

INFLUENCE OF COMPLEMENTARY SPORT TRAINING DURING THE TRANSITION PERIOD OVER THE REACTION TIME AND COORDINATION FOR FEMALE BASKETBALL PLAYERS

GHERȚOIU DAN MIHAI^{1,*}, MOCA COSMIN MIHAI¹

ABSTRACT. Introduction. Basketball is a dynamic team sport that involves a pattern of intermittent dynamic and skilled movement activities that are governed by the reaction time and coordination level of the player. **Objectives.** The aim of this paper was to determine if the use of complementary sport training (tennis) during the transition period influences the reaction time and the coordination coefficient of young female basketball players, measured using the MGM-15 jumping carpet. **Materials and Methods.** The participants in this study were female basketball players (N = 14), aged from 11 to 12 years that underwent two measurements: the jumping reaction time test and the coordination coefficient test (EVC) using the MGM-15 carpet before and after a transition period. **Results.** There was a significant difference between the initial and final measurement for both the reaction time and EVC variable. **Conclusion.** The reaction time and the coordination coefficient were decreased by the transitional period of complementary sport training.

Keywords: *basketball, reaction time, coordination, transitional period, tennis training*

REZUMAT. Influența unui sport complementar în perioada de tranziție asupra timpului de reacție și al coordonării la jucătoarele de baschet. Introducere. Baschetul este un sport de echipă care implică un model de mișcări dinamice intermitente care sunt guvernate de timpul de reacție și nivelul de coordonare al jucătorilor. **Obiective.** Scopul acestei lucrări a fost de a determina dacă folosirea unui sport complementar (tenis) în perioada de tranziție influențează timpul de reacție și coeficientul de coordonare a unor jucătoare tinere de baschet folosind covorul de sărituri MGM-15. **Materiale și metode.** Participantele în studiu au fost jucătoare de baschet (N=14) cu vârste cuprinse între 11 și 12 ani la care au fost măsurate timpul de reacție în săritură și testul

¹ Babeș-Bolyai University, Faculty of Physical Education and Sport, Cluj-Napoca, Romania

*Corresponding author: ghertoiodan@yahoo.com

coeficientului de coordonare (EVC) folosind covorul de sărituri MGM-15 înainte și după perioada de tranziție. **Rezultate.** A existat o diferență semnificativă între măsurătorile inițiale și cele finale atât pentru timpul de reacție cât și pentru variabila EVC. **Concluzie.** Timpul de reacție și coeficientul de reacție au scăzut prin folosirea în perioada de tranziție a unui sport complementar.

Cuvinte cheie: *baschet, timp de reacție, coordonare, perioadă de tranziție, antrenament tenis*

Introduction

The worldwide popularity of basketball is unquestionable, especially among the young. Basketball is a dynamic team sport that involves a pattern of intermittent dynamic and skilled movement activities. There are complex demands that require a combination of individual skills, team plays, tactics, and motivational aspects. During a basketball game, we can see variety of movements such as running, dribbling, shuffling, and jumping. These movements are directional, multidirectional, intense and short lasting and most importantly, they are all governed by the reaction time and coordination level of the player (Wong et al., 2012).

Basketball is an anaerobic and high intensity exercise. Because of the high intensity and anaerobic property of basketball, one has to perform the players' best performance within the short period of the game. These performances include shooting action, jump shooting and defense. Shooting is the basic way to get score in basketball and for this reason, it is the most frequently used technical action. The jump shot is distinguished as the most important of all the shooting actions (Atan and Akyol, 2014).

In the field of team sports training, it is important to establish the reference reaction time profile for a better control of the training efficiency. Although it is commonly accepted that team sports training needs a multifaceted approach to understand all of the performance factors affecting competition, it is also well known that the enhancement of reaction time levels is relevant to obtain a better result (Tamer, 2000).

Sprinting performance, strength, and muscular power are thought to be important for successful participation in basketball (Koç et al., 2006). Anthropometrically, basketball players have shown a notable average height in several studies (Colakoglu et al., 1993) even when conducted with players from different nationalities. Most notably, the reaction and coordination performance are crucial in basketball, with critical elements in the game such as quick change

of direction, acceleration, deceleration and jumping ability. However, physical characteristics are not homogeneous for all the positions of the game. Characteristics of junior basketball players differ slightly, in the above-mentioned parameters, from those playing in high-performance situations (Menevşe, 2011).

Reaction times depend on motor nerve conduction velocity and are commonly divided between auditory reaction times (ART) and visual reaction times (VRT). It has been demonstrated that ART are less important than VRT, since it is essentially a visual game (Spierer et al., 2011; Ruschel et al., 2011).

Objectives

The aim of this paper was to determine if the use of complementary sport training (tennis) during the transition period influences the reaction time and the coordination coefficient of young female basketball players, measured using the MGM-15 jumping carpet.

Methods

Subjects

The participants in this study were female basketball players (N = 14), aged from 11 to 12 years that underwent two measurements: the jumping reaction time test and the coordination coefficient test (EVC) using the MGM-15 carpet.

The subjects were part of a basketball team that was during a summer transitioning period where they underwent a series of tennis trainings as a complementary sport. The transition period was 5 weeks, composed of 4 trainings of 90 minutes per week.

Methods and the Steps of the Research

We used the MGM-15 Jumping Carpet for test. The test consists of 15 jumps repeated 3 times: once for the left leg, once for the right one and last time on both legs. The legs must not be bent during the execution of the jumps. The software from the MGM-15 Jumping Carpet offered out, among others, two measurements for each subject named: reaction time and EVC (energetic variance coefficient). The reaction time is measured in milliseconds, while the coefficient is just a quantifiable number. The initial and final measurements were used for the statistical analysis.

Results

After the tests, the data collected was centralized in Table 1.

Table 1. Collected data for each subject regarding the average reaction time and average EVC for the initial measurement

Initial measurement		
Subject	Reaction_Time	EVC
1	0.325	6
2	0.458	11
3	0.39	8
4	0.452	11
5	0.332	6
6	0.377	7
7	0.489	14
8	0.462	13
9	0.401	8
10	0.385	7
11	0.49	11
12	0.442	10
13	0.311	4
14	0.372	5

Table 2. Collected data for each subject regarding the average reaction time and average EVC for the final measurement

Final measurement		
Subject	Reaction_Time	EVC
1	0.313	5
2	0.436	9
3	0.374	7
4	0.43	9
5	0.32	4
6	0.363	6
7	0.461	11
8	0.436	10
9	0.385	7
10	0.371	7
11	0.468	9
12	0.422	10
13	0.303	4
14	0.362	5

Table 3. Descriptive statistics for the initial and final measurement of the reaction time and EVC coefficient

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Reaction_Ini	.4061	14	.06011	.01607
	Reaction_Fin	.3889	14	.05443	.01455
Pair 2	EVC_Ini	8.6429	14	3.05355	.81610
	EVC_Fin	7.3571	14	2.34052	.62553

Table 4. Correlation between the initial and final measurements of the reaction time and EVC

		N	Correlation	Sig.
Pair 1	Reaction_Ini & Reaction_Fin	14	.999	.000
Pair 2	EVC_Ini & EVC_Fin	14	.956	.000

Table 5. Paired sample t test for the two pairs of measurements (initial and final) for the two tested variables: EVC and reaction time

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Reaction_Ini - Reaction_Fin	.0172	.006	.001	.013	.0208	10.590	13	.000
Pair 2	EVC_Ini - EVC_Fin	1.285	1.069	.285	.66847	1.902	4.500	13	.001

A paired-samples t-test was conducted (Table 5) to compare the reaction time before and after the transition period. There was a significant statistical difference in the scores between the initial (M=0.406, SD=0.06) and final (M=0.389, SD=0.054) conditions; $t(13)=10.59$, $p = 0.000$. This means that the transitional training period had an influence over the reaction time of the subjects as recorded by the MGM-15 Jumping Carpet.

A paired-samples t-test was conducted (Table 5) to compare the EVC before and after the transition period. There was a significant statistical difference in the scores between the initial (M=8.64, SD=3.05) and final

($M=7.35$, $SD=2.34$) conditions; $t(13)=4.5$, $p = 0.001$. This means that the transitional training period had an influence over the EVC of the subjects as recorded by the MGM-15 Jumping Carpet.

Conclusion

Our study has shown that there was a positive decrease of the two measured variables. Both the reaction time and the EVC have shown a decrease that was significant from a statistical standpoint. This means that the transitional period of trainings consisting of exercises from a complementary sport (tennis) did have a positive influence over the reaction times and EVC variable.

Further studies should compare a transitional period with and without the complementary sport trainings.

REFERENCES

- Atan, T., Akyol, P. (2014). Reaction times of different branch athletes and correlation between reaction time parameters. *Procedia - Social and Behavioral Sciences*, 116, p. 2886 – 2889.
- Colakoğlu, M., Tiryaki, S., & Morali, S. (1993). Konsantrasyon çalışmalarının reaksiyon zamanı üzerine etkisi. *Spor Bilimleri Dergisi*, 4(4), 3–9.
- Koc, H., Kaya, M., Sarıtas, N., & Coksevim, B. (2006). Futbolcularda ve teniscilerde bazı fiziksel ve fizyolojik parametrelerin karşılaştırılması. *Sağlık Bilimleri Dergisi (Journal of Health Sciences)*, 15(3), 161-167.
- Menevşe, A. (2011). Examination of the relationship between muscle palmaris longus and reaction time. *World Applied Sciences Journal*, 12 (1), 114-118
- Ruschel, C., Haupenthal, A., Hubert, M., Fontana, H.B., Pereira, S.M. et al. (2011). Simple reaction time in soccer players from differing categories and field positions. *Motricidade*, 7: 73-82.
- Spierer, D.K., Petersen, R.A., Duffy, K. (2011). Response Time to Stimuli in Division I Soccer Players. *J Strength Cond Res* 25: 1134-1141.
- Tamer, K. (2000). *Sporada fiziksel-fizyolojik performansın ölçülmesi ve değerlendirilmesi*, Bağırhan Yayınmevi, 140-147, Ankara.
- Wong D.P., Chaouachi A., Dellal A., Smith A.W. (2012). Comparison of Ground Reaction Forces and Contact Times Between 2 Lateral Plyometric Exercises in Professional Soccer Players. *Int J Sports Med*, 33: 647-653.