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ORIGINAL ARTICLE

Heart rate responses and distance coverage during 1 vs. 1 duel in soccer: Effects of neutral player and different task conditions

Fréquence cardiaque et distance couverte lors du duel 1 vs 1 en football : effets du joueur neutre et des différentes consignes de jeu

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KEYWORDS

Football;
Extreme small-sided
games;
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Summary

Objectives. – The aim of this study was to determine the effects of using neutral players and different task conditions in 1 vs. 1 small-sided games (SSG) on amateur soccer players' heart rate responses and distance coverage.

Equipment and methods. – Ten amateurs' soccer players (26.4 ± 5.3 years old, 8.0 ± 3.2 years of practice) from a Portuguese regional league participated in this within-subject repeated measures study. The heart rate responses, distance coverage, speed and acceleration were recorded by using heart rate monitors with GPS throughout all SSG.

Results. – Two-way MANOVA results revealed that neutral players ($F=43.6$; $P=0.001$; $\eta_p^2=0.017$; $Power=1.00$; small effect size) and task conditions ($F=84.7$; $P=0.001$; $\eta_p^2=0.038$; $Power=1.00$; small effect size) had significant main effects and small practical effects on heart

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MOTS CLÉS

Football ;
Petits côtés des jeux
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performance

rate responses and distance coverage. It was concluded that, in very small-sided game, the use of neutral players increased the heart rate responses and distance coverage.

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Résumé

Objectifs. – Le but de cette étude était de déterminer les effets de l'utilisation des joueurs neutres et des conditions de travail dans 1 vs 1 petits jeux face (SSG) sur les réponses de la fréquence cardiaque joueurs de football amateurs et la distance parcourue.

Matériel et méthodes. – Dix joueurs de football (anciens $26,4 \pm 5,3$ ans, $8,0 \pm 3,2$ années de pratique) d'une ligue régionale portugais ont participé à cette étude. L'évolution de la fréquence cardiaque, la distance parcourue, la vitesse et l'accélération ont été enregistrées dans toute la phase de jeu.

Résultats. – Les résultats de la MANOVA bidirectionnelles ont révélé que les joueurs neutres ($F=43,6$; $p=0,001$; $\eta_p^2 = 0,017$; $Power = 1,00$; *small effect size*) et les conditions de travail ($F=84,7$; $p=0,001$; $\eta_p^2 = 0,038$; $Power = 1,00$; *small effect size*) ont eu des effets principaux significatifs et des petits effets pratiques sur les réponses de la fréquence cardiaque et de la distance couverte. Il a été conclu que, dans les très petites faces jeu, l'utilisation de joueurs neutres augmente l'évolution de la fréquence cardiaque et la distance de couverture.

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1. Introduction

The use of small-sided games (SSG) in soccer training has been well studied in the last decade [1]. Their multiple effects on players' performance are believed to be useful in optimizing training specific to soccer [2]. Nevertheless, the use of SSG can be very different from coach to coach. In fact, a great number of task constraints can be used to change the games and induce different effects on players' performance [3]. Task constraints such as field dimension, game format, specific rules and targets, strategic/tactical missions, and coaches' encouragement have been studied and their effects on players' response have been reported [4–6].

In general, higher heart rate responses and time-motion characteristics of soccer players were observed in larger field dimension [4,7]. Likewise, some studies found that larger field dimension increases the number of individual technical actions [8]. About the formats of the games, it is consensual that smaller formats (i.e., less number of players) increase the heart rate responses, blood lactate concentration [9,10], and individual technical actions [7,11]. In addition, it has been found that SSG without goals and with coaches' encouragement increased the intensity of SSG [12,13]. However, these aforementioned studies only examined the different task conditions in common formats, which means that analysis on very small-sided game such as 1 vs. 1 duel is lacking. Moreover, the use of task conditions that improves the players' perception for a given tactical content is not studied with regularity. Thus, SSG are commonly investigated but small-sided and conditioned games (SSCG) that have a stronger tactical awareness seem to be not investigated. In that sense, the investigations do not follow the recent reality of training tasks based on tactical thinking [3].

Besides the aforementioned factors, one of the main manipulations used by coaches is the neutral player that

provides to one team a temporary numerical advantage. It is usually use to develop a particular tactical content. For example, neutral player acts in the attacking process, thus helping the team with possession of the ball. Nevertheless, the reverse setting can be used to give support to defensive team. Among all previous studies in SSG, only two studies investigated this factor [14,15]. Both studies examined the performance variance between the games with and without neutral players. It was found that the use of attacking neutral players increased the heart rate responses in 2 vs. 2 format and the defensive neutral players increased the heart rate responses in 3 vs. 3 format. Despite the possibility to generalize those effects for 1 vs. 1, the results from these two studies cannot be assumed by the specific conditions of extreme format, moreover distance coverage was not measured. Moreover, the effects of neutral players in extreme SSCG are not too investigated. Theoretically, the use of neutral players in smaller formats may reflect greater effects than in bigger formats. Such hypothesis it is associated with the small number of options (team-members) in smaller formats, increasing the usefulness of playing with neutral members.

Another factor that is usually use by coaches in SSG is to change the way the goal is defined. Previous studies only compared the effects of using goals with goalkeepers against goals without goalkeepers, and it was found that SSG without goalkeepers increased the intensity of exercise [16–18]. Nevertheless, the effects of using reduced goal or other types of targets such as the endline have not been fully studied. Such conditions lead with physiological changes in players. Actually, the use of targets or goals (even in small-goals) increases the defensive organization around the goal, thus reducing the effort and counter-attack movements [13]. In the occasions of endline, the target is too big to have a great organization in the opponents, thus increasing the counter-attack and the effort. Such changes are even

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