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Original Article

Monitoring training to adequate the teaching method in training: an interpretative concepts

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Abstract
The aimof this study is to analyze and deduce,through a short report, the scientific idea of several research applicable in training practices of the team sport. It is possible to monitor different aspects of the training process using several test and technological devices, to adeguate the teaching method and foreventually positive effects on performance. These procedures can allow to coach, player and team a efficient training, whatever their competitive level; therefore, these allow, constantly, to have under control the whole training process with the possibility of making the necessary adaptations to workloads.
Key Words: control tools, evaluate, training process, sport performance..

Introduction

The sports training is a formation process that has the aim to obtain the highest possible performance under the aspects quantitative and qualitative. In the field of the physical activity and sports (Gaetano, 2012) it is essential to identify methodologies that improve the performance either quantitative or in terms of learning (Serrano et al, 2013). Determine which methodology is most effective, in the motor and sports field (Gaetano et al, 2014) means allowing coaches to schedule workouts, so that they can have a positive impact on performance and therefore on the final outcome of each match(Gaetano & Rago, 2014). Team sports such as football, basketball, volleyball, include both many rules that physical, technical, tactical skills (Dellal et al, 2011) from to have, necessarily, to monitor, analyze and evaluate (D'Isanto et al, 2019), through use the field tests, technological devices and statistical processing of the data. For example, a particular skill required during a sports activity, such as strength, endurance, agility or coordination skills (Mathisen & Danielsen, 2014); or to verify the effectiveness of training and changes in physical conditions (Raiola et al, 2019).The field test (yo-yo endurance test, strength test, jump test, ecc…) are a fundamental periodic control tool (D'Isanto et al, 2018) very effective and thanks to the analysis of its results and the feedback received it is possible identify what may be the best adaptation to be made to the training program (Chiodera et al, 2008).In recent years has been a widespread use of devices sport-related (Di Tore, 2015); in fact, they are used several devices for collected physical parameters during training and match (GPS, Metabolimeter with cardio, Optojump, ecc…). The GPS technology is a portable device for monitoring workloads (MacLeod et al., 2009), it is a commonly used method in professional sports.The Metabolimeter with cardio (K5 portable) allows to measure or recalculate the metabolic parameters starting from the consumption of oxygen (O_2), the production of carbon dioxide (CO_2) and heart rate, recalculating the respiratory quotient (QR) and the gross energy cost (Cr). The Optojump provides real-time data on contact time, flight time, step length and step frequency with no impedance to the athlete (Lehance et al, 2005). The global navigation satellite system with inertial measurement unit (GNSS-IMU) have become a common tool to assess players' physical activity during competition and training in team sports (Aughey, 2011); in fact, the coaches have preferred use this device over other tracking techniques (e.g. video analysis) thanks to its time efficiency and real-time feedback (Scott et al, 2016). It is very important to monitor periodically the results of training programs (Raiola & D'isanto, 2016).In sports practice, the program trainingand of the load's entity, are used to develop qualities and abilities that determine the level of special preparation of players: endurance, strength, aerobic or anaerobic efficiency, etc. The workload analysis during the matches is nowdays essential for the planning training (Altavilla & Raiola, 2018); therefore, is useful to understand how the energetic cost change due to the complexity of the task performed. This allows us to set up specific paths of training to improve the motor learning, making this more economic and efficient.These analyzes are useful for sports operator and coaches to organize training planning, to monitor, analyze and evaluate the performance reduction or improvement, during the entire training process, using laboratory and field test, tecnological devices and statistical processing of the data collected.

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Methods

The approach is argumentative theoretical for the part relating at the training theory. Firstly, summarizing and deducting the scientific idea of several researches published and applicable it in the practices of training to optimize the sport performance of the individual players and of team.

Results and discussion

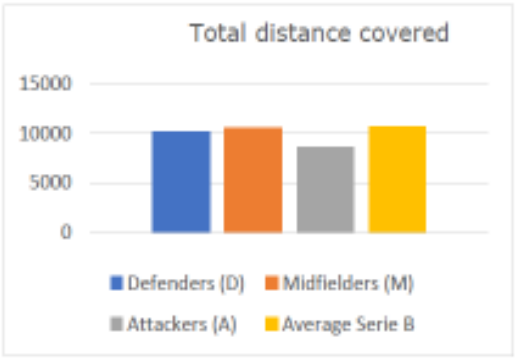
The following research papers analyze various quantitative and qualitative aspects in different team sports. The first work analyzed performance and physical effort in the different roles of thirty Italian professional footballers (Altavilla et al, 2017). Positional roles were: defenders (D), midfielders (M), forwards (A). Measurements were made using GPS during 20 friendly matches of 90 minutes in the 2017-18 period. The GPS is a valid device to estimate physical variables that have an impact on performance, such as metabolic power and total distance covered.

Table 1. Averages and Standard Deviation of the parameters physical performance in the different roles

Role of players	Defenders (D)	Midfielders (M)	Attackers (A)	Averages	SD	Averages Serie B
Total distance covered	10123,4	10586,6	8656,8	9788,8	775,3	10654
Metabolic power	10,05	11,60	8,84	10,15	0,9	11,5

Table 2. Differences between playing position in metabolic power and endurance capacity

Role of players	Defenders (D)	Midfielders (M)	Attackers (A)	P	Post-hoc test
Total distance covered	10123.4 ± 1097.9	10586.6 ± 1213.2	8656.8 ± 946.97	< 0.05	D, M> A
Metabolic power	10.05 ± 0.87	11.60 ± 1.08	8.84 ± 1.02	< 0.05	D, M > A



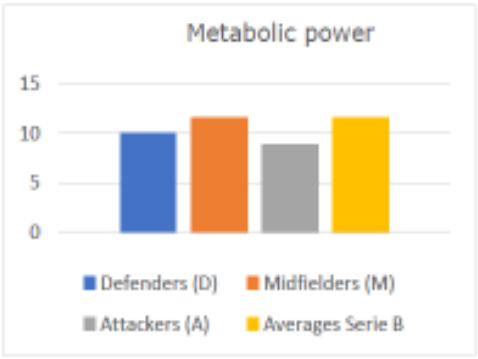


Fig. 1. Comparation of data on the total distance covered in the several roles
Fig. 2. Comparation of data on the metabolic power in the several roles

The midfielders (M) and the defenders (D) have obtained great physical performances during the matches, on the total distance covered and as like metabolic power (Table 1 and 2; Fig. 1 and 2). The midfielders (M), in fact, has reached the greatest distance covered in meters (10586.6), producing a high metabolic power (11.6) also respect to the reference average (Italian Serie B championship). The results demonstrate that physical needs are influenced by player gaming positions and must be used to program specific training plans based on their role. Coaches and anyone involved in training of young player should account for these methodological indications with the aim of specific training program (personalized training).The second work offers an analysis on the incidence of some aspects such as jumping ability and anthropometric characteristics in modern basketball (Table 3); which allow to better understand and motivate the methodological choices, respecting the physical, physiological and technical characteristics (Altavilla et al, 2018).Data were collected by 40 basketball players (Senior elite), divided into four groups: Power Forward (n = 12), Pivot (n = 12); Playmaker/Guard (n = 8) and Small Forward (n = 8). Anthropometric data:height, weight, body mass index (BMI), Abalakov test modified. By Bosco's method has been measured the explosive strength: squat jump (SJ), counter movement jump (CMJ) and CMJ with arms (CMJas).During a match there are numerous short sprints in successive and different directions (Ben Abdelkrim et al, 2007);this type of work in basketball increases the anaerobic commitment to alacidacid. The first methodological indication is thatthe training of aerobic capacity is not specific and contraindicated for basketball (Katch & Weltman, 1979). In modern basketball the increasment speed of game is a precise signal of a greater demand for physical strength and the speed of the technical gesture; in fact, in the activity of training

and selection of the players the explosive dynamic strength, the elevation and the fast sliding movement, represents selective and determining elements (Ashley & Weiss, 1994). The study highlights that the action of the arms in the jumps due to rebounds, the action of stopping the shot, the strength developed by the lower limbs, the coordination between the movements of the arms and legs, can be decisive for assessing an athlete's potential (Harman et al, 1990; Feltner et al, 1999).

Table 3. Comparison of the anthropometric and jump abilities variables according to the role

Variables	Power Forward (n=12)	Pivot (n=12)	Playmaker/ Guard (n=8)	Small Forward (n=8)	F	*p*
Height (cm)	198,4±4,1	200,2±5,1	190,1±3,8	194,8±5,4	4,75	*0,006*
Weight (kg)	88,9±6,3	86,3±4,9	80,7±5,5	84,5±8,3	1,64	*0,221*
BMI (kg/cm2)	22,5±1,4	21,5±1,3	22,3±1,3	22,2±1,2	0,25	*0,704*
AB1 (cm)	258,1±6,1	263,5±6,8	253,2±5,2	257,7±6,1	3,60	*0,022*
AB2 (cm)	255,1±6,1	258,5±6,3	249,5±4,6	254,2±6,2	3,66	*0,020*
SJ (cm)	38,7±3,8	39,6±2,8	37,5±5,3	36,8±4,8	1,03	*0,388*
CMJ (cm)	43,8±3,9	44,6±2,1	41,8±5,9	42,7±4,7	0,72	*0,546*
CMJ-SJ (cm)	5,1±1,6	5,0±1,4	4,3±1,5	5,9±1,4	0,24	*2,199*
CMJas (cm)	50,6±4,5	51,5±2,8	49,5±6,5	49,1±7,2	0,70	*0,555*
St (cm)	332,9±6,6	336,7±6,4	327,8±8,7	328,9±2,1	7,29	*0,001*
Rb (cm)	309,8±8,7	313,7±7,3	305,6±8,3	306,7±5,1	3,95	*0,01*

Table 4. Correlation matrix (anthropometric variables and jumping ability)

	Height	*Weight*	*AB1*	*AB2*	*SJ*	*CMJ*	*CMJ-SJ*	*CMJas*	*St*	*Rb*
Height	-									
Weight	*0,631*	-								
AB1	*0,860*	*0,690*	-							
AB2	*0,873*	*0,674*	*0,990*	-						
SJ	*-0,342*	*-0,356*	*-0,298*	*-0,328*	-					
CMJ	*-0,294*	*-0,282*	*-0,198*	*-0,234*	*0,933*	-				
CMJ-SJ	*0,114*	*0,186*	*0,259*	*0,242*	*-0,131*	*0,234*	-			
CMJas	*-0,274*	*-0,239*	*-0,250*	*-0,296*	*0,737*	*0,813*	*0,246*	-		
St	*0,596*	*0,392*	*0,705*	*0,680*	*0,198*	*0,264*	*0,190*	*0,215*	-	
Rb	*0,640*	*0,442*	*0,730*	*0,707*	*0,109*	*0,245*	*0,379*	*0,107*	*0,837*	-

The significative correlation between St and Rb is an indicator of an athlete's ability to transform the accumulated kinetic energy during the run-up phase into potential energy. The results of the Bosco test showed no significative difference between the several roles in terms of jumping ability among basketball players. Analysis of the correlation matrix (Table 4) shows that the anthropometric variables are correlated: in particular height with weight and AB1 and AB2, and are positively correlated with St and Rb and negatively to SJ. The increasing intensity of the game rhythm, increasingly commits the alactacid anaerobic component, consequently we need to have powerful players, who are fast in the movement and capable of high performance in the jumps. For this reason the continuous monitoring of anthropometric characteristics and jumping abilities are decisive aspects of the performance (Altavilla et al, 2018).

Conclusions

Programming is a perfected form of planning the contents of the training process, its need derives from the needs of modern sport that is constantly looking for performance that allows sportive success. Each training process requires the elaboration and solution of a series of methodological problems. The coaches,when planning the training must analyze and evaluate the results, during the sportive activity, through a continuous monitoring; using the tests and technological devices that allow you to have a very effective periodic control and thanks to the analysis of its results it is possible to relate the performance with the work strategies adopted. Through this operative strategy, it is possible to identify what can be the best adaptations to be made to the training program that is being administered to the athletes. These argumentation want to be is an invitation and a stimulus to further investigations, in order to reach the depth scientific knowledge that must always be the basis of any training methodology.

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