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ORIGINAL ARTICLE

High intensity interval training negatively affects mood state in professional athletes

L'entraînement par intervalles de haute intensité affecte négativement l'état d'humeur chez les athlètes professionnels

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KEYWORDS

Intense exercise;
Intermittent training;
Internal intensity;
Players;
Negative mood

Summary

Objectives. – This study aimed to identify the effects of high-intensity interval training (HIIT) on psychological responses and to verify the relationship between Ratings of Perceived Exertion (RPE) and the Profile of Mood State (POMS) scores.

Equipment and methods. – Twenty male soccer players took part in the study (mean \pm SD: age = 23.85 \pm 0.9 years). Training session: 28-min (4 \times 4 minutes work interspersed with 3-min of passive recovery). Effort: HIIT: intermittent 10-s runs at 120% maximal aerobic speed interspersed with 10-s of passive recovery. Psychological responses were collected before and after HIIT-session using POMS scores (Tension, Anger, Confusion, Depression, Fatigue, and Vigour). RPE was collected after HIIT-session.

Results. – The HIIT resulted in: an increased anxiety, fatigue, total mood disturbance (TMD) ($P < 0.05$, $ES = 0.41$; $P < 0.001$, $ES = 0.37$; $P < 0.001$, $ES = 1.48$, respectively), a decreased vigor ($P < 0.001$, $ES = 0.84$). No significant correlation was found between POMS scores and RPE ($P > 0.05$). HIIT negatively affected POMS scores. Results support the interest of this tool as

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MOTS CLÉS

Exercice intense ;
Entraînement
intermittent ;
Intensité interne ;
Joueurs ;
Humeur négative

one for monitoring mental fatigue and emotional change during training in professional soccer players. Mood state does not seem to be affected by the perceived internal intensity. Additional HIIT to the soccer training sessions promoted different mood states that coaches need to be aware in a way to optimize physical fitness and recovery.

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Résumé

Objectifs. – Cette étude visait à identifier les effets de l’entraînement par intervalle à haute intensité (HIIT) sur les réponses psychologiques et de vérifier la relation entre les scores de la perception de l’effort (RPE) et les scores du profil de l’état d’humeur (POMS).

Matériel et méthodes. – Vingt footballeurs ont participé à l’étude (moyenne \pm ET : âge = 23,85 \pm 0,9 ans). Séance d’entraînement : 28 minutes : (4 \times 4 minutes de travail entrecoupées de 3 min de récupération passive). Effort : HIIT : 10-s de course intermittente à 120 % de la vitesse aérobie maximale entrecoupée de 10-s de récupération passive. Les réponses psychologiques ont été recueillies avant et après la séance de HIIT en utilisant les scores de POMS (tension, colère, confusion, dépression, fatigue et vigueur) tandis que RPE a été collecté après l’épreuve.

Résultats. – HIIT a entraîné une augmentation des scores de l’anxiété, de la fatigue et de la perturbation totale de l’humeur ($p < 0,05$, $ES = 0,41$; $p < 0,001$, $ES = 0,37$; $p < 0,001$, $ES = 1,48$, respectivement) et une diminution de la vigueur ($p < 0,001$, $ES = 0,84$). Aucune corrélation significative n’a été trouvée entre les scores de POMS et RPE ($p > 0,05$). HIIT a affecté négativement les scores de POMS. Les résultats confirment l’intérêt de cet outil pour surveiller la fatigue mentale et les changements émotionnels pendant l’entraînement chez les footballeurs professionnels. L’état d’humeur ne semble pas être affecté par l’intensité interne perçue. L’adjonction d’un entraînement par intervalles à haute intensité aux séances d’entraînement de football provoque des modifications négatives de la tonalité de l’humeur que les entraîneurs devraient prendre en considération pour optimiser la condition physique et la récupération.

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1. Introduction

It is well known that soccer competition stresses the aerobic metabolism while demanding high intensity activity. To improve specifically aerobic fitness in soccer, several training methods have been used in training regimen including high-intensity interval training (HIIT) [1]. HIIT is an exercise modality that alternates between short bouts of very high intensity effort and recovery periods [1,2]. Indeed, HIIT has the potential to improve the soccer players’ aerobic fitness [3]. Several studies indicated that HIIT have been stated in players with improved cardio-respiratory fitness of players. Besides, aerobic power and delayed fatigue compared to continuous running methods [3–6]. In fact, Different HIIT structures (30s–30s, 15s–15s, 10s–10s, 10s–20s, 5s–25s) were used as a significant way for achieving greater improvements in physiological responses since they allow individuals to realize activities at high intensities for definite durations [7].

It-well-known that in comparison to physical conditioning and physiological response, exercise training have been positively related to affective appearance in soccer players [8]. In this regard, a recent study reported that HIIT causes discomfort and annoyance of players and bad intervention in training exercise [9]. It has been found that HIIT offer negative feeling that reduce player enjoyment,

such as the opportunity to repeatedly race with the same action effected and routine of training [9,10]. According to the literature, intensified training exercises can affect the mood state of athletes which suggested that exhaustion after intensified training session lead to increase anxiety, anger, hostility and depression [11,12]. Moreover, intense training increase negative mood [13]. However, moderate intensity training is associated with a positive mood [14].

For determining training intensity, the modified Borg rating of perceived exertion (RPE) scale is one of the useful tools to assess exercise intensity [15]. Using RPE-scale provides a subjective estimation of the intensity perceived by soccer players [3,16,17]. This method is a psychophysiological measure that encompasses sensation of muscle soreness, strain, heart rate, discomfort and fatigue that an individual experiences during exercise [18].

However, according to our knowledge, there is no information concerning the relationship between internal intensity of the training session and mood state of players during intensified training in soccer. Thus, the aim of the present study was to identify the impact of HIIT on mood state and to verify the relationship between RPE-scale and POMS scores during HIIT session in professional soccer players. We hypothesized that HIIT would produce a psychological disturbance and that perceived internal intensity does not affect the mood state.

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