Comparison of agility and countermovement jump performance among middle school, high school, and college aged female soccer players

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Abstract

Introduction

Only a small number of published reports describe agility and countermovement (CMJ) performance characteristics for female soccer players. The purpose of our study was to compare CMJ height and performance on two agility tests among different age groups of female soccer players. We hypothesized that older players would demonstrate greater CMJ height and faster agility times compared to younger players.

Data from 415 female soccer players aged 12-21 years who participated in several previously conducted studies from our group were gathered retrospectively and evaluated in a cross-sectional design. Participants were divided into the following groups: middle school (12-13 yr, n=79); high school (14-17 yr, n=223); and college (18-21 yr, n=113). Agility was assessed using modified versions of the Illinois and countermovement tests included in the Illinois test battery (Pro-System). The Illinois test was modified by removing the following: 1.5 meter linear sprints; 2.4 m change of direction sprint; and 3.6 m change of direction sprint. Participants performed each test in duplicate; the second test was performed only if the first test was not performed to completion. The Illinois test was performed using an electronic timing mat (Pro-System). Participants stood with their hands on the hips, performed a crouching action followed immediately by a jump for maximal height. Flight time was converted to jump height with the equation: 1/8 (g•t2). Maximal height was recorded using a dial caliper. The Illinois test was modified using a one-way ANOVA with LSD post-hoc analysis.

Results

Pro-agility times were greater in middle school soccer players compared to high school and college athletes (10.84±0.71 vs. 10.36±0.50 vs. 10.20±0.36s, p≤0.026). Differences between each age group were observed for Pro-agility test times (R2=0.791). Illinois agility times were different between each of the three age groups (10.84±0.71 vs. 10.36±0.50 vs. 10.20±0.36s, p≤0.026). Differences between age groups were significant for Illinois test times (R2=0.142). Scatterplots and correlations for high school players are shown in the following figure.

Discussion

Countermovement Jump

Illinois agility times were different between each of the three age groups (10.84±0.71 vs. 10.36±0.50 vs. 10.20±0.36s, p≤0.026). Pro-agility times were greater in middle school compared to high school and college players, however no difference was observed between the two older age groups.

Purpose

No single study has presented linear sprint times for a group of female soccer players spanning a wide age range-1, 2, 3. Thus it is unclear if we can distinguish between different age groups based on linear sprint times of

Methods

Participants

Data from 415 female soccer players aged 12-21 years who participated in several previously conducted studies from our group were gathered retrospectively and evaluated in a cross-sectional design. Participants were divided based on age into the following groups: middle school (12-13 yr, n=79); high school (14-17 yr, n=223); and college (18-21 yr, n=113).

Countermovement Jump

Countermovement jump height was determined using an electronic timing mat (Just Jump System, Pro-System Inc.). Participants began with both feet on the start line and a standing position, performed a crouching action followed immediately by a jump for maximal height. Hands remained on the hips for the entire movement. Participants were instructed and carefully observed to maintain straight legs while airborne. If the knees were bent or raised the trial was discarded and the athlete was given another attempt following a rest period.

Illinois Agility Test

The Illinois test timing gates were placed at the start and finish lines at a height of 0.30 m. The original version of the Illinois may be heavily influenced by the ability to sprint quickly over short distances instead of measuring the ability to change directions. In addition, the duration of the original test is approximately 18-18 seconds, thus performance may have metabolic limitations. Therefore, two of the four 1 meter linear sprints were omitted from the original protocol. Thus to complete the modified Illinois test athletes sprinted 9.1 meters from the starting line to the middle cone (10.84±0.71 vs. 10.36±0.50 vs. 10.20±0.36s, p≤0.026).

Pro-Agility Test

The pro-agility test was modified by using a flying start to incorporate the use of the timing gates, which were placed at the center line of cones, made one final change of direction at the third corner cone and finished with another 0.3 meter sprint across the finish line. The pro-agility test was modified by using a flying start to incorporate the use of the timing gates, which were placed at the center line. Athletes sprinted 9.1 m from the start line to the second corner cone, changed direction, sprinted back to the start line, and made a final change of direction to sprint through the finish line at the center cone at 0.8 m. CMJ height was determined using an electronic timing mat (Pro-System). Participants stood with their hands on the hips, performed a crouching action followed immediately by a jump for maximal height. Flight time was converted to jump height with the equation: 1/8 (g•t2). Selection was based on height and weight and ability to perform the modified Illinois test.

Conclusion

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References


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