format by means of VirtualDub v1.9.9;
- the identification of the representative movement sequences and the framing of the specific sequence from the video file by means of VirtualDub v1.9.9;
- grouping the frames according to the moments of input into the execution of the two-handed pass from below;
- introducing the images into the Physics Toolkit 6.0 program led to processing the biomechanical indices found in the execution of the two-handed pass from below;
- the analysis of the data issued from the program on each articulation in part by means of Microsoft Excel 2003 and their global graphical representation by means of Adobe Fireworks CS4.

Fig. 1. Transforming images and identifying sequences in AVI format through VirtualDub v1.9.9

Fig. 2. Identifying bodily segments of interest in relation to the ball

The analysis of the mathematical data on each bodily segment of interest (shoulder, elbow, cuff, hip, knee, ankle) in relation to the ball was processed Adobe Fireworks CS4. It led to the following graphical representation of the analysis on each articulation.

shoulder						**elbow**		
X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)	X2(m)	Y2(m)	R2
0.464	1.246	1.33	0.00E+00	0.00E+00	0.00E+00	0.493	0.928	1.05
0.435	1.406	1.472	-2.90E-02	0.159	0.162	0.522	1.116	1.232
0.406	1.565	1.617	-0.058	0.319	0.324	0.565	1.377	1.488
0.377	1.681	1.723	-0.087	0.435	0.443	0.565	1.609	1.705
0.348	1.681	1.717	-0.116	0.435	0.45	0.522	1.696	1.774

Fig. 3. Mathematical analysis on the shoulder and elbow action in relation to the ball

hip						**ball**		
X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)	X2(m)	Y2(m)	R2
0.304	0.797	0.853	0.00E+00	0.00E+00	0.00E+00	1.188	2.073	2.389
0.304	0.899	0.949	0.00E+00	1.01E-01	1.01E-01	0.899	1.725	1.945
0.319	1	1.05	0.014	0.203	0.203	0.638	1.449	1.583
0.304	1.087	1.129	0.00E+00	0.29	0.29	0.797	2.189	2.329
0.304	1.102	1.143	0.00E+00	0.304	0.304	0.942	2.812	2.965

Fig. 4. Mathematical analysis on the hip action in relation to the ball

Right ankle						**Left ankle**		
X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)	X2(m)	Y2(m)	R2
0.391	0.116	0.408	0.00E+00	0.00E+00	0.00E+00	2.61E-01	2.32E-01	3.49E-01
0.391	0.116	0.408	0.00E+00	0.00E+00	0.00E+00	2.61E-01	2.32E-01	3.49E-01

Fig. 5. Mathematical analysis of the ankles action in relation to the ball

Right knee						Left knee		
X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)	X2(m)	Y2(m)	R2
0.507	0.522	0.728	0.00E+00	0.00E+00	0.00E+00	0.362	0.507	0.623
0.493	0.522	0.718	-0.014	0.00E+00	0.014	0.362	0.536	0.647
0.435	0.58	0.725	-0.072	5.80E-02	0.093	0.333	0.58	0.669
0.377	0.652	0.753	-0.13	1.30E-01	0.184	0.319	0.623	0.7

Fig. 6. Mathematical analysis of the knees action in relation to the ball

cuff						thumb		
X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)	X2(m)	Y2(m)	R2
0.522	0.768	0.929	0.00E+00	0.00E+00	0.00E+00	5.65E-01	0.696	0.896
0.565	0.928	1.086	0.043	0.159	0.165	5.94E-01	0.87	1.053
0.667	1.304	1.465	0.145	0.536	0.556	7.54E-01	1.275	1.481
0.696	1.58	1.726	0.174	0.812	0.83	7.68E-01	1.58	1.757
0.652	1.754	1.871	0.13	0.986	0.994	0.725	1.797	1.938

Fig. 7. Mathematical analysis of the palms grasp and cuff contact in relation to the ball

The selection of the images showing erroneous executions aided in the examination of the deficient segment of the players during the execution of the two-handed pass from below.

Attempting to put together a classification of technical errors, they were differentiated according to the phases (sequences) of the technical procedure (particularisation), and then identified in the execution on the whole in game conditions (generalisation).

The input of images in the Physics Toolkit 6.0 program allowed the processing of the biomechanical indicators found in the execution of the two-handed pass from below.

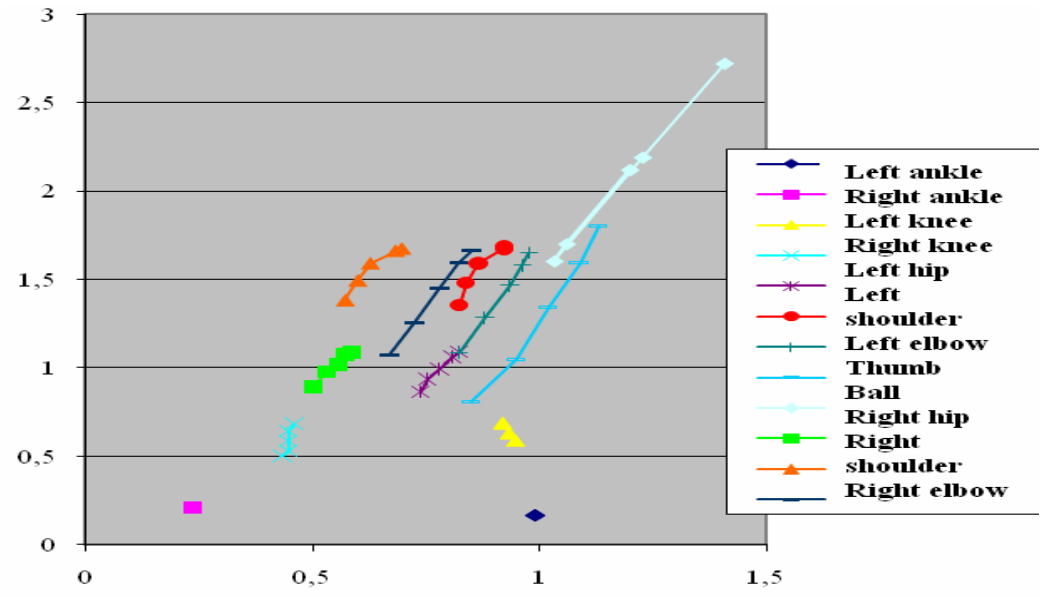

Fig.8. Graphical representation of the mathematical analysis on each articulation

RESULTS

As a result of the analysis performed on the beginner female players after completing the initiation stage, it was found that most execution errors occur in the "arm work" sequence, the main issues being elbow bending or the erroneous contact with the ball, thus requiring attention in order to improve the execution technique.

Consequently, the "ALTATHLON" device was devised to assess the execution objectively, by taking into account the process stages.

CONCLUSIONS

During the training process, it is of use to operate with a unitary system of objective indices able to assess the training level, represented by a motion analysis program. The use of supporting devices is an effective way to train and assess players, able to complete the present methodology in high performance volleyball.

Using the video recordings, the main technical errors were identified; more importantly, the causes leading to the error occurrence were extrapolated.

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ÉTUDE SUR L'IDENTIFICATION DES ERREURS DE TECHNIQUE EN VOLLEYBALL — LA PASSE A DEUX MAINS DE DESOUS, EN UTILISANT L'ANALYSE VIDEO

Résumé

L'article fait partie d'un projet plus ample ayant comme objectif l'identification des erreurs de technique par l'analyse vidéo.

Dans l'appréhension initiale d'un procédé technique, la formation de la représentation psycho-motrique est accompagnée de déviations importantes dans la biomécanique des actions. Cet aspect fait l'objet de la recherche présente tout comme des efforts de nombreux experts dans ce domaine, qui essaient à prévenir et éliminer les erreurs qui causent des préjudices, par la dénaturation de la forme et du contenu de l'acte motrique.

***Mots clés** : technique, volleyball, analyse vidéo, erreurs, évaluation*

STUDY ON IDENTIFICATION OF FUNCTIONAL FEATURES UNDERLYING TRAINING IN MARTIAL ARTS

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Abstract:

The purpose of the study is to identify functional features of martial arts artists and their influence on training. The goal is to adapt the body to prepare competitive effort resulting in morpho-functional improvement, increased body potential and capacity to resist external factors.

Basic guidelines for preparing children to be sports practice orientated by designing programs tailored for 6-8 year olders; programs whose practical effect to achieve the objectives set for this level of training, according to theoretical data and methodological literature provided.

This age group (6-8 years) is optimal for the development of certain components of driving ability: mobility, speed, strength, coordination capabilities (rythm, balance, spatial and temporal orientation).

***Keywords**: functional features, training, kids, martial arts*

INTRODUCTION

The study was structured in the following sections: material-method (approach that sets the premises in the study), results (analysis) and discussions (presents the final conclusions of the study).

The sports training effort means physical and psychical screening, transmission and processing of information to determine a certain degree of solicitation of body involving the muscle and energy system, amending the homeostazic and starting at a higher level.

Modeling is the method by which phenomena are studied using models, reproducing the original system model. Through design, knowledge of reality is done with the object or process that shapes it.

By studying the model, we collect data, formulate hypotheses and assumptions about the