

暑熱環境下における身体外部・内部冷却併用の有効性の検討 －運動間のリカバリーに着目して－

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Combined Effect of Internal and External Cooling between Exercise Bouts on High-Intensity Endurance Exercise Performance in the Heat

by

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ABSTRACT

The purpose of this study was to investigate the combined effect of internal and external cooling between exercise bouts on high-intensity endurance exercise performance in the heat. Six active males completed two trials in a random order: 1) passive rest (control trial) and 2) wearing a cooling vest and ingesting ice slurry (cool trial). The two experiential trials consisted of two (first and second half), 30-min cycling exercises (i.e., 25 min of cycling at 55% of maximal oxygen uptake followed by 5 min of time trial) separated by a 15-min half-time break in the heat (i.e., 35.0°C, 50% relative humidity). In the cool trial, participants wore a cooling vest, which can

cool the neck, upper body, back, and side, and ingested 5.0 g/kg of ice slurry during half-time break. Time trial performance in the second half was substantially higher in the cool trial compared with the control trial. Rectal temperature at 45, 50, and 55 min and deep forehead temperature at 45 min were substantially lower in the cool trial compared with the control trial. Forehead and mean skin temperatures at 35, 40, and 45 min and neck skin temperature from 35 to 55 min were substantially lower in the cool trial compared with the control trial. Rating of perceived exertion at 50 min and thermal sensation from 35 to 50 min and at 60 and 65 min were substantially lower in the cool trial compared with the control trial. Thermal comfort and recovery rating scale from 35 to 45 min were substantially higher in the cool trial compared with the control trial. In conclusion, combined methods of internal and external cooling between exercise bouts maintained high-intensity endurance exercise performance and decreased core temperature in the initial part of the second half.

要 旨

本研究の目的は、暑熱下における運動間の休息中に行う身体外部・内部冷却の併用が高強度運動パフォーマンスに与える影響を検討することであった。6名の若年男性を対象に、暑熱下における2試行の無作為化交差試験を実施した。本試験では、15分間の運動間の休息（ハーフタイム）を挟む、30分間の自転車運動を2回（前・後半）行った。ハーフタイムでは、安静座位（コントロール試行）またはクーリングベストの着用・体重当たり5 gのアイススラリーの摂取の併用（クーリング試行）のいずれかを行った。主評価項目は前・後半終了前5分間のタイムトライアルパフォーマンスとした。運動間の休息中の身体冷却によって、後半のタイムトライアルパフォーマンスが高い値で維持された。またクーリング試行の直腸温が後半開始0分、5分、10分で低下した。従って、本研究で用いた身体外部・内部冷却の併用は、運動パフォーマンスの維持・体温の低下の観点から暑さ対策として有効である可能性が示された。