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Research Article

BRAZILIAN SOCCER PLAYERS AND NO-PLAYERS ADOLESCENTS: EFFECT OF THE MATURITY STATUS ON THE PHYSICAL CAPACITY COMPONENTS PERFORMANCE

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ABSTRACT

The aim of this study was to compare the speed and the agility between Brazilian soccer players and non-players, regarding maturity status in adolescents 11-15 years old. Forty and two soccer players (age – 159.30±17.28 months old; weight – 48.45±9.96 kg; height – 1.53±0.10 m) and 45 non-players (age – 162.62±24.92 months old; weight – 48.30±8.35 kg; height – 1.54±0.12 m) participated of this study. Participants were classified by maturity status. On 2 different days with 1 week of differences between the assessments the participants were evaluated the agility, by Shuttle Run test, and the speed, by 30 m maximum speed test. The results showed that the maturity status was an influential factor in the performance with better results for individuals in a more advanced stage. The soccer practice does not seem to interfere in the performance of the physical capacity components analyzed, only effective when different maturity levels are involved in the analysis. It is also possible that late maturing boys selectively drop-out of soccer as age and sport specialization increase.

***Key words*:** soccer, maturity level, speed, agility.

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INTRODUCTION

The maturity status is an influential factor in the performance of physical capacity components in young football players (Malina et al., 2004; Malina, 2005; Le Gall et al., 2007). However, the relationship between the maturity status and soccer practice is not well known. Only one study compared soccer players and non-players with regard the maturity status and physical performance. The soccer practice effects were effective for the physical capacity components, but the maturity status was influential only for some players levels (Seabra et al., 2001).

For adolescents soccer player, given performance advantages associated with early maturation in boys, specifically size, strength, power and speed, with biological maturity status significantly influences the functional capacity of adolescent soccer players 13-15 years of age (Malina et al., 2004; Figueredo et al., 2009). Chronological age was the primary contributor to the variance in the 60m dash and 500m run in Spanish youth soccer players 12-17 years of age (Rovira et al., 1991). Aerobic power increased with age and stage of puberty of English youth soccer players (Baxter-Jones et al., 1993; Jones and Helms, 1993). Biological maturity status did not significantly affect overall injury incidence in elite French youth soccer players, although there were differences between maturity groups when patterns of injury location, type, severity and re-injury were analyzed (Le Gall et al., 2007). With respect of age soccer-specific skill tests, experience, body size and stage of puberty contributed relatively little to variation in performance of adolescent footballers aged 13 to 15 years (Malina, 2005).

It is concerned for adolescent non-soccer players, great differences among early, average and late maturing boys occurred between 13 and 16 years of age in tests of muscle strength (static arm strength), power (vertical jump) and endurance (leg lifts and flexed arm hang) (Beunen et al., 1980). Differences in physical activity determined by the pedometer among the early, average, and late maturing 13 to 14 year olds did not demonstrate significant (Wickel & Eisenmann, 2007).

The purpose of this study was to compare the speed and agility between Brazilian soccer players and non-players, regarding maturity status in adolescents 11-15 years old. The hypothesis of the study was that the maturity status and soccer practice will be to interfere in the agility and speed performance in initial stage individuals will had a worse performance than advanced stage individuals and soccer players will had better performance than non-players. These observations suggest the hypothesis that boys advanced in biological maturity tend to be more successful in soccer in later adolescence. This study tested this hypothesis in a sample of Brazilian soccer players and no-players adolescents with aged 11 to 15 years.

MATERIAL AND METHODOLOGY

The study subjects were 11 to 15 years of age male. The soccer players group trained in a soccer initiation school, which participated in regional championships and obtained good results. The participants played soccer at least one year. The non-soccer players group only did physical education as physical activity. It is also important to note that the soccer school did not training soccer specific for the physical capacity components. So, the study was based only on the

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influence of the soccer widespread practice in agility and speed. The study was approved by the local Ethical Committee.

The participants' selection was random from a sample of 100 individuals from each group. Students were selected according to age and sexual maturation level. We selected 87 participants for the study: 42 soccer players (age – 159.30±17.28 months old; weight – 48.45±9.96 kg; height – 1.53±0.10 m) and 45 non-players (age – 162.62±24.92 months old; weight – 48.30±8.35 kg; height – 1.54±0.12 m).

Participants were evaluated maturity (Tanner et al., 1983) and divided according to the maturity status classification within each group (Table 1). Individuals were classified according to pilosity axial: A0 (lack of hairs), A1 (the first hairs, short and spairs at central part of the armpit), A2 (well evident hairs, occupying the total are of the armpit), A3 (complete development of hairs that become thick long and strong, occupying surface of the armpit).

Table 1. Group division according participant's maturity status.

	Maturity level	N	age (months)	weight (kg)	height (m)
Soccer players	A0	8	135.7±3.4	37.6±0.7	1.40±0.01
	A1	17	154.2±12.0	45.9±6.5	1.49±0.05
	A2	7	171.2±2.3	54.4±6.6	1.61±0.05
	A3	10	178.3±6.0	57.3±10.6	1.64±0.09
Non-players	A0	14	135.3±2.3	39.4±1.2	1.40±1.8
	A1	10	150.3±18.4	47.4±10.1	1.47±0.07
	A2	11	185.9±18.4	55.8±3.3	1.65±0.02
	A3	10	187.5±3.2	53.2±2.1	1.65±1.54

Participants were evaluated on 2 different days with 1 week of differences between the assessments. In the 1st day of data collection was evaluated the participants agility by Shuttle Run test (Johnson & Nelson, 1975). On 2nd day, the subjects performed the 30 m maximum speed test. Each participant performed two trials for each of the tests with 5 minutes of rest between them. Trials were timed with accuracy to the tenth of a second, and best of two trials was selected for analysis.

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The variables were analyzed using descriptive statistics (mean and standard deviation), and the data normality was tested of Shapiro-Wilk. The groups were compared by analysis of variance – Two-Way ANOVA, with factor for soccer practice and maturational level. The Scheffe's test was used to detect the differences among conditions. SPSS 10.0® was used to the analysis with $p<0.05$ significance level.

RESULTS

For the anthropometric characteristics, analysis showed differences to maturational levels, in stature ($F_{3,87}=96.98$, $p<0.001$) and body mass ($F_{3,87}=32.30$, $p<0.001$), without indicate differences between the groups and interaction between the factors. Scheffe's test showed not only differences between stage 2 and 3 ($p<0.001$), with greater height and body mass for the more advanced stages.

The analysis of variance showed no significant difference between soccer players and non-players ($F_{1,87}=0.10$) and no interaction ($F_{3,87}=2.29$) among the factors for the speed test (Figure 1). For the maturational level, we found significant differences ($F_{3,87}=8.21$; $p<0.001$) between stages A1 and A3 ($p<0.001$), A0 and A2 ($p<0.001$), A0 and A3 ($p<0.001$), with better results for the more advanced maturation levels.

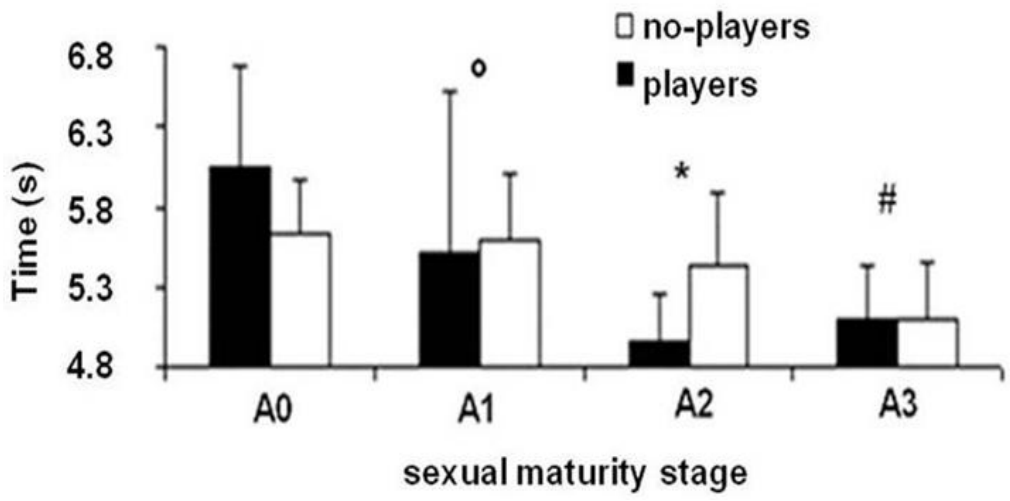

Figure 1. Mean and standard deviation of the time for the speed test for soccer players and non-players according to the maturity status. ° - difference between A1 and A3, * - difference between A0 and A2, # - difference between A0 and A3.

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For the agility test, significant differences showed for groups ($F_{1,87}$=10.43, p<0.002) and maturational level ($F_{3,87}$=13.65, p<0.001), without interaction between factors. With respect to non-players, Scheffe's test indicated differences between stages A0 to A2 and A3 (p<0.001), with better performances for the more advanced stages. In the comparison between groups, differences were showed between stages A0 of non-players and A1 (p<0.001), A2 (p<0.001), A3 (p<0.002) of soccer players, and A1 of non-players and A3 of soccer players (p<0.001), with best performance for the soccer players (Figure 2).

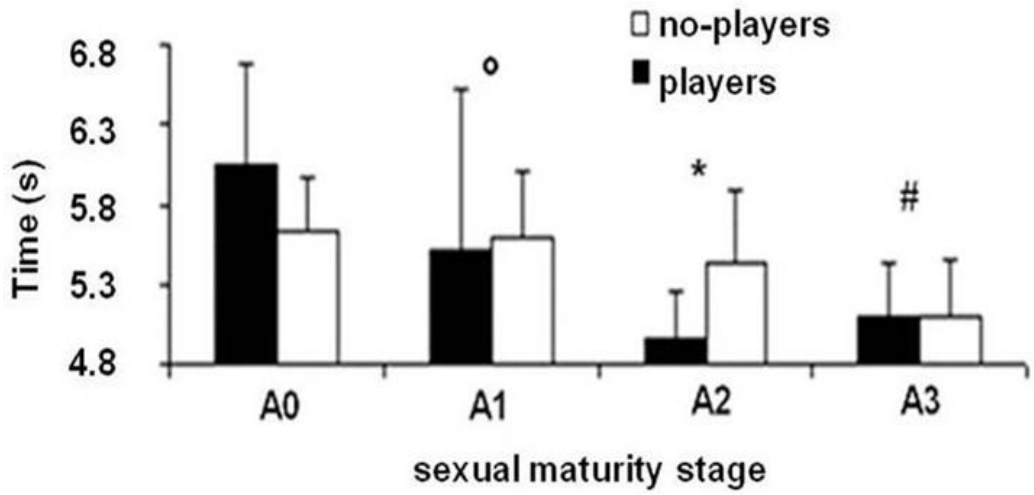

Figure 2. Mean and standard deviation of time for the agility test for soccer players and non-players according with maturity status. * - difference between A0 and A2, # - difference between A0 and A3, ^ - difference between the A1 of non-players and A3 of soccer players, ~ - difference between A0 of non-players and A1 of soccer players, £ - difference between A0 of non-players and A2 of soccer players, € - difference between A0 of non-players and A3 of soccer players.

DISCUSSION

We partially confirmed the hypotheses of this study. The maturity status was an influential factor in the performance with better results for individuals in a more advanced stage, but it seems there is a threshold between the maturity levels. However, the soccer practice does not seem to interfere in the performance of the physical capacity components analyzed, only effective when different maturity levels are involved in the analysis.

The maturity status is factor present in the speed and agility performance in soccer players and non-players, which confirms some study (Verschuur, 1987; Malina et al., 2000; Malina et al., 2004; Malina, 2005). For the speed and agility, the early stages are different in more advanced stages, which lead us to believe that there is a threshold in the maturity status to promote

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differences in performance. The performance is directly related to stage of secondary sex characteristic development. This suggests that within adolescent soccer players and non-players, advanced biological maturity status is associated with slightly better performance in the agility and speed, what already confirmed for six skill tests (Malina, 2005). As the speed and agility to develop between 7 and 11 years and only begin to decrease in performance after between 16 and 17 years (Casperson et al., 2000) is a possible explanation. One indication of this decline is observed in speed, where in the soccer players the A2 stage had better performance, not significantly, than stage A3, which appears to be a beginning of the decline in performance.

Therefore, it is important for the child reach the maturation stage A2 to improve their performance, regardless of age. This happen similarly for height in boys (Backous et al., 1988). The sport of soccer systematically excludes late maturing boys and favors average and early maturing boys the chronological age and sport specialization increase (Malina, 2000). The physical growth may have connection with this, since differences in height and body mass were also listed among the early stages and advanced. The increase in weight is association with the sport-regular physical activity (Malina, 1994). So, this suggests that bigger physical growth is associated with better performance on these two tests for 11 to 15 Brazilian adolescents. The weight and height are significant contributors to the sprint and vertical jump, respectively (Malina et al., 2004). Similar tends was found for skill soccer tests and physical capacity (Malina et al., 2004; Malina 2005; Figueredo et al., 2009). The average heights and weights of young soccer players from Europe and North America tend to fluctuate above and below reference medians for non-athletic youth from childhood to mid-adolescence (about 8-14 years) (Malina et al., 2000). Statistical adjustment for age and body dimensions reduced the differences between elite and non-elite players (Hansen et al., 1999).

In contrast, early pubertal Italian soccer players and non-players aged 10±11 and 12-13 years do not differ in skeletal and sexual maturation or in body size, but pubertal players aged 14-16 years are advanced in skeletal maturation, pubic hair development and testicular volume, and are taller and heavier than non-athletes (Cacciari et al., 1990).

The soccer practice seems to have some contribution only in agility, without interfering in speed. Even so, the soccer practice factor was not very effective to promote improvements in agility, since the groups of this study was only showed difference among early maturation stages of the non-players group and advanced stages of soccer player group. This is interesting; because researches suggest soccer practice influenced in the agility, speed and aerobic resistance, when compare soccer players and sedentary adolescents (Seabra et al., 2001; Malina et al., 2004). However, the non-players did physical activity at school, which can induce to no difference.

It is important to remember that the sample of soccer players in this study practice soccer in a school and not in a high-performance team. The soccer schools do not training effectively the physical capacity components because the technique is more practiced. The difference between the groups might be strong if the soccer players train in a high-performance team, since these teams type have concern in developing the physical aspects of the players. With age and presumably experience, boys advanced in maturity appear to dominate the game, at least at youth level (Malina et al., 2000).

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CONCLUSION

Maturity status interferes in the speed and agility performance in 11-15 years old Brazilian soccer players and non-players, with advanced stage individuals better than beginning stage individuals, independently of the group. The soccer practice improvement some increased in the speed and agility performance, mainly in agility. The results of this comparative analysis suggest that the sport of soccer systematically excludes late maturing boys and favours average and early maturing boys as chronological age and sport specialization increase. It is also possible that late maturing boys selectively drop-out of soccer as age and sport specialization increase.

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