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DETECTION OF TECHNICAL MISTAKES IN THE PROCEDURE OF BASKET SHOT FROM A STANDING POSITION, IN THE BASKETBALL BASIC COURSE BY APPLYING VIDEO ANALYSIS

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ABSTRACT
The article underlines the importance of the programs of video analysis in the objective detection of technical mistakes within the basic course in Basketball. It is based on an extensive experimental study on optimising the technical component in basketball, and also general aspects regarding the process of professional training in the faculties of sports and physical education for the basic course in the subject of basketball.
PURPOSE. Detection of technical mistakes in the procedure of basket shot from a standing position,in the basketball basic course by applying video analysis
METHODS. The methods and techniques of scientific research in the present article are as follows: bibliographic documentation, the method of pedagogical observation, video analysis method, the method of the biomechanical analysis of spatial parameters (trajectory of the movement of segment articulation), the method of the constatative experimental study, the statistical-mathematical method, the graphical and table method. The specialised video analysis for the basket shot from a standing position was performed by the "*Physics ToolKitt"- version 6.0* program, and focused on the trajectory of the segment articulations in 5 movement points (ankle, knee, hip, shoulder, fist).
RESULTS. The presentation and interpretation of data provided by the specialised program of video analysis, which confirmed the research hypothesis, will be exemplified in the execution of a student, randomly selected out of the 10 participants.Evincing the technical mistakes was performed by processing the data from the specialised program of video analysis, also completed by direct observational analysis of each sequence.
CONCLUSIONS. The ability of the program to also carry out the biomechanical analysis of certain spatial parameters (segment trajectory) contributed to evincing the main moments in performance and the detection of technical mistakes improving the progress of technical student training in this throwing procedure.
KEY WORDS: video analysis, spatial parameters (traiectoria segment trajectory), basket shot from a standing position, technical training, technical mistakes.

INTRODUCTION

In the basic course for basketball, obvious difficulties were noticed in the optimisation and effectiveness of the technical training components, in the context of implementing the higher learning system reform. Thus, the reduced number of classes, crowded and inefficiently compartmentalised curricula in point of game contents, as well as the lack of modern methodology in learning, consolidating, assessing, objectively correcting the technical mistakes required real solutions in this direction. On the basis of the practical and methodological experience acquired by specialists in this field, there have always been concerns with the typology and causality of the technical mistakes in sports games (A. Popescu, 1954, V.V. Belinovici, 1959, A. Hrişcă, C. Negulescu, D. Colibaba-Evuleț, 1977, R.W. Christina, D.M. Corcos, 1999, C. Hânsa, 2003, A. Păcuraru, L. Călin, G. Prisecaru, 2004, A. Păcuraru, P. Ghervan, A. Acsinte, 2006, C. Ciorbă, I. Comarnițchi, 2007, D.L. Ciocoiu, 2009, D.L. Ciocoiu, C. Ciorbă, 2009, C. Preda , M. Niculescu, 2009).

RESEARCH HYPOTHESIS

It was presumed that the application of specialised video analysis in the basic course in Basketball will increase the efficiency of the methodological approach of learning-consolidation-assessment of the technical procedure called basket shot from a standing position, by gaining knowledge of the moments composing the movement and by objectively detecting technical mistakes.

RESEARCH OBJECTIVES

1. Analysis and generalisation of data in specialised literature.
2. Identification of the main moments in execution and common technical mistakes for the given procedure.
3. Ascertaining the efficiency of the video method in technique analysis and mistake detection in teaching basketball for the given procedure.
4. Experimental argumentation of the efficiency of the video method for the given procedure within the component of technical training of the students at the Faculty of Sports and Physical Education in the basic course for the subject Basketball.

METHODS

The methods and techniques of scientific research in the present article are as follows: bibliographic documentation, the method of pedagogical observation, video analysis method, the method of the biomechanical analysis of spatial parameters (trajectory of the movement of segment articulation), the method of the constatative experimental study, the

statistical-mathematical method, the graphical and table method.

The research activity took place in the Faculty of Sports and Physical Education and the Phoenix Sports High school club in Galati. The subjects were 10 students in the Faculty of Sports and Physical Education, selected on the basis of the average grades between 7,40-7,84 obtained in testing the technical procedures, and 3 high performance athletes in the Phoenix club Galați.

RESULTS

The presentation and interpretation of data provided by the specialised program of video analysis, which confirmed the research hypothesis, will be exemplified in the execution of a student, randomly selected out of the 10 participants.

Determining the trajectory of the movement of segment articulation in executing the procedure of basket shot from a standing position for the executing student is shown in Figure. 1-2 and table 1, providing the possibility to observe the position indicator on the horizontal (*Xm*) and vertical (*Ym*) axis.

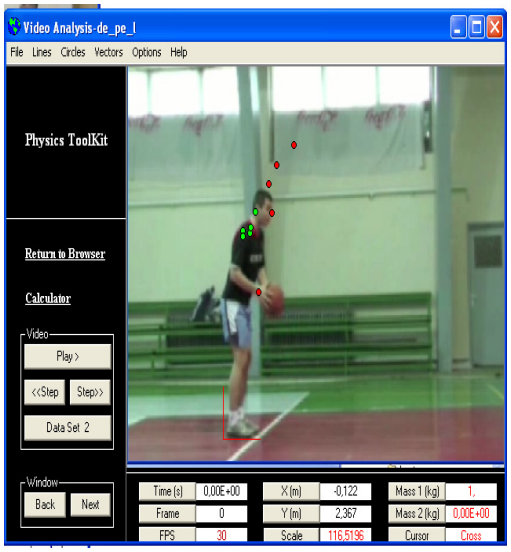

Figure 1. The movement points at the level fist and shoulder articulation- student execution

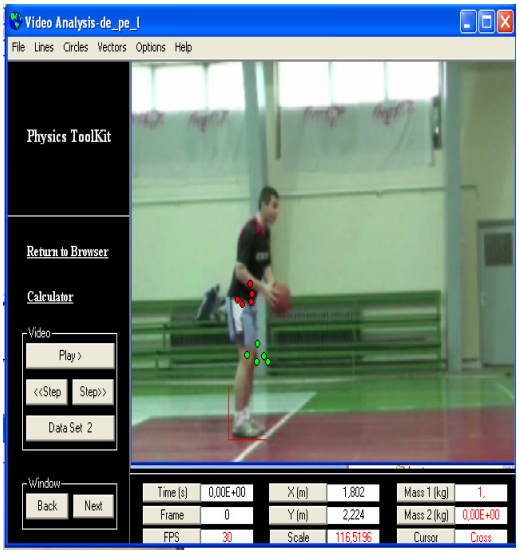

Figure 2. The movement points at the level of the the hip and knee articulation - student execution

Table 1 Data and coordinates during student evolution

a) for the fist
b) for the shoulder
c) for the hip
d) for the knee
e) for the ankle

a.

Time	The data coordinates for the fist in all five moments					
t(s)	X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)
0,00E+00	0,322	0,944	0,997	0,00E+00	0,00E+00	0,00E+00
3,30E-02	0,443	1,452	1,518	0,122	0,508	0,522
6,70E-02	0,415	1,638	1,689	0,093	0,694	0,7
1,00E-01	0,486	1,759	1,825	0,164	0,815	0,832
1,33E-01	0,644	1,888	1,995	0,322	0,944	0,997

b.

Time	The data coordinates for the shoulder in all five moments					
t(s)	X2(m)	Y2(m)	R2	Dx2(m)	Dy2(m)	D2(m)
0,00E+00	0,179	1,337	1,349	0,00E+00	0,00E+00	0,00E+00
3,30E-02	0,179	1,302	1,314	0,00E+00	-0,036	0,036
6,70E-02	0,243	1,323	1,345	0,064	-0,014	0,066
1,00E-01	0,25	1,359	1,382	0,072	0,021	0,075
1,33E-01	0,293	1,459	1,488	0,114	0,122	0,167

c.

Time	The data coordinates for the hip in all five moments					
t(s)	X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)
0,00E+00	0,079	0,887	0,89	0,00E+00	0,00E+00	0,00E+00
3,30E-02	0,122	0,858	0,867	0,043	-0,029	0,052
6,70E-02	0,2	0,873	0,895	0,122	-0,014	0,122
1,00E-01	0,207	0,923	0,946	0,129	0,036	0,134
1,33E-01	0,193	0,987	1,006	0,114	0,1	0,152

d.

Time	The data coordinates for the knee in all five moments					
t(s)	X2(m)	Y2(m)	R2	Dx2(m)	Dy2(m)	D2(m)
0,00E+00	0,164	0,536	0,561	0,00E+00	0,00E+00	0,00E+00
3,30E-02	0,25	0,493	0,553	0,086	-0,043	0,096
6,70E-02	0,35	0,493	0,605	0,186	-0,043	0,191
1,00E-01	0,315	0,529	0,616	0,15	-7,15E-03	0,15
1,33E-01	0,257	0,608	0,66	0,093	0,072	0,117

e.

Time	The data coordinates for the ankle in all five moments					
t(s)	X1(m)	Y1(m)	R1	Dx1(m)	Dy1(m)	D1(m)
0,00E+00	0,093	0,1	0,137	0,00E+00	0,00E+00	0,00E+00
3,30E-02	0,107	0,1	0,147	0,014	0,00E+00	0,014
6,70E-02	0,122	0,122	0,172	0,029	0,021	0,036
1,00E-01	0,122	0,129	0,177	0,029	0,029	0,04
1,33E-01	0,122	0,15	0,193	0,029	0,05	0,058

The graphical representation of segment trajectory in the 5 essential points of the student's movement allowed the inclusion of the global execution into a synthetic, easily observable form (Figure 3).

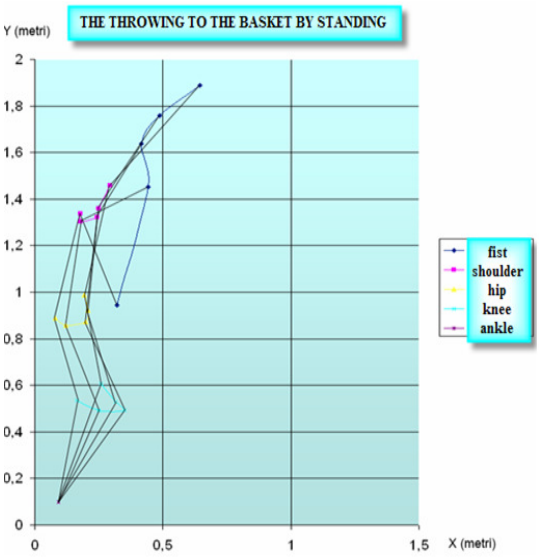

Figure 3. Graphical representation of segment trajectory in the 5 points of the given technical procedure - (student execution)

The identification of the main moments in the execution of the procedure under study is focused on: **M1**- initial position (fundamental); **M2**- ball positioning in asymmetric hold, **M3**- action of the legs (the action of the lower limbs), **M4**- action of the arm and palm (the throwing upper limb); **M5**- ball trajectory and throw/shot proper.

For the objective detection of technical mistakes, the student's execution was compared to the execution of a high performance athlete, taken as a model. The comparative analysis of the execution of the procedure under study was made by superposing the two initial positions (student and athlete) wherefrom the segment displacement was effected during the execution (Figure 4).

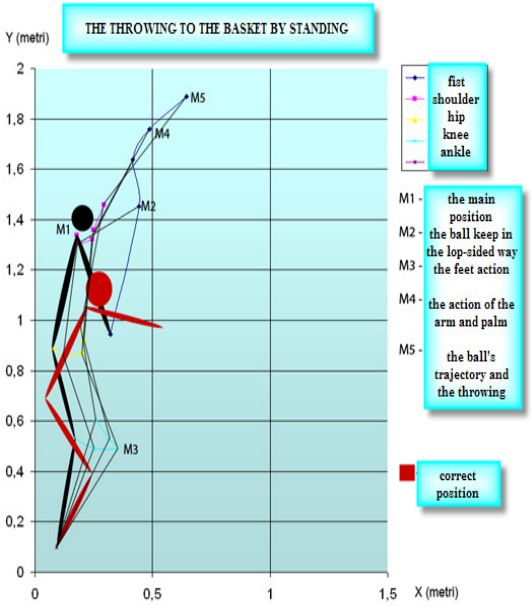

Figure 4. Comparative analysis of the evolution of segment trajectory in the given procedure (student execution)

Evincing the technical mistakes was performed by processing the data from the specialised program of video analysis, also completed by direct observational analysis of each sequence. The common technical mistakes seen during the acquisition of the sequential stages of the technical procedure were synthetised in figure 5.

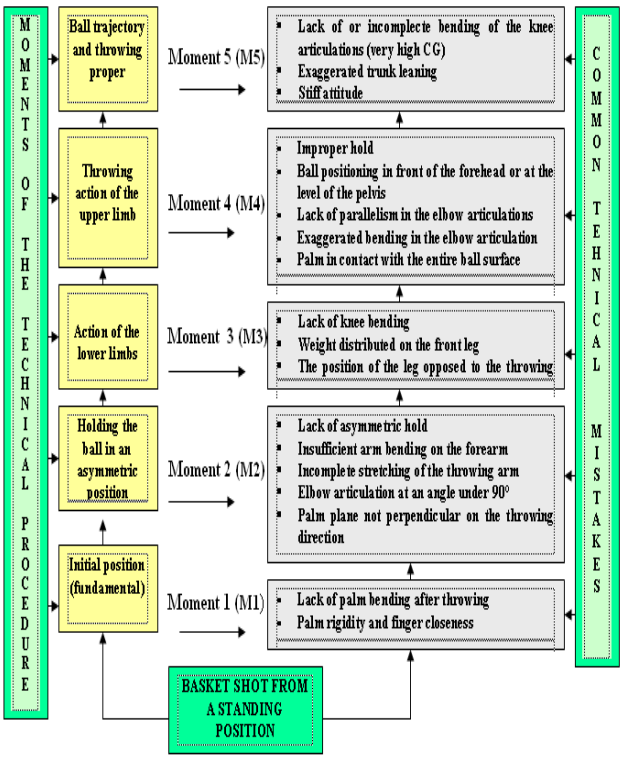

Figure 5. Common mistakes in the technical execution of the basket shot from a standing position

DISCUSSION AND CONCLUSION

♦All of the above lead to the conclusion that the video method was applied and put to good use in teaching the procedure under study (basket shot from a standing position) as an observational instrument and also as a diagnosis tool in its acquisition by the students in the basic course of basketball.

♦The ability of the program to also carry out the biomechanical analysis of certain spatial parameters (segment trajectory) contributed to evincing the main moments in performance and the detection of technical mistakes improving the progress of technical student training in this throwing procedure.

♦The combined use of the video and traditional methods was a safe way to effectiveness in the methodological path of learning-consolidation-assessment-detection-prevention-correction, providing objective solutions for the teacher and also for the students in the given procedure.

♦The experimental argumentation of the effectiveness of the video analysis method for the procedure under study within the basic course curriculum in Basketball was solved and proven through an ample experimental study focusing on optimising the technical training component. Thus, the experimental group, also comprising the sample taken as analysis subject for the present research, registered a higher quality level in the execution of technical procedures (7,09), due to forming a motor background specific to the game, according to the experimental methodical approach, as compared to the witness group (6,75).

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