Agility Score of Junior Soccer Athletes in Jakarta

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Abstract

Introduction: *Agility score is important in setting the rehabilitation's goal of injured athlete. More agility requirement needs more rehabilitation effort. The aim of this study is to measure the agility score of junior soccer athletes in Jakarta and compare the agility score based on athlete's playing positions.*

Methods: *Agility score of 65 junior athletes measured using T-Agility test. Subjects categorized based on playing positions which are defender, midfielder and forward. Mean agility score of each group was then compared. Data analyzed using descriptive analysis and one-way annova.*

Results: *The mean agility score is 10.89 ± 0.47 seconds. The mean agility score in defender is 11.02 ± 0.51, midfielder 10.79 ± 0.41 and forward 10.73 ± 0.47. No significance statistical difference between the three groups (p=0,70).*

Conclusion: *Agility score of junior soccer athletes in Jakarta using the T-Agility test is 10.89 ± 0.47 seconds and may illustrate the risk of sport injury. The forward soccer player has higher agility score compared to the midfielder and defender.*

Keywords: *Soccer, Agility Score, Junior Athlete, Playing Position*

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Nilai Agilitas Pada Atlit Sepakbola Junior di Jakarta

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Abstrak

Pendahuluan: *Nilai ketangkasan merupakan komponen penting untuk menentukan target sebuah program rehabilitasi. Kebutuhan kemampuan ketangkasan yang lebih besar dapat mempengaruhi usaha rehabilitasi yang dibutuhkan. Penelitian ini bertujuan menilai agilitas atlit sepakbola junior di Jakarta dan membandingkanya berdasarkan posisi bermain atlit.*
Metode: *Nilai ketangkasan 65 atlit junior diukur menggunakan uji T-Agility. Subjek dikategorikan berdasarkan posisi bermain, yaitu pemain belakang, tengah dan depan. Rerata nilai agilitas tiap kelompok kemudian dibandingkan. Data penelitian dianalisis secara deskriptif dan menggunakan one-way annova.*
Hasil: *Nilai rerata agilitas penelitian ini didapatkan 10.89 ± 0.47 detik. Nilai rerata agilitas kelompok pemain belakang 11.02 ± 0.51, pemain tengah 10.79 ± 0.41 and pemain depan 10.73 ± 0.47. Tidak terdapat perbedaan bermakna antara ketiga kelompok. (p=0,70).*
Kesimpulan: *Nilai agilitas pada atlit sepakbola junior menggunakan uji T-Agility adalah 10.89 ± 0.47 detik dan mungkin dapat menggambarkan resiko terjadinya cedera olahraga. Pemain depan mempunyai nilai ketangkasan yang lebih tinggi dibandingkan pemain tengah dan pemain belakang.*

Keywords: *Sepak Bola, Nilai Agilitas, Atlit Junior, Posisi Bermain*

Introduction

Soccer is the most popular sport in the world and is estimated to have been played by more than 265 million people in more than 200 countries including Indonesia.[1] It is also a very dynamic sport which require athletes to move in multiple planes of motion and run with rapid changes in acceleration.[2] With the increase of soccer popularity, especially in young age, also increase the incidence of sport injury during soccer practice or competition. In the study by Faude, et al3 the incidence of injury in junior soccer athletes is 1-5 per 1000 hours of practice and 15-20 per 100 hours of competition with 60-90 % of injury is caused by trauma to lower extremities.[3,4]

Junior athletes are very important because they are the successor of the senior athletes in the national team and also professional athletes in soccer clubs in the future. Severe injury in junior athletes can affect athlete's growth and cause long term complications that alter physical performance and the level of participation in sport.[5]

Agility is the ability to maintain or control the body position in sudden change of direction or speed.[6] It is the integration of isolated movement that require balance, coordination, speed, reflex, power and endurance.[7] One benefit of agility training is to increase control of body position that produce by kinesthetic awareness and neuromuscular adaptation so the athlete is able to control the fast body movement to avoid or reduce injury or trauma.[8] Agility measurement and training are also included in the rehabilitation process of sport injury. Therefore, it is important to measure the agility level of junior soccer athletes. Agility score evaluation is done by measuring the amount of time needed for the athlete to perform standardized complex movements. The T-Agility test is simple, cheap, easy to understand by subjects and have been validated.[9]

A soccer team generally consist of 3 role type athletes which are defender, midfielder and forward. Each of them has different role and characteristics depending on the playing position and strategy. The aim of this study is to measure the agility score of junior soccer athletes in Jakarta using the T-agility test and also to compare the agility score based on the athlete's playing positions in soccer which is defender, midfielder and forward.

Methods

This cross-sectional study was conducted from February 2016 to March 2016. The subjects consisted of junior soccer athletes from soccer clubs and schools in Jakarta who were selected according to the inclusion criteria which are male, aged 12-16 years old, Indonesian nationality, currently active in local, regional or national competition and have the approval from the athlete's parents and coach or club manager. The exclusion criteria are playing as goalkeeper, injured or have signs of injury during physical examination which can influence the agility performance of the athlete.

Written informed consent was obtained from each subjects, parents and coaches before the enrollment in the study. The protocol of this study have been approved by the Ethical Committee of the Faculty of Medicine Universitas Indonesia / Cipto Mangunkusumo Hospital (No. 121/UN2.F1/ETIK/2016).

The measurement of the agility score was done with the T-Agility test, in which athlete must finish a letter T shaped running track with 36.8 meters total distance at their fastest pace. This test required athlete to run forward, sideways and backwards to finish the running track by returning to the starting position. Time was measured with stopwatch with accuracy of 0.1 seconds. Measurement was done twice with 2 minutes resting interval between measurements and the fastest time was taken as the final agility score data. Measurement was done before athlete's routine exercise in a standard soccer field. Before the measurements, athlete must wear their complete sport equipment and warm up for 15 minutes by stretching and running in accordance to their pre-exercise routine.

The whole agility score data was analyzed and also categorized into 3 groups according to the athlete's playing position which is forward, midfielder and defender. The agility score mean difference between groups will be analyzed using one-way Annova. Analysis of the data was performed by using SPSS version 20.0.

Results

There were 65 junior soccer athletes measured in this study. The mean age of subjects was 13.6 ± 1.2 years old, body height 160.1 ± 8.1 cm, body weight 50.8 ± 12.6 kg and body mass index 19.8 ± 3.1 kg/cm2. The agility score data was normally distributed with the mean of 10.89 ± 0.47 seconds. Data of mean agility score between playing positions groups are shown on table 1. No significance statistical difference between the three groups found in this study (p=0,70).

Table 1. Mean Agility Score Between Groups

	N	Mean Agility Score
Defender	25	11.02 ± 0.51
Midfielder	23	10.79 ± 0.41
Forward	17	10.73 ± 0.47

Discussion

The mean agility score in this study was lower than the study conducted by McFarland, et al[10] in junior soccer athletes in the USA and also by Sporis, et al[11] who study junior athletes in the Croatian league. This may be caused by anthropometric difference and also training methods of junior athletes in Indonesia compared to American and Croatian junior athletes. Body height is known to affect stride length. Study by Wong, et al[12] showed that junior athletes with higher body height have higher running speed at the distance of 10 and 30 meter. Sheppard, et al[6] stated that agility is influence by anthropometry, leg

muscle qualities, running speed, technique, perceptual and decision making. Barnes, et al[13] found that agility training is a re-enforcement process of motoric learning through neuromuscular conditioning and neural adaptation of muscle spindles, Golgi tendon organ and joint proprioseption. In soccer, the change of direction and speed is a respond to specific stimulus such as the movement of the ball, other players and field conditions. A well trained physical qualities to execute complex movements, good cognitive specific ability to process incoming stimulus, fast and accurate decision making is needed to have optimum agility performance.[6]

Study by Kainoa, et al[9] categorized participation level in soccer sport based on agility score using T-Agility test on male athletes into 3 level which are low sport, recreational sport and elite athletes. Based on that stratification, the result of this study is placed between low sport and recreational sport. This low to medium agility score showed risk of sports injury incidence. In 90 minutes of soccer game, a professional athlete averagely do 600-1200 sudden change in running direction and speed.[10] The extreme change in direction and speed with high intensity makes the athletes prone to sport injury.

The result analysis on player positions shows that the forward player has the best agility score, followed by the midfielder and the defender without significance difference between groups. This result is similar with the study by Kaplan, et al[14] in athletes in Turkey and Sporis, et al[15] in Croatia using different agility testing method. This is relevant to the role of forward soccer player who have to maneuver with the ball, outwit and outrun the opponent players to score goals. The forward soccer player also require the ability to accelerate and decelerate with high intensity that will generate higher shearing force to the lower extremities and if not supported by optimum agility performance will result in a higher risk of injury.[16]

No significance difference between player position group in this study could be caused by the similarity of each subject's ability which was measured by T-Agility test. According to Kainoa et al[9], one major difference of T-Agility test compared with other methods of agility testing is the component of backward running. The defender player in soccer is trained to do more backward running which required 20-40% higher energy expenditure compared to forward running.[16] This may also increase the agility score of defender soccer athletes in this study.

Conclusion

In conclusion, the agility score using the T-Agility test of junior soccer athletes in Jakarta is 10.89 ± 0.47 seconds and may illustrate the risk of sport injury. The forward soccer player has higher agility score compared to the midfielder and defender.

Acknowledgment

Conflict of Interest

The authors affirm no conflict of interest in this study.

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