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A comparison of physical fitness by competitive levels in youth basketball players

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ABSTRACT

Some basketball teams use train two teams at the same time. Even more, some younger players train and compete in a higher competitive level. The aim of this study was to compare the physical fitness (PF) between under sixteen (U16) and under eighteen (U18) basketball players. Body mass and height were assessed with a bioimpedance balance and a stadiometer. The strength levels were assessed for upper limbs by the number of push-ups (per 30s) and lower limb's with a horizontal jump without preparatory race (in centimetres). Coordination was measured by dribbling 5 barriers in the diagonal with a distance of 1m (The first barrier at a distance of 8m from the start and the last at 1m of the basket). The speed was measured with a 20 meters sprint test (seconds). The seat and reach flexibility test and the up the back test in centimetres measured the flexibility. One way ANOVA assessed the statistical differences between groups. The significance level was 5%. Only significant different were founded between U16 and U18 players in weight. No significant differences were founded between groups in anthropometrics, strength, speed, coordination and flexibility. In this team, no significant differences in physical fitness between U16 and U18 competitive levels were founded. Thus, youngers basketballers should be encouraged to train and compete in a higher competitive level. **Keywords:** Physical fitness; Performance; Youth; Basketball.



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INTRODUCTION

Some team sports include two competitive levels in one team. However, sometimes there are physical differences that may compromise the younger players' performance. In basketball, speed, strength and motor coordination are three elemental motor abilities and the individual technique, strength and resistance are also associated with the team performance (Forte et al., 2016). The competitive level are determined by the birth age in junior basketball. That may result in a difference of two years between players (Wattie, et al., 2008). Intending to improve player's performance, several teams encourage the young players to practice in a higher competitive level or older team in the same club (Figueira, et al., 2018). However, younger's performance may be affected by the physical fitness differences. Considering the importance of train and compete in a higher competitive level, the aim of this study was to compare the physical fitness (PF) between under sixteen (U16) and under eighteen basketball (U18) players.

MATERIAL AND METHODS

Participants

This was a convenience sample, composed by nine U16 with 14.67 (± 0.50) years old and seven U-18 players with 16.71 (± 0.48) years old. All the players competed in Nacional Cup for U18 and U16 competitive levels. All the procedures were in accord to the Helsinki's declaration regarding human research. A written consent by the parents or tutors was obtained beforehand.

Measures

Body mass and height were assessed with a bioimpedance balance (Tanita, BC-601, USA) and a stadiometer. The PF assessment were made considering Forte et al., (2016) evaluations. Strength levels, coordination, speed and flexibility were evaluated.

Procedures

The upper limbs strength was measured by the number of push-ups (per 30s) and lower limb's with a horizontal jump without preparatory race (in centimetres). Coordination was measured by dribbling 5 barriers in the diagonal with a distance of 1m (The first barrier at a distance of 8m from the start and the last at 1m of the basket). The speed was measured with a 20 meters sprint test (seconds). The seat and reach flexibility test and the up the back test in centimetres measured the flexibility.

Statistical Analysis

The Levene's and Kolmogorov-Smirnov tests assessed the equality of variances and normality respectively. The One way ANOVA evaluated the statistical differences between groups. The significance level was 5%.

RESULTS

The mean values of anthropometrics, PF and statistical significance are presented in Table 1.

Table 1. Means and standard deviation values of anthropometrics and physical fitness between U16 and U18 players

Variables	Mean (\pm SD)		F	p
	U16	U18		
Age (years)	14.67 (\pm 0.50)	16.71 (\pm 0.49)	67.411	<0.001*
Weight (kg)	71.44 (\pm 3.28)	78.43 (\pm 4.79)	12.007	0.004*
Height (cm)	175.11 (\pm 8.02)	179.43 (\pm 4.47)	1.619	0.224
Wingspan (cm)	174.00 (\pm 9.72)	177.29 (\pm 3.99)	0.699	0.417
Upper Limbs Strength (reps)	23.5556 (\pm 8.37)	22.71 (\pm 6.87)	0.046	0.833
Lower Limbs Strength (cm)	198.33 (\pm 24.70)	207.71 (\pm 11.54)	0.854	0.371
Coordination (sg)	7.29 (\pm 0.40)	8.0486 (\pm 0.65)	3.139	0.098
Speed (sg)	3.77 (\pm 0.39)	3.4386 (\pm 0.19)	3.058	0.102
Sit and reach (cm)	-1.44 (\pm 7.52)	-1.7 (\pm 8.83)	0.004	0.948
Up the back (cm)	10.4444 (\pm 7.02)	5.57 (\pm 3.789)	2.727	0.121

* $p < 0.05$

DISCUSSION

The aim of this study was to assess the differences in PF between U16 and U18 team. No significant differences in PF were observed between the two teams. Forte et al. (2016), applied a strength program on a U18 team. The authors made the same evaluations in two distinctive moments, the beginning of the season and four months later. Only age, upper limbs strength, coordination and up the back flexibility presented significant differences. In our study, no strength program was applied. However, the evaluations were at the beginning of the season and trainee was not assessed.

Different studies presented differences in strength levels (Fort-Vanmeerhaeghe et al., 2016; Forte et al., 2016). The mainly causes for physical fitness differences are strength levels. The main limitations of this study were: (i) the differences between U16 and U18 players were assessed in one single moment, at the beginning of the season; (ii) only sixteen players made part of this research. Thus, these findings cannot be extrapolated for all basketball players. However, it should be considered to predict significant differences in young player's physical fitness.

CONCLUSIONS

In this study that, no significant differences in physical fitness between U16 and U18 competitive levels were found. Strategies such as train and compete in a higher competitive level should be adopted.

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