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ORIGINAL ARTICLE

Reliability and discriminative power of soccer-specific field tests and skill index in young soccer players

Étude de la reproductibilité et de la sensibilité des tests spécifiques au football et l'indice d'habileté technique chez des jeunes footballeurs

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KEYWORDS
Young soccer player;
Dribbling;
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Skill index

Summary
Purpose. — To examine the reliability and construct validity of straight sprint, agility, slalom dribble tests and skill index in young soccer players.
Methods. — Ninety-two male soccer players (age: 14.2 ± 0.6 years; body mass: 54.0 ± 8.9 kg; height: 166.3 ± 9.4 cm; body mass index: 19.4 ± 1.7 kg/m^2) participated in this study. They were assigned to either two groups G1 or G2 according to their experience and competition levels. After familiarization, two trial sessions of three tests of sprint were administered: straight sprint (SS), agility test (AT) and slalom dribble test (SDT). Skill index (SI) was calculated as the ratio between AT and SDT.
Results. — Reliability of SS, AT, SDT performances and SI were very good, with intraclass correlation coefficient greater than 0.80, CV less than 5%, low bias and small ratio limits of agreement. Areas under the receiver operating characteristics curves (ROC) were 0.555 (95%

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CI: 0.448—0.659), 0.851 (95% CI: 0.762—0.917), 0.913 (95% CI: 0.836—0.962) and 0.629 (95% CI: 0.522—0.727) for SS, AT, SDT and SI, respectively.
Conclusions. — Results demonstrated that the three tests and SI were reliable but only AT, SDT and SI could discriminate between the levels of players' ability. They could be used for soccer-specific skills assessments and selection process of young soccer players.

MOTS CLÉS
Jeune footballeur ;
Dribble ;
Sprint ;
Indice d'habileté technique

Résumé
Objectifs. — Étudier la reproductibilité et la sensibilité des tests de sprint, d'agilité, de dribble et de l'indice technique des jeunes footballeurs.
Méthodes. — Quatre-vingt-douze footballeurs (âge : 14,2 ± 0,6 ans ; masse corporelle : 54,0 ± 8,9 kg ; taille : 166,3 ± 9,4 cm ; indice de masse corporelle : 19,4 ± 1,7 kg/m^2) ont participé à cette étude. Ils ont été répartis en deux groupes G1 et G2 en fonction de leurs niveaux d'expérience et de compétition. Après familiarisation, chaque joueur a réalisé, à deux reprises, les tests suivants : sprint en ligne (SL), agilité (AT) et dribble en slalom (SDT). Skill index (SI) est le rapport entre AT et SDT.
Résultats. — La reproductibilité des performances aux différents tests a été très bonne avec un coefficient de corrélation intraclasse supérieur à 0,80, CV inférieur à 5 %, un faible biais et des limites de concordance très réduites. Les aires sous les courbes *receiver operating characteristic* (ROC) ont été de 0,555 (95 % IC : de 0,448—0,659), 0,851 (95 % IC : 0,762—0,917), 0,913 (95 % IC : 0,836—0,962) et 0,629 (95 % IC : 0,522—0,727) pour respectivement, SL, AT, SDT et SI.
Conclusion. — Les résultats ont montré que les trois tests et l'indice technique sont reproductibles mais seulement AT, SDT et SI pourraient différencier entre les niveaux de pratique des joueurs. Ils pourraient être utilisés dans l'évaluation des qualités techniques des joueurs ainsi que dans le processus de la sélection et l'identification des jeunes footballeurs.

1. Introduction

Soccer game is considered as an intermittent activity which requires many different actions such as jogging, sprinting, jumping and changing direction [5,21]. Additionally to physical capacity, soccer players also need high level of technical skills such as passing, shooting, tackling, dribbling without loss of speed or velocity [11,23]. It has been demonstrated that during a soccer match, the player completes between 50 and 110 technical skill involvements [8,11]. Among these skills, dribbling and short passes are the most frequently skills observed during a match [8]. In the last decade, professional football clubs are increasingly interested in factors required for high performance. In fact, it has been reported that speed, agility and dribbling a ball were the best predictors of talented players in soccer and need to be developed from a young age [25]. In this context, most professional soccer academies are continuously looking for the effective methods to optimize the early detection and to develop both physical and soccer-specific skills of their young players [24]. Nevertheless, most studies have investigated technical, physical and physiological characteristics of adult soccer players, but little is known about agility and soccer-specific skills as dribbling, in young soccer players. A various multi-factorial battery of tests for supporting the talent identification process [25,26,33] and addressing physiological and specific-sport skill characteristics of young soccer players [17,31,32] were previously proposed in the literature. All these testing procedures included anthropometric measurements, strength, power, agility and specific-sport skills. The protocols used in order to perform these tests were variable and controversy such as the distance covered or the number of direction changes [1,12,13,20,28]. Indeed, the dribbling distance chosen in most of these tests is greater than 20 m while distance covered per ball possession by players was 4.0 ± 1.9 m during match [11]. Accordingly, soccer players need to be exceptional movers with or without a ball in a reduced area [8]. Furthermore, reliability and validity of most of the tests used in these procedures, especially those assessing speed, agility and dribbling are not deeply investigated and reported. Indeed, coaches and trainers would like to possess and use reliable and valid tests that reflect real activities and exigencies of soccer. In fact, the tests used in young soccer players should not only be reliable, but should also be sensitive to distinguish between the levels of players' ability since the classification of young soccer players as possessing high or low levels ability by coaches is still based on subjective evaluations [17]. Recently, Mirkov et al. [20] have proposed the skill index, calculated as the ratio of the performance obtained from agility test without and with a ball, to identify the best skilled players. This index seems to be interesting and could discriminate and classify the best skilled player.

The aims of the present study were therefore, firstly to examine the reliability of straight sprint, agility, slalom dribble tests, and skill index, and secondly, to determine the appropriate test which could discriminate between young soccer players' level.

2. Methods

2.1. Participants

Ninety-two youth male soccer players (age: 14.2 ± 0.6 years; body mass: 54.0 ± 8.9 kg; height: 166.3 ± 9.4 cm; body mass