Revista de Psicología del Deporte 2013. Vol. 22, núm. 1, pp. 205-208
ISSN: 1132-239X
ISSNe: 1988-5636

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Universitat Autònoma de Barcelona

Perceived exertion effort in mini basketball players and its relationship with training volume

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PERCEIVED EXERTION EFFORT IN MINI BASKETBALL PLAYERS AND ITS RELATIONSHIP WITH TRAINING VOLUME

KEY WORDS: Basketball, Effort perception, Volume, Training.

ABSTRACT: The main aim of this study was to describe the *Ratings of Perceived Exertion* (RPE) during the final championship of Guipuzkoa (Spain), in under-12 basketball players and its relation to workload. It was a transversal descriptive study. It was realized whit 150 basketball players. Since instrument for the withdrawal of the PSE was in use the pictorial scale of Eston and Parfitt (2007). The players expressed on having finished every period of party disputed of individualized form and in a pictorial scale the RPE. A RPE was obtained by period of participation with which there was calculated the average RPE of every player in the game. There was realized a descriptive analysis of the PSE and an analysis of multiple regression by steps using as independent variables the years of sports practice, the years of Minibasket's practice (under-12 category), the number of annual sessions, the number of weekly sessions and the duration of the training sessions.

There was obtained an average RPE of the game of 4.48 ± 1.65, not being significant differences based on gender ($p > .05$). The results indicated that the boys begin significantly before that the girls to the Minibasket, though the girls train more annual and weekly training sessions ($p < .01$). The predictive model reflected that five obtained variables explained 32 % of the variability observed in the average RPE of the games ($R^2 = .32$; $F = 30.82$; $p = .00$). The specific training in Minibasket, the number of training and weekly sessions and the duration of the sessions are predictors of a minor RPE in the players.

Basketball is one of the most popular team games played in almost every country in the world (Ostojic et al., 2006), competitive basketball is played not only in North America, where the game was invented and developed, but also on other continents (Ziv and Lidor, 2009). Although during the last years many scientific evidence had been published about basketball, to our knowledge there is no references about mini basketball (under-12 basketball). In that way, we consider determinant the control of the load of training and the intensity in this population of sportsmen.

During the last years, there are numerous ways of assessing physical activity and exercise intensity in children that include heart rate, accelerometer, observation, pedometer, recall, and the rating of perceived exertion.

For perceived effort, the main reference is Dr. Gunnar Borg's classic *Ratings of Perceived Exertion* (RPE) or RPE scale, introduced in the 1970s and published in 1982. The classic Borg scale rates your perceived effort on a scale from 6 to 20, with 6 being "no exertion at all," to 13 being "somewhat hard," 17 being "very hard," through to 20 being "maximal exertion." But, application of the ratings of perceived exertion to self-regulate the intensity of exercise in physical education classes was suggested over 20 years ago (Eston, 1984).

The advanced results of RPE have provided compelling arguments that adult-derived methods and applications of (RPE) concept is not appropriate for use with young children. Investigations on effort perception in children should consider the ability of children to understand and interpret the scale used. This has led to the modification of existing scales or the development of new ones (Eston et al. 2000). In the development of child-specific effort rating scales, there appear to be no evidence which have questioned the inter modal validity of scales.

The investigators have tended to use mode-specific pictorial scales to assess their validity and reliability for other modalities: cycling (Robertson et al., 2004), or treadmill walking or running (Utter et al., 2002), but no specific scales to evaluate neither basketball nor Minibasketball.

The Minibasket (under-12) competition has experienced an increase in the number of players in the last years, however no investigations studied the responses during the game, and it allows us to ask how the minutes played has an influence on the perception of the players' effort. To our knowledge, we have not found studies that analyzed the response of the RPE, depending on the training load.

Therefore, the RPE, could be of interest for the trainers know depending on the total time that players of Minibasket play.

Thus, the aim of the present study was to describe the RPE during the final championship of Guipuzkoa (Spain), in mini basketballers, and its relation to workload.

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– *Artículo invitado con revisión*

Method

The research design was transversal, descriptive and ex post -fact (Montero and León, 2007). With regards to the subjective RPE of the sportsmen and a survey used to compile information about training conditions. One hundred fifty players (67 boys and 83 girls), took part in this investigation. The coaches were informed carefully about the experimental procedures and the possible risk and benefits of the project with the approval of the local committee of ethics and they gave the written consent to participate in this study. The under-12 players' families gave their consent took part in the research.

For the record of the RPE, we use the pictorial scale (Eston and Parfitt, 2007), a leaf of information for the withdrawal of the perceptions of the players and coaches, a card to gather the characteristics of the sports life and anthropometrical parameters of the players.

The Minibasketballers expressed, once they finished every game period of each game played, they answered to the question of the pollster *how of tired do you feel..?* (individually and in a pictorial scale the RPE). A RPE was obtained by game periods of participation with which finally there was calculated the RPE average for each player in the game depending on the played quarters.

					Diferencies sex			
	M	*SD*	Min.	Max.			Range medium	
					U	*p*	Men	Women
Sport practice years	4.15	1.58	1	10	2059.50	.18	65.13	74.19
Mb. practice years	3.03	1.22	1	6	958.50	.00	95.18	53.55
N° sessions per year	53.03	12.55	26	72	1178.50	.00	49.68	84.80
N° sessions per week	2.10	.73	1	4	1695.00	.00	58.74	78.58
Duration session (min)	69.29	9.73	60	90	2056.50	.16	65.08	74.22
RPE	4.48	1.65	1	10	5929.50	.28	109.44	118.90

Table 1. Descriptive of the sample.

Results

The statistical analysis described that the boys initiate the sports practice significantly before that the girls, although the girls train more training sessions per week and per year (Table 1). We have not found significant differences in years of practice and session duration. On the other hand, they have not found differences in the average RPE of the practice depending on the sex.

There was used an analysis of multiple regression, using the stepwise by steps and taking as dependent variable the RPE gathereduring the match and as independent variables the years of sports practice, the years of Minibasket practice, the number of annual sessions, the number of weekly sessions and the duration of the training sessions. The analysis of the information, confirms the normal distribution of the data ($p > .05$), whereas the value of Durbin-Watson test (DW = 1.62), indicates that the supposition of independence is not broken and that the residuals are independent. In the first step it was obtained as predictor variable the duration of the meetings, with a predictive capacity of 12 %; in the second step, the variable years of practice of Minibasket, explaining 21 % of the observed variability, the third in importance, the criteria of number of annual sessions, explaining 25 % of the variability, in the fourth step, the number of weekly sessions, explaining 30 % of the variability and the last one, the 5° step, we introduced the years of sport practice, justifying the 5 variables, a 32% of the variability observed in the medium RPE of the match ($R^2 = .32$; $F = 30.82$; $p < .01$).

Model	R	R^2	R Square Corrected	Typical error Estimation	Statisticians of change				
					Change in R^2	Changed in *F*	gl1	gl2	Sig.
1	.346a	.120	.116	1.51225	.120	30.816	1	226	.000
2	.468b	.219	.212	1.42800	.099	28.454	1	225	.000
3	.507c	.257	.247	1.39568	.038	11.539	1	224	.001
4	.553d	.306	.293	1.35237	.049	15.578	1	223	.000
5	.566e	.321	.305	1.34067	.015	4.908	1	222	.028

Table 2. Summary of adjustment and statistical descriptors on model change of regression.

a. Variables, predictors: (Constant), duration sessio
b. Variables, predictors: (Constant), duration session, practice years Mb.
c. Variables, predictors: (Constant), duration session, practice years Mb., nº annual session
d. Variables, predictors: (Constant), duration session, practice years Mb., nº annual sessions, weekly sessio
e. Variables, predictors: (Constant), duration session, practice years Mb., nº annual sessions, weekly sessions, sport practice year

From the model five (RPE_{medium} = -.1 x session, duration - .33 x years, practice + .5 x annual sessions - .66 + .16 years, sports practice + e) it is necessary to distinguish that the years that have been practiced Minibasket, the number of weekly sessions and the session duration help to reduce the RPE (Table 3).

	Model	Not standardized coefficients		Typified coefficients		
		B	Typical error	β	*t*	Sig.
1	(Constant)	8.172	.682		11.976	.000
	Session duration	-.052	.009	-.346	-5.551	.000
2	(Constant)	9.481	.689		13.751	.000
	Session	-.049	.009	-.331	-5.607	.000
	Practice years Mb.	-.440	.082	-.315	-5.334	.000
3	(Constant)	9.426	.674		13.983	.000
	Session duration	-.079	.012	-.531	-6.438	.000
	Practice years Mb.	-.353	.085	-.252	-4.166	.000
	nº annual session	.034	.010	.285	3.397	.001
4	(Constant)	10.837	.745		14.554	.000
	Session duration	-.093	.012	-.623	-7.482	.000
	Practice years Mb.	-.258	.085	-.185	-3.022	.003
	nº annual session	.042	.010	.347	4.187	.000
	Weekly sessions	-.523	.133	-.235	-3.947	.000
5	(Constant)	10.994	.742		14.826	.000
	Session duration	-.101	.013	-.681	-7.864	.000
	Practice years Mb.	-.329	.091	-.236	-3.637	.000
	nº annual session	.047	.010	.389	4.616	.000
	Weekly sessions	-.660	.145	-.297	-4.546	.000
	Practice years Mb	.159	.072	.157	2.215	.028

Table 3. Coefficients of regression and coefficients of contribution for the prediction.

Discussion

An average RPE of the matches, has been obtained below 5, frequent value in young sportsmen (Bar-Or, 1984) and that has been stated in small games in basketball (Sampaio, Abrantes, and Leite 2009) and in other team sports (soccer) (Hill-Hass, Dawson, Coutts, and Rowsell, 2009).

The sportsmen with more experience years of minibasket, with more weekly sessions and with higher duration of the training sessions, induces the decrease of RPE (French and Thomas, 1987).

The years of sports specific practice seem to favour a major adjustment to the physical loads needed for the basketball (Drinkwater, Pyne and Mckenna, 2008) and a physical condition differentiated for every specific position of the game (Delextrat and Soothsayer, 2009). These results suggest a functional role for other activities than sport-specific training in the development of expert decision-making (Baker, Côté and Abernethy, 2003; Lorenzo, Pujals, Navarro and Lorenzo, 2012).

The specific training in sport, the increment of weekly sessions and the increment of the duration, can be predictors suitable to get a lower RPE in these young basketballers.

PERCEPCIÓN DEL ESFUERZO EN JUGADORES DE MINBASKET Y SU RELACIÓN CON EL VOLUMEN DE ENTRENAMIENTO

PALABRAS CLAVE: Baloncesto, Percepción del Esfuerzo, Volumen, Entrenamiento.

RESUMEN: El objetivo del presente estudio fue describir la Percepción Subjetiva del Esfuerzo (PSE) durante la fase final del campeonato de Gipuzkoa (España), en jugadores de baloncesto mini, además de predecir la PSE en función del volumen de entrenamiento de los jugadores. Se realizó un estudio transversal, descriptivo, en el que participaron 150 jugadores de baloncesto. Como instrumento para la recogida de la PSE se utilizó la escala pictórica de Eston and Parfitt (2007). Los jugadores expresaron al finalizar cada periodo de partido disputado de forma individualizada y en una escala pictórica la RPE. Se obtuvo una RPE por periodo de participación con la que se calculó la RPE media de cada jugador en el partido. Se realizó un análisis descriptivo de la PSE y un análisis de regresión múltiple por pasos utilizando como variables independientes los años de práctica deportiva, los años de práctica de Minibasket, el número de sesiones anuales, el número de sesiones semanales y la duración de las sesiones de entrenamiento. Se obtuvo una RPE media del partido de 4.48 ± 1.65, no encontrándose diferencias significativas en función del género (p >.05). Los resultados indican que los chicos se inician significativamente antes que las chicas al minibasket, aunque las chicas entrenan más sesiones anuales y semanales de entrenamiento (p < .01). El modelo predictivo obtenido indica que las cinco variables obtenidas explican un 32% de la variabilidad observada en la RPE media del partido (R^2 = .32; F = 30.82; p = .00). El entrenamiento específico en minibasket, el número de sesiones de entrenamiento semanal y la duración de las sesiones son predictores de una RPE menor en los jugadores.

PERCEPÇÃO DE ESFORÇO EM JOGADORES DE MINIBASKET E A SUA RELAÇÃO COM O VOLUME DE TREINO

PALAVRAS-CHAVE: Basquetebol, Percepção de esforço, Volume, Treino.

RESUMO: O objetivo deste estudo foi descrever a percepção subjectiva de esforço (PSE), durante a fase final do campeonato de Gipuzkoa (Espanha), em jogadores de basquetebol mini e predizer a PSE em função do volume de treino dos jogadores. Foi realizado um estudo transversal, descritivo, no qual participaram 150 jogadores de basquetebol. Como instrumento para a recolha da PSE foi usada a escala pictórica de Eston e Parfitt (2007). Os jogadores expressaram no final de cada período de jogo disputado de forma individual e sob a forma de uma escala pictórica a PSE. A PSE foi obtida por período de participação com o qual foi calculada a PSE média de cada jogador no jogo. Foi realizada uma análise descritiva da PSE e uma análise de regressão múltipla stepwise usando como variáveis independentes os anos de prática desportiva, os anos de prática de Minibasket, o número de sessões anuais, o número de sessões semanais e a duração das sessões de treino. Obteve-se uma PSE média por jogo de 4.48 ± 1.65, não se verificando diferenças significativas por género ($p > .05$). Os resultados indicam que os rapazes começam no minibasket significativamente antes das meninas, embora as meninas tenham mais sessões anuais e semanais de treino ($p < .01$). O modelo preditivo obtido indica que as cinco variáveis obtidas explicam 32% da variação observada na PSE média por jogo ($R^2 = .32$, $F = 30.82$, $p = .00$). O treino específico em Minibasket, o número de sessões de treino semanais e a duração das sessões são preditores de uma PSE menor nos jogadores.

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