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Postural control in young soccer players: differences between the cognitive approach and ecological-dynamic one

RAIOLA GUETANO ¹ , MARIO LIPOMA ², DOMENICO TAFURI ¹

¹ University Parthenope of Napoli, Italy

² University kore of Enna, Italy

ABSTRACT

Raiola, G., & Nughes, E., (2015). Postural control in young soccer players: differences between the cognitive approach and ecological-dynamic one. *J. Hum. Sport Exerc.*, 9(Proc1), pp.S385-S390. Previous research had evaluated the training football effect in adolescence on postural control through the use of a platform of strength for the detection of the COP; however This research showed just how football compared to other sports or compared to sedentary individuals would improve postural stability in adolescence before the normal maturation of man. However the significance of this potential can be given by the skills developed through this sport or its exercises / situations that facilitate the learning. This further research on the influence of football training on postural control will have to show the specific factors that lead to a greater postural control; Therefore, the project deals with two different methodologies in experiencing different workout on two groups of children aged between 6-7 years, which will be offered its training program for five years, and the beginning and end of each year / cycle training will be conducted surveys through a platform of strength of the COP to assess postural stability of children. Teaching applications will be either prescriptive or ecological - dynamic and the final goal of this study is to highlight precisely what kind of methodological approach in football will lead to a greater postural control in adolescence, in order to get additional data that can contribute looking for the Peterson search done in 2006 on the variables that influence the postural control in adolescence. **Key words:** FOOTBALL, TRAINING, ADOLESCENCE, COP.

 **Corresponding author.** Gaetano Raiola, Via Berenice 11, Napoli, Italy

E-mail: raiolagaetano@libero.it

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INTRODUCTION

Investigation of postural stability in sports which require excellent postural performance provides insight into development of specific postural strategies (Perrin et al 2002; Vuillerme et al 2004; Paillard et al 2006). Several years of training and participation in demanding competition may significantly modify the redundancy of postural control system and lead to the discipline-oriented (Davlin 2004) optimal use of sensorimotor modalities responsible for body balance (Rose 1997). In team sport, such as volleyball (Parisi et al 2014ab), it is important the core of stabilization of the athlete especially female (Raiola 2014a). Understanding of these transformations is valuable in sports sciences because postural stability is an important determinant of both sports level (Era et al 1996; Vuillerme et al 2001; Noe', & Paillard 2005), and susceptibility to injuries (McGuine & Keene 2006) and to improve the self-efficacy, particularly, in gymnastic artistic (Gomez et. al, 2014). It may be also inspiring for clinicians interested in designing new rehabilitation therapies. Superior postural stability in athletes has been reported in several individual sports disciplines (Era et al. 1996; Golomer et al. 1999; Bringoux et al. 2000; Perrin et al. 2002; Noe', & Paillard 2005) but only few studies focused on popular team sports, mainly on soccer. It has been documented that soccer players have better postural stability (Bressel et al. 2007; Matsuda et al. 2008), rely less on vision (Paillard et al. 2006) and develop different postural strategies (Paillard et al. 2006) than untrained subjects.

The soccer players were consistently better than other athletes (Bressel et al. 2007; Matsuda et al. 2008) and their level of competition had positive relationship with postural stability (Paillard et al. 2006; Paillard, & Noe' 2006). More interestingly, the expert soccer players developed the ability to shift the sensorimotor dominance from vision to proprioception (Paillard & Noe' 2006) and built up a better internal representation of erect posture (Paillard et al. 2007). It has been argued that these specific postural adaptations or strategies of soccer players resulted from their experience in changing environment where vision is mainly used to collaborate with partner, to anticipate pass destination, and fixate on peripheral aspects of the match, such as the positions and movements of other players (Williams et al. 1994; Paillard & Noe' 2006; Paillard et al. 2006). Thus, differences between postural strategies in athletes and non-athletes seem to have potential in elucidating the effect of soccer training on postural control regardless of their initial postural abilities.

The purpose of this study is to assess the postural stability in two groups of football athletes young played two different approaches to training: training with cognitive approach and training with dynamic ecological approach. The first sees a strong involvement with the directives mode of the coach which imparts type exercises prescriptive equal for all with the following steps: order, command, sequence, timing, demonstration of model executive motor, execution and error correction. The types of exercises are the repeated exercises, exercises varied in time and space, randomized exercises, exercises of mental training. The second sees a very tenuous role of the coach almost alien to activities: he controls, monitors and suggests possible solutions taking care to bring down the risk of injury and to ensure the continuity of the exercise. The training activities are defined teaching and educational practices and involving athletes totally: choices of activities, solutions to problems technical and tactical. The most common methods are the circle time, cooperative learning, role play, the focus group.

METHOD

The first part deals with the preliminary study with the construction of the research design and analysis of possible critical aspects.

The study will be carried out by two groups of young players of 6-7, to which the p will be proposal ,for 5 years, 2 different methods of training: : Cognitive training with prescriptive exercises and eco-dynamic. Each group will play for five years a training program that includes three training sessions a week for 2 hours. However it should be noted that for both groups will be scheduled one weekly game. At the beginning and end of each football season for each individual player will be evaluated the variability of the COP in its characteristics of variability of oscillation (standard deviation of the COP), range, average, and the frequency. The variability of oscillation and speed are two commonly used parameters to assess the performance postural and lowest values of these parameters indicate minor postural stability. The frequency of oscillation is indicative of the rate of exploratory actions that our system balance performs and which are necessary to maintain stability. The frequency represents the amount of activity necessary to maintain the stability (Olivier et al. 2008). The frequency is a rough measure of the number of turning the COP (anterior-posterior and left-right) per second. When the postural request is more challenging or a specific group of subjects is less trained, the frequency of the COP increases. All dependent variables will be subjected to a statistical study (ANOVA) to evaluate the main effects of the training of football and the possible differences between the trained subjects with cognitive learning and the ecological dynamics learning. The results will then be compared to the quantitative data of the research conducted by Ewa Biec & Michal Kuczynski in 2010, which by measuring the COP highlighted the differences in terms of postural control in children who practiced football and sedentary children.

Table 1. Mean (SD) of the postual stability parameters in the soccer players and controls in both planes an both visual conditions

	Eyes open			Eyes closed		
	Athletes	Controls	<i>p</i>	Athletes	Controls	<i>p</i>
Medial/lateral plane						
Variability (mm)	3.0 (1.4)	4.1 (2.2)	0.04	2.5 (0.9)	4.1 (1.8)	0.0003
Range (mm)	15.6 (10.2)	22.8 (17.0)	0.05	12.7 (4.8)	21.9 (10.3)	0.0003
Mean velocity (mm/s)	6.1 (2.9)	10.5 (3.2)	0.0001	5.7 (1.9)	10.9 (4.7)	0.0001
Frequency (Hz)	0.33 (0.07)	0.47 (0.10)	0.001	0.37 (0.11)	0.44 (0.12)	0.04
Anterior/posterior plane						
Variability (mm)	3.2 (1.1)	3.9 (1.5)	0.07	3.4 (1.4)	4.0 (1.3)	n/s
Range (mm)	15.6 (7.2)	18.5 (6.3)	n/s	16.1 (5.6)	20.5 (6.9)	0.02
Mean velocity (mm/s)	6.6 (2.9)	8.0 (2.5)	0.04	7.5 (2.1)	9.4 (3.3)	0.03
Frequency (Hz)	0.34 (0.09)	0.36 (0.12)	n/s	0.39 (0.14)	0.39 (0.14)	n/s

The *p* values are significance levels of the between-group differences resulting from planned comparisons *n/s* non-significant

Furthermore, will be evaluated, the qualitative aspects of young players, through direct observation of the coach. Skills in assessment will be proposal for both training methods: 1) driving the ball 2) control-oriented 3) shooting.

RESULTS

Table 2. Exsamples of cognitive exercises.

1	Guide the ball between the cones only with the right foot
2	Guide the ball between the cones only with the left foot
3	Dribble

Table 3. Exsamples of ecological – dinamyc exercises.

1	1 player vs 1player
2	4 players vs 3 players
3	Small games

From this study hopes to get more data that indicate that training is more suitable for a greater postural stability in adolescence before the normal maturation of man, so you can then investigate, having more specific data, the main factors lead to a better postural control.

The results are expected a greater postural control in the group of children who will perform the workout ecological dynamic, as is the workout that best emulates the match.

DISCUSSION

It can be argued that football leads to better postural stability than non-athletes. However the significance of this potential factor can be given by the skills developed through sport (Schmidt and Lee 1999), and its exercises / situations that facilitate learning (Perrin et al. 2002), therefore, from this research will hopefully get more data that indicate that training is more suitable for a greater postural stability in adolescence before the normal maturation of man, so you can then investigate, having more specific data, the major factors that lead to a better postural control , then the most important objective and pragmatic of this study will be to highlight any changes neurophysiological or sensorimotor that may arise as a result of these activities. I think this study is very important because it raises, first of all, focus on the benefits of physical activity on postural control; in particular focuses on training football, considered by further studies as the sport that leads to a greater postural control. During my studies I had the opportunity to understand, and then further, that the movement is aware, that our body is a surface receptor and that training is therefore a form of learning that if well structured can elicit the proper mental and physical development of man. The tool that we posturologists / coaches we have is made from the exercise should not merely be organized only in quantitative terms, s, but also in quality terms compared to the elements of variability,

frammentabilità, adaptability (Raiola, 2014b). Therefore, I believe that they are dutiful further research on the influence of training on postural control football to know specifically the factors that lead to a greater postural control in order to develop specific exercises that lead to significant improvements in adolescence, such as to obtain additional data that can respond to the Peterson research on the variables that influence the postural control.

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