

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://www.elsevier.com/locate/medici>

Original Research Article

Functional and biochemical adaptations of elite level futsal players from Brazil along a training season

Rômulo Pillon Barcelos^{a,1}, Guilherme Lopes Tocchetto^{b,1}, Frederico Diniz Lima^b,
 Sílvia Terra Stefanello^c, Harrison Fabricio Muzzy Rodrigues^d, Manuela Borges Sangoi^e,
 Rafael Noal Moresco^e, Luiz Fernando Freire Royes^b, Félix Alexandre Antunes Soares^c,
 Guilherme Bresciani^{f,*}

^aInstituto de Ciências Biológicas, Programa de Pós-graduação em Bioexperimentação, Universidade de Passo Fundo, Passo Fundo, RS, Brazil

^bLaboratório de Bioquímica do Exercício, Centro de Educação Física e Desportos, Programa de Pós-Graduação em Educação Física, Universidade Federal de Santa Maria (UFSM), Santa Maria, Rio Grande do Sul, Brazil

^cDepartamento de Bioquímica e Biologia Molecular, Centro de Ciências Naturais e Exatas (CCNE), Universidade Federal de Santa Maria (UFSM), Santa Maria, RS, Brazil

^dAssociação Carlos Barbosa de Futsal (ACBF), Carlos Barbosa, Rio Grande do Sul, Brazil

^eLaboratório de Pesquisa em Bioquímica Clínica, Departamento de Análises Clínicas e Toxicológicas, Centro de Ciências da Saúde, Universidade Federal de Santa Maria (UFSM), Santa Maria, Rio Grande do Sul, Brazil

^fGrupo de Investigación en Rendimiento Físico y Salud (IRyS), Escuela de Educación Física, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile

ARTICLE INFO

Article history:

Received 2 November 2016

Received in revised form

8 August 2017

Accepted 14 August 2017

Available online 26 August 2017

Keywords:

Elite futsal

Intense training

Muscle damage

Oxidative stress

Inflammation

ABSTRACT

Background and objective: Although hard training is mandatory in elite level futsal training, few studies have proposed a biochemical follow up in futsal players during a whole season. Therefore, the aim of this study was to compare functional and biochemical markers in Brazilian elite level futsal players throughout a competition season.

Materials and methods: Eight players aged 25.5 ± 5.4 years were evaluated at three time points: preseason (T1), immediately before the FIFA®-Intercontinental-Futsal-Cup (T2), and at the end of the season (T3), with a tapering period of 1 week before T2. Functional parameters (weight, height, body fat, VO_2 max, heart rate, and distance ran) and blood sampling for cell count and lipid profile (cholesterol, HDL-C, LDL-C, triglycerides) were assessed at each time point. After, a Yo-Yo R2 test was carried out in each time point (T1, T2 and T3) and blood samples to assess skeletal muscle damage (creatinase kinase [CK], lactate dehydrogenase [LDH]), inflammation (C-reactive protein [CRP]) and oxidative stress markers (ischemia modified albumin [IMA], and advanced oxidation protein products [AOPP]) were obtained before and after the tests.

Results: Although functional parameters did not change throughout the season, greater total number of erythrocytes ($P \leq 0.05$), and hemoglobin ($P \leq 0.05$) were found at T2 compared to

* Corresponding author at: Grupo de Investigación en Rendimiento Físico y Salud (IRyS), Escuela de Educación Física, Pontificia Universidad Católica de Valparaíso, Av. El Bosque 1290, Viña del Mar, Chile.

E-mail address: guilhermehresciani@gmail.com (G. Bresciani).

¹ These two authors contributed equally to the manuscript.

<http://dx.doi.org/10.1016/j.medici.2017.08.001>

1010-660X/© 2017 The Lithuanian University of Health Sciences. Production and hosting by Elsevier Sp. z o.o. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

T1. Similarly, lower LDH ($P \leq 0.05$) and CK ($P \leq 0.05$) levels were found at T2 compared to T1. CPR levels were also decreased at T2 in comparison to T1 both before and after Yo-Yo R2 test ($P \leq 0.05$), while IMA and AOPP levels showed only a season effect ($P \leq 0.05$).

Conclusions: The tapering strategy was successful considering players presented lower levels of muscle damage, inflammation and oxidative stress makers before T2, which preceded the main championship of the year. These results are of great relevance, considering the team won the FIFA®-Intercontinental-Futsal-Cup, which happened at T2. Thus, it seems that routine-based biochemical markers may be useful as training control means in this population.

© 2017 The Lithuanian University of Health Sciences. Production and hosting by Elsevier Sp. z o.o. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Intensive training is a common routine for elite athletes in order to improve performance [1]. However, to optimize performance both intensive training and proper recovery are needed [2,3]. Usually, recovery takes place within 24 h following a single bout of exercise, while elite level athletes may train two, three times per day, followed by a relative short recovery period [4]. This could cause an imbalance between training, competition and recovery, which greatly impacts performance outcomes [5]. In this sense, it is well accepted that training monitoring is essential to optimize performance and reduce muscle injury risks [6], especially among high-performance futsal players [7].

Intense exercise may induce skeletal muscle damage, which is related to cytosolic enzymes appearance in the bloodstream, such as creatine kinase (CK) and lactate dehydrogenase (LDH) [8]. These biomarkers are associated with micro injuries and skeletal muscle inflammation, causing a delayed increase on inflammatory markers in the bloodstream, such as the C-reactive protein (CRP) [9], which is reported in different sports modalities, including futsal [10–12]. On the same line, new and specific oxidative stress and inflammation markers have been also studied in sports scenarios, such as the serum ischemia-modified albumin (IMA), a marker of inflammation-related myocardial ischemia and necrosis [13–15], and advanced oxidation protein products (AOPP), a potent systemic marker of oxidative stress [16–18].

Futsal is an intermittent, high-intensity sport with different levels of effort in which players may reach up to 85–90% of the maximal heart rate (HR_{max}) and 75% of maximal oxygen uptake (VO₂max) [19,20] during 70–85% of the match [19,21,22]. In this sense, players may undergo more than 25% of a match on extremely high intensity efforts, which is a common routine throughout a competitive season [19]. Additionally, players are usually submitted to 2–3 matches per week during competition, which induces great physical stress, increasing injury risks and performance lost due to muscle damage, fatigue, stress and inflammation [19]. Therefore, tapering strategies, known as a planned reduction in training loads before important competitions, have been vastly used in team sports [23]. The reduction of training loads can be achieved by several means, such as reduced training frequency, volume, and/or intensity [24], which has been proven to positively

impact on performance and physiological markers of different sportsmen [23,24].

Over the last decades, scientific interest in futsal has considerably grown [19,25]. Although few reports have pointed out a futsal match-induced change on biochemical markers [25], the current state of art does not provide practical methods to control stress conditions and recovery during a futsal season. This is still a significant limitation on the field, considering that high intensity efforts and recovery time during futsal clearly indicates that players are prone to muscle damage and inflammation increases [22,26,27].

In this sense, studies aiming to establish new biochemical markers for training control in elite level futsal players are necessary for technical support. This could provide a reliable feedback for training preparation to coaches and exercise performance professionals. Therefore, this study aimed to compare functional and biochemical markers related to skeletal muscle damage, inflammation and oxidative stress on elite level Brazilian futsal players during a whole season, including preseason and competition periods.

2. Materials and methods

2.1. Subjects

At first, seventeen futsal players (full time pay-job) were enrolled in the study. However, only eight outfield elite male players (25.5 ± 5.4 -years-old) with over 6.8 ± 5.8 years of professional futsal experience met the inclusion criteria, and thus were included in the study. Recruited participants had to match (1) no injuries during the study, and (2) no anti-inflammatory medications or antioxidant supplements intake throughout the season. The participants were informed about the experimental procedures and possible discomforts associated with the study before signing a written informed consent. The study was approved by the Ethics Committee of the Universidade Federal de Santa Maria and carried out according to the Declaration of Helsinki and Ethical Standards in Sport and Exercise Science Research.

2.2. Experimental design

Experimental procedures were carried out on three time points along the season: at the end of the preseason (T1), two weeks

Download English Version:

<https://daneshyari.com/en/article/8585572>

Download Persian Version:

<https://daneshyari.com/article/8585572>

[Daneshyari.com](https://daneshyari.com)