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Shuttle Run Agility Test in Soccer Athletes of Under – 10 Category with Dry and Wet Conditions Field

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Abstract Introduction: The soccer is characterized by being the most practiced and known sport in the world, and has conquered new territories in recent years regardless of the characteristics of the practitioners. The performance of a soccer player can be understood by many factors, but the best indicator of overall performance of the athlete is agility. Such performance is related to psychosocial factors, which causes a certain difference between categories within the modality. Purposes: Identify the behavior of the agility variable in soccer athletes, at field with dry and wet conditions, through the application of the Shuttle Run Agility Test protocol. Methods: Participated of the study sixteen male soccer athletes in the Under-10 category of the Paulista Soccer Team with the following characteristics (height: 1.14 ± 0.07 m, body mass: 33.87 ± 5.14 kg, mass index Body weight: 17.2 ± 1.25 kg / m²). Results: The value obtained in the Shuttle Run tests in dry and wet field was 11.31 ± 0.34 sec and 11.42 ± 0.55 sec respectively. Conclusion: There was not significant difference between the Shuttle Run Agility Test performed in different environmental conditions (dry field and wet field). More studies are necessary to understand the behavior of soccer athletes about the divergence of environmental condition.

Keywords Soccer, Shuttle Run Agility Test, Under-10 Category, Dry, Wet, Field Conditions, Athletes

1. Introduction

The soccer is the most practiced sport in the world, as well as the most popular, since it was introduced in the Brazilian culture, great proportions in all of the national territory [1].

The performance in this modality depends of several factors, including: technical, tactical, psychological and physical abilities [2]. From the physical point view, the modality is characterized how an intermittent exercise (frequent changes in the intensity of effort) [3].

In this way, it is possible to say that the ability to produce varied actions during the 90-minute game is associated with high aerobic capacity while the ability to perform explosive movements in a short period of time is associated with high anaerobic capacity [1]. Time and motion analyzes have shown that high intensity interval sprints (forward, backward, and lateral movements) are determinants in field sports performance [4].

According to Bloomfield [5] soccer requires players to perform numerous actions involving high levels of strength, power, speed, agility, balance, stability, flexibility and endurance [6].

During a soccer game, players reach a total distance of approximately 10 kilometers, including a sprint each 90 seconds. Each action lasts an average of 2 to 4 seconds and it can reach a distance of 15 meters [1] (smaller distances). In the longer distances (approximately 40 meters) are present about 4 to 8 changes of directions [7-9]. Davids [10] demonstrates that a soccer players executes 1,200 to 1,400 changes of direction during official games. Bloomfield [5] evaluated 55 Premier League players in official matches, finding that 727 turnovers and detours are made during the match.

Agility may be considered an essential component of contemporary soccer [11, 12]. According to Sheppard e Ackland [4, 13], agility is the ability of the rapid body movement involving change of speed and direction in response to a stimulus and it can maintaining the motor control. In this way Benvenuti [14] complement that this capacity is composed by accelerations, decelerations and reacceleration, characterized as essential for the soccer specific skills [15].

Thus, Lyle [16] pointed out that the identification of

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factors that influence motor skills can be useful for the development of training programs with the aim of sports performance. On the other hand, in younger age groups, differences in maturation, development, learning, as well as rapid physiological and anthropometric changes during the growth are observed and then feature direct influence on the performance [17].

According to Pinder's [18] study, the development of young players may be non-linear, with periods of abrupt performance transitions and anticipations, stable levels with little progression, or even periods of regression.

It is well known that climate changes that permeates soccer matches can induce loss of stability, increasing the chance of some injuries [19]. However, it was not found studies in the scientific literature that have evaluated the behavior of physical capacities, especially agility, in different climatic conditions, including rainfall.

Therefore, the purpose of the present study was to identify the agility of 10 years old soccer athletes category in two different conditions: dry and wet field.

2. Methodological Procedures

Assessed Individuals

Were evaluated sixteen male soccer athletes of the professional soccer team of São Paulo, Brazil. The athletes signed and agreed to the criteria of the Free and Informed Consent and the Term of Assent. The study was approved by the Ethics Committee of São Judas Tadeu University, São Paulo, SP, Brazil, according to protocol (11/2010). The exclusion criteria were: a) absence in more than 25% of training sessions and / or official matches of the team; b) present any osteo-myo-articular pathology.

Procedures

The athletes were evaluated in four different situations with a minimum interval of 72 hours between the tests. On the first day of evaluations, the anthropometric measurements were perform for characterization of the sample, including height, total body mass, body mass index (BMI). On the second day, the evaluation of sexual maturation was realized by the parents / person responsible of the children, using the Tanner Instrument. [20].

On the third and fourth day of evaluation it was applied the Shuttle Run Agility Test in a rainy day (wet field) and in a normal day (dry field), respectively

The two days of evaluations were classified according to the environment and climate conditions (wind speed, ultraviolet rays, possibility of rain, temperature and relative humidity). All athletes were wearing the official soccer equipment, including Dri Fit® T-shirt, shorts and soccer-specific socks, shin guard and soccer boot with rubber studs.

Tanner Scale

It is an evaluation scale of the sexual maturation of the individuals represented by the sequence of the pubertal events in both sexes. In the boys were evaluated: development of external genitalia and pubic hair, while in the girls are evaluated the breast development and pubic hair too [20].

Shuttle Run Agility Test

The Shuttle Run Agility Test (SRAT) involve 20m run with three changes of direction in 180° [21]. Two parallel lines are demarcate with 9.14m between them, measured from her outer edge, in unobstructed space. One of the lines was take as the starting point of the test and the individuals positioned themselves behind this one, prepared to begin the test in the command "Prepare! Go! ". The athletes should make two back and forth in the space marked [22]. When they exceed the line in the last race, the stopwatch was stop and the time recorded.

3. Results

As shown in Table 1, the mean values of height (m), body mass (kg) and body mass index (kg/m^2) of subjects in the study were 1.14 ± 0.07m, 33.87 ± 5.14kg and 17.2 ± 1.25Kg/m^2 respectively.

Table 1. Anthropometric Variables

	Average and SD*
Stature (m)	1,14 ± 0,07 m
Body Mass (Kg)	33,87 ± 5,14 Kg
Body Mass Index (BMI) (Kg/m^2)	17,2 ± 1,25 Kg/m^2

* Standard Deviation

The value obtained in the Shuttle Run tests in dry and wet conditions was 11.31 ± 0.34sec and 11.42 ± 0.55sec respectively (Chart 1.). No significant difference was found between the tests execution. However, it is possible to observe a trend of minor performance for the wet field.

4. Discussion

The statistical analysis showed that there were not significant differences between field conditions (wet and dry). The evaluation of certain variables is restricted in the literature, especially because field tests in real climatic conditions may disadvantage the scientific control of the variables, which makes it simultaneously more applicable. In this way, Smeets [23] report that each type of soccer lawn has their own characteristics and, therefore, the performance of the soccer athlete can be influenced by the type of sole of the footwear used (boot).

Smeets [23] still determine the friction force between the sole of the players' shoes and the ground, concluding that in dry conditions, the simulations for determination of the torque culminated in relatively higher values. This fact can justify a greater adhesion to the ground in dry conditions and consequently more safety to the athlete to realize sprints and changes of direction with speed and effectiveness.

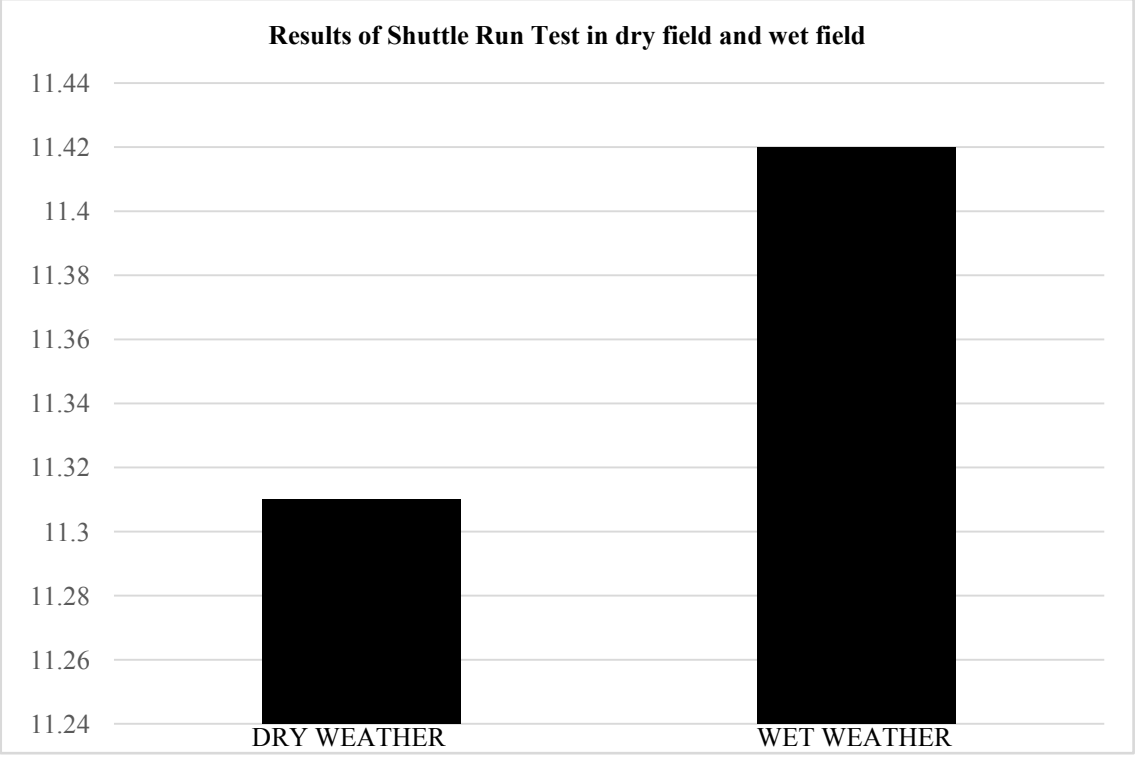

Chart 1. Shuttle Run Test Values in different environment conditions

According to study by Mirkov [24], the great performance indicator of a soccer player is agility. However, the literature is outdated and it can be explained by the absence of a gold agility test standard, which could contribute methodologically by unifying and standardizing agility tests with specific purposes. There are several agility tests found in recent studies in the literature, and there is no standardization in the application of these tests. Kutlu [2], in a study with 113 individuals (including amateur, professional soccer players and college volunteer students) compared a new Agility and Shooting Skill Test for Soccer with other agility tests, concluded that while the Illinois Test had a high score for the agility test, the Zigzag Test showed a low value. Moreover, the authors showed that according to the analysis of the variables 5 different agility tests and sprint, there was significant difference between them.

Another study that used as sample 52 members of both sexes of the course of Sports and Physical Activity, aimed to analyze the correlation between three agility tests (Illinois Agility Test, 5-0-5 Agility Test and Pro-Agility Shuttle Test). Contrary to the findings of the aforementioned studies, the results showed that all the tests have a positive correlation, do not showing statiscal differences into the different field tests [25]. This does not determine a complete divergence between the tests, but also does not justify a trend, because there was a significant sample difference between the studies. However, many studies have used the Shuttle Run Agility Test to evaluate futsal athletes of 13 years old, such as the studies of Polito [26], Kutlu [2] and Gatterer [27] that used the test as part of the methodological procedures.

In the first study, the Shuttle Run Agility Test was used to characterize the sample. The 13 years old children athletes showed the follow results by position game: Goalkeepers (12,4 ± 0,7); Full-backs (10,4 ± 1,0); wing backs (11,6 ± 0,9); Centre forwards (11,6 ± 0,4) and General results (11,5 ± 0,9). There were not found statistical difference into the positions Polito [26].

Kutlu [2] compared a New Test For Agility and Skill in Soccer with others test of agility. The results showed that were not found statiscal differences between the agility tests protocol (Illinois, Zig-Zag, 30m, Bosco, T-drill agility and Wingate peak power test) and the New Test for Agility and Skill, this way concluding that protocol test proposed by Kutlu 2012 can be acceptable and reliable.

The study of Gatterer [27] suggest identify the hypoxia by the Shuttle Run Sprint Training and if it can improves the repeated sprint ability and the Yo-Yo intermittent recovery test outcome in young elite soccer players. This way, the study conclude that in youth soccer players this type of hypoxia training should induce great progress in repeated sprint ability.

This study is a pioneer in the analysis of the interference of non-simulated climatic environments in the performance of physical and motor skills of children and adolescents soccer practicing of high performance.

After the statistical analysis, it was verified that there were no significant differences in the performance executed in both situations, despite the remarkable tendency of more time spent to perform the test in rainy conditions.

According to Brughelli [28], performance of agility can be improved as a result of the development of muscular strength and power, only in very short sprints, because the

accelerations and re-accelerations are characteristics of the rapid changes of direction and are considered power actions [22]. In this sense, Weineck [29] suggests that agility, during the fast and fast duration of the first few passes, represents a greater significance of the motor skill of a soccer player and is considered a fundamental physical quality for the ideal performance of the players. Together with that the ability to anticipate and ball time [4].

According to Mathisen [30] in a study of 132 subjects with 10 to 16 years old, sprint and agility performance improved in relation to chronological age. In this context, the superiority appeared not only of the age differences, but also maturational and according to the level of physical aptitude [22].

5. Conclusions

For this study, it was understood that no significant difference was found between the Shuttle Run Agility Test performed in different environmental conditions. For these results should be considered the type of soles of the boots and the literature said about this subject that this factor can influence in the players' performance. For this, future specific studies are necessary to understand the behavior of the athletes in different situations within the game environment.

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Yago de Moura - Subjects and Methods
Helton - Discussion
Henrique Nunes - Introduction
Simone Inácio - Conclusion
Luciane Moscaleski - Abstract

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REFERENCES

[1] Stølen T, Chamari K, Castagna C, Wisløf U. Physiology of soccer. Sports medicine 2005. 35: p. 501 - 536.

[2] Kutlu M, Yapici H, Yoncalik O, Çelik S. Comparison of a new test for agility and skill in soccer with other agility tests. Journal of human kinetics 2012. 33: p. 143-150.

[3] Girard O, A Mendez-Villanueva, D Bishop. Repeated-sprint ability—Part I. Sports medicine 2011. 41(8): p. 673-694.

[4] Sheppard JM, WB Young. Agility literature review: Classifications, training and testing. Journal of sports sciences 2006. 24(9): p. 919-932.

[5] Bloomfield J, R Polman, P O'Donoghue. Physical demands of different positions in FA Premier League soccer. Journal of Sports Science and Medicine. 2007. 6(1): p. 63-70.

[6] Hoff J, J Helgerud, Endurance and strength training for soccer players. Sports medicine 2004. 34(3): p. 165-180.

[7] Bangsbo J. Fitness training in soccer: a scientific approach 2004. Reedswain Inc.

[8] Jovanovic M, Sporis G, Omrcen D, Fiorentini F. Effects of speed, agility, quickness training method on power performance in elite soccer players. The Journal of Strength & Conditioning Research 2011. 25(5): p. 1285-1292.

[9] Rienzi E, Drust B, Reilly T, Carter JEL, Martin A. Investigation of anthropometric and work-rate profiles of elite South American international soccer players. Journal of Sports Medicine and Physical Fitness 2000. 40(2): p. 162.

[10] Davids K, A Lees, L Burwitz. Understanding and measuring coordination and control in kicking skills in soccer: Implications for talent identification and skill acquisition. Journal of sports sciences 2000. 18(9): p. 703-714.

[11] Jeffreys I. The Use of Small-Sided Games in the Metabolic Training of High School Soccer Players. Strength & Conditioning Journal 2004. 26(5): p. 77-78.

[12] Meckel Y, O Machnai, A Eliakim. Relationship among repeated sprint tests, aerobic fitness, and anaerobic fitness in elite adolescent soccer players. The Journal of Strength & Conditioning Research 2009. 23(1): p. 163-169.

[13] Ackland T, J Bloomfield, B Elliot. The assessment and modification model. Applied anatomy and biomechanics in sport 2009.

[14] Benvenuti C, Minganti C, Condello G, Capranica L, Tessitore A. Agility assessment in female futsal and soccer players. Medicina (Kaunas) 2010. 46(6): p. 415-420.

[15] Carnaval P. Medidas e avaliações em ciências do esporte. 6ª edição. Rio de Janeiro. Sprint 2004.

[16] Lyle MA, Valero-Cuevas FJ, Gregor RJ, Powers CM. Lower extremity dexterity is associated with agility in adolescent soccer athletes. Scandinavian journal of medicine & science in sports 2015. 25(1): p. 81-88.

[17] Meylan C, Cronin J, Oliver J, Hughes M. Reviews: Talent identification in soccer: The role of maturity status on physical, physiological and technical characteristics. International Journal of Sports Science and Coaching 2010. 5(4): p. 571-592.

[18] Pinder RA, I Renshaw and K Davids. The role of representative design in talent development: a comment on "Talent identification and promotion programmes of Olympic athletes". Journal of sports sciences 2013. 31(8): p. 803-806.

[19] Goga I, P Gongal. Severe soccer injuries in amateurs. British journal of sports medicine 2003. 37(6): p. 498-501.

[20] Tanner JM. Growth at adolescence; with a general consideration of the effects of hereditary and environmental factors upon growth and maturation from birth to maturity

1962. Oxford: Blackwell Scientific Publications.

[21] Harris GR, Stone MH, O'Bryant HS, Proulx CM, Johnson RL. Short-Term Performance Effects of High Power, High Force, or Combined Weight-Training Methods. The Journal of Strength & Conditioning Research 2000. 14(1): p. 14-20.

[22] Picanço LM, JJR Silva, FB Del Vecchio. Relação entre força e agilidade avaliadas em jogadores de futsal. RBFF-Revista Brasileira de Futsal e Futebol 2012. 4(12).

[23] Smeets K, *et al*. Torsional injuries of the lower limb: an analysis of the frictional torque between different types of football turf and the shoe outsole. British journal of sports medicine 2012. 46(15): p. 1078-1083.

[24] Mirkov D, Nedeljkovic A, Kukoli M, Ugarkovic D, Jaric S. Evaluation of the reliability of soccer-specific field tests. The Journal of Strength & Conditioning Research 2008. 22(4): p. 1046-1050.

[25] Mendes P, *et al*. Illinois agility test, o 5-0-5 agility test e o pro-agility shuttle test na avaliação da agilidade em alunos do ensino superior. E-balonmano.com: Revista de Ciencias del Deporte 2015. 11(3): p. 199-200.

[26] Polito LFT, Brandão MRF, Charro MA, Bocalini DS, Figueira Júnior AJ. Parâmetros de intensidade e sudorese de jogadores de futsal por posição de jogo. Revista Brasileira de Medicina do Esporte 2015. 21: p. 355-359.

[27] Gatterer H, *et al*. Shuttle-run sprint training in hypoxia for youth elite soccer players: a pilot study. J Sports Sci Med 2014. 13: p. 731-735.

[28] Brughelli M, Cronin J, Levin G, Chaouachi A. Understanding change of direction ability in sport. Sports medicine 2008. 38(12): p. 1045-1063.

[29] Weineck J. Salud, ejercicio y deporte. Vol. 1. Editorial Paidotribo 2000.

[30] Mathisen G, SA Pettersen. Anthropometric factors related to sprint and agility performance in young male soccer players. Open access journal of sports medicine 2015. 6: p. 337.