The caffeine effect on tolerance to sport-specific maximal intensity exercise in young elite soccer players

Vakhidov Timur[1,2], Bezuglov Eduard[1,2], Malyakin Georgiy[2], Achkasov Evgeniy[1], Emanov Anton[2], Koroleva Egana[2], Kapralova Elizaveta[1], Talibov Oleg[3], Morgans Ryland[1]

1 Department of Sports Medicine and Medical Rehabilitation, Sechenov First Moscow State Medical University

2 High Performance Sports Laboratory, Sechenov First Moscow State Medical University

3 Moscow State University of Medicine and Dentistry, Moscow, Russia

Introduction

Modern elite soccer places extremely high demands on the athlete's body, so it is of practical interest to study the effect of various dietary supplements on load tolerance and post-exercise recovery. There is a lack of research on the effects of caffeine consumption on commonly used indicators of load tolerance in soccer such as delayed onset muscle soreness (DOMS), rate of perceived exertion (RPE), and heart rate (HR) at different time points after the end of exercise.

Methods

54 soccer players (age 15.93±0.8 years, height – 180±8.28 cm, weight – 69.45±8.82 kg, BMI – 21.36±1.37 kg/m^2, somatic maturation degree – 98.05±1.90), from a leading Russian soccer academy took part in a randomised trial using the balanced placebo design. In order to study the influence of the expected effect of caffeine intake on these indicators, this design was chosen. For 48 hours prior to the testing, the soccer players did not engage in high-intensity training or consume any pharmacological substances.

They were divided into 4 groups: 1 - told caffeine/given caffeine, 2 - told caffeine/given placebo, 3 - told placebo/given placebo, 4 - told placebo/given caffeine. All participants consumed two identical capsules 60 minutes before testing, each containing 200 mg of caffeine or placebo.

To create conditions for high-intensity sports-specific load tests such as 5, 10, 20 and 30 metre sprint, counter-movement jump, change of direction, dribbling, T-test and RSA test were used.

A visual analogue scale (VAS) was used to assess the severity of muscle soreness, with participants rating the intensity of muscle soreness before and 24 hours after the test. RPE was assessed using the Borg Rating of Perceived Exertion scale (Borg CR-10), which participants filled out 10 minutes after the end of the test. HR was measured using the Activio Sport Solution GPS tracking system. HR immediately post exercise (HRpe) (after the last test), HR after two minutes of passive rest (HRrest) and recovery HR (HRrec = HRpe - HRrest) were obtained.

Results

The data obtained demonstrated that a single caffeine intake (400 mg) 60 minutes before testing had no effect on RPE ($p = 0.948$), HRpe ($p = 0.698$), and HRrec ($p = 0.920$) in any of the groups. DOMS severity 24 hours after the load was not statistically significant between the groups ($p=0.077$).

Conclusion

The acute caffeine ingestion of 400 mg does not affect the subjective and objective indicators of training load in young soccer players aged 15-17 years with a high degree of somatic maturation.