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ORIGINAL ARTICLE

Change in marker of hydration correspond to decrement in lower body power following basketball match

Le changement de marqueur d'hydratation correspond au décrément dans la puissance du corps inférieur suivant le match de basket-ball

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KEYWORDS
Hydration;
Muscle damage;
Plyometric jump;
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Summary
Background. — Muscle damage and dehydration are common during basketball matches, but their relationship with performance in this sport is unclear. The aim of this study was to correlate changes in muscle damage (creatine kinase), hydration status (Na+; K+; body mass), and lower body power (countermovement jump) occurring in young athletes during a basketball competition.
Methods. — Fourteen basketball-players (age, 17.1 ± 3.4 years) simulates a 40-min match, with pre-post measurement conducted for creatine kinase, Na+, K+, body mass,

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and countermovement jump. Basketball-players were divided according to the magnitude of jump performance decrease after the match into: low decrease and high decrease.
Results. — creatine kinase and [Na+] increased (38.1% and 1.4%, respectively; $P < 0.0001$), while body mass and countermovement jump decreased (1.3% and 10.8%, respectively; $P < 0.0002$), without changes in [K+] after the match. Differences were found between low and high decrease groups in body mass loss ($P = 0.03$) and [Na+] changes ($P = 0.02$). No differences were found between groups in creatine kinase and [K+]. Countermovement jump reduction was associated to body mass loss ($r = 0.63$, $P = 0.01$) and [Na+] changes ($r = -0.63$, $P = 0.02$), not with creatine kinase or [K+] changes.
Conclusion. — These results reaffirm the notion that basketball matches induce muscle damage and dehydration. As a novelty, these results suggest that dehydration have a important role on reduced explosive performance during basketball competition and should be a key point in recovery strategies.

MOTS CLÉS
Hydratation ;
Dégâts musculaires ;
Saut pliométrique ;
Sport d'équipe

Résumé
Contexte. — Les dégâts musculaires et la déshydratation sont fréquents pendant les matchs de basket, mais leur relation avec la performance dans ce sport n'est pas claire. L'objectif de cette étude était de corréler les changements dans les dégâts musculaires (créatine kinase), l'état d'hydratation (Na+ K+ la masse corporelle) et la puissance inférieure du corps (saut de contre-mouvement) chez les jeunes athlètes lors d'une compétition de basket-ball.
Méthodes. — Quatorze joueurs de basket-ball (âge, 17,1 ± 3,4 ans) simulent un match de 40 minutes, avec une mesure pré-post menée pour la créatine kinase, la Na+ la K+ la masse corporelle et le saut de contre-mouvement. Les joueurs de basket-ball ont été divisés en fonction de l'ampleur de la diminution de la performance du saut après le match : diminution faible et forte diminution.
Résultats. — La créatine kinase et [Na+] ont augmenté (38,1 % et 1,4 %, respectivement, $p < 0{,}0001$), tandis que la masse corporelle et le saut de contre-mouvement ont diminué (1,3 % et 10,8 %, respectivement, $p < 0{,}0002$), sans modification de [K+] Après le match. Des différences ont été observées entre les groupes de diminution faible et élevée dans la perte de masse corporelle ($p = 0{,}03$) et [Na +] ($p = 0{,}02$). Aucune différence n'a été trouvée entre les groupes dans la créatine kinase et [K +]. La réduction du saut du contre-mouvement a été associée à la perte de masse corporelle ($r = 0{,}63$, $p = 0{,}01$) et aux variations [Na+] ($r = -0{,}63$, $p = 0{,}02$), et non aux modifications de la créatine kinase ou [K+].
Conclusion. — Ces résultats réaffirment l'idée que les matchs de basket-ball induisent des dégâts musculaires et une déshydratation. En tant que nouveauté, ces résultats suggèrent que la déshydratation joue un rôle important dans la réduction des performances explosives lors de la compétition de basket-ball et devrait être un élément clé dans les stratégies de récupération.

1. Introduction

Basketball is a popular and physically demanding sport [1]. Competitive leagues, such as Women's NBA, similar to Men's NBA, have increased the number of matches per season, and up to three-four matches are held each week during playoffs [2]. In addition, most of the basketball match time is conducted at high intensity (> 80% of maximal heart rate) [3], increasing risk of fatigue. Therefore is critical identify variables that may reduce performance [4] to plan recovery strategies during and between matches [5].

Basketball performance is multifactorial, however the most important physical skill in this sport is lower body power, demonstrated on the player's jumping ability [6]. One of the tools used to measure the lower body power is countermovement jump (CMJ) and it has been reported that in this test professionals players reach a height of 59.1 cm [7], whilst youth players achieve 30.8 cm [3,6]. This skill is reduced after basketball drills designed to simulate the competition [8] and could be due to the muscular damage induced by the eccentric phases of the movements made in the sport. In this sense, Moreira et al. (2014) [9] showed that basketball competition increases creatine kinase (CK), a common marker used to assess muscle damage [10], that has been correlated in a good way with sports performance in recovery periods and during competition [11,12]. Although skeletal muscle status is important for athletic performance, other factors such as hydration status may play a fundamental role in sport. Baker et al. (2007) showed that a progressive dehydration (4% of body mass loss) and electrolytes changes induces a decrease in basketball skills performance such as jumping ability [8]. Identifying performance-related factors in sports with high physical demand such as basketball is