The effect of blood flow occlusion and of heating lower and/or upper leg on the post warm up decline in muscle temperature

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The effect of leg blood flow occlusion and of heating lower and/or upper leg on the post warm up decline in muscle temperature

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Elevated muscle temperature ($T_m$) has been repeatedly shown to be beneficial to power activities. Our previous studies demonstrated that passive leg heating attenuated the decline in $T_m$ between warm up and competition. However despite external heating, $T_m$ still decreased during the recovery period (Faulkner et al. 2013a, 2013b). This study aimed to investigate the role of the blood flow in the observed $T_m$ drop, as well as to optimise the leg heating procedure. Eight male competitive cyclists (age=22.2 ± 0.8yr, height=1.82 ± 2.3m, body mass=76 ± 5.4kg) completed a 15-min intermittent warm-up on a cycle ergometer, followed by 30–mins passive recovery. During the recovery period participants wore water perfused (43.5°C±0.3°C) trousers. The effect of the blood flow was studied using single leg occlusion (OCCL) while the contralateral leg was used for control (CONT) in two conditions: whole leg heating and upper leg only heating. $T_m$ was measured in vastus lateralis at 1, 2 and 3 cm depth before and after the warm up and immediately after the recovery period. External heating increased $\Delta T_m$ significantly at 1 cm depth in all conditions (1.34°C±0.53). After the recovery period there was a significantly lower ($p=0.011$) $\Delta T_m$ at 3 cm depth in CONT compared to OCCL (-0.21°C±0.03). Similarly, this effect was apparent at 2 and 1 cm depth, however the data did not reach significance ($p=0.06$; $p=0.07$, respectively). There was no effect of upper versus whole leg heating on post-recovery $\Delta T_m$ at all depths ($p \geq 0.31$). We can conclude that the optimised heating procedure avoided most of the $T_m$ drop observed before, and that indeed the blood flow is responsible for the cooling process of the leg between warm up completion and the start of competition.

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