Want to be cool?

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1. Problems and potential solutions

•Exercising in extreme heat increases body temperature, having a detrimental effect on sporting performance as well as severe health consequences, evidenced during the Australian Tennis Open.

•Precooling techniques interventions ameliorate exertional heat stress and mediate decline in sporting performance.

•Precooling can be internal or external - no evidence has compared the approaches.

•**Aim:** Compare physiological response to two prominent approaches to precooling during an incremental running test under heat stress.

3. What does it do?

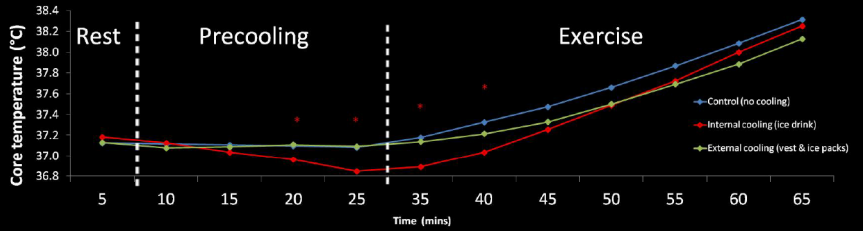

Figure 2: Response of T_{CORE} throughout protocol. Differences to CON displayed using * with respective colours ($p < 0.05$).

2. Cooling down

Twelve males completed three incremental, discontinuous treadmill tests in the heat (31.9 [1]°C, 61.9 [8.9]% relative humidity) with core temperature (T_{CORE}) monitored throughout.

Trials were proceeded by 20 minutes of either :

Internal cooling (Fig 1A; INT, 7.5 g.kg^{-1} ice slurry ingestion)

External cooling (Fig 1B; EXT, ice packs to quadriceps, ice vest, hand & forearm immersion in 9°C water and frozen towels on head and neck.

No intervention (CON).

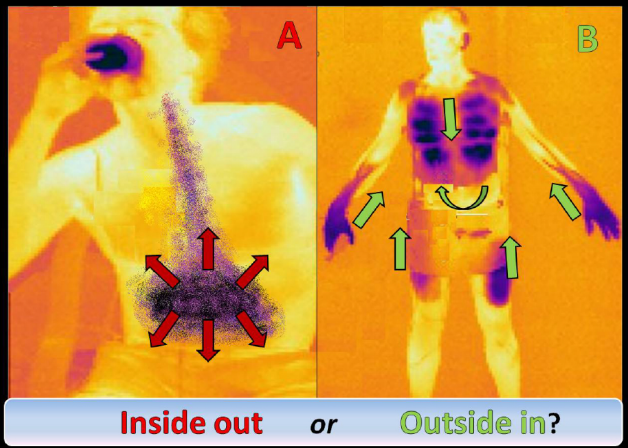

Figure 1 A. Thermal image of internal precooling. Arrows denote cooling direction. Light colours reflect hot areas & dark colours reflect cold areas.
Figure 1 B. Thermal image of external cooling following ice packs, ice vest, hand immersion and frozen towels.

4. The effects

During precooling a cooling*time interaction was observed (p<0.01, partial η2=0.72) with greatest T_{CORE} reduction from INT (Fig. 2).

A cooling*time interaction was observed during exercise (p=0.01, partial η2=0.31).

5. How to be cool

Internal precooling had the greatest effect lowering T_{CORE}.

Despite a failure to initially lower T_{CORE}, external cooling demonstrated a meaningful mediation of the rise in T_{CORE}.

Event characteristics may dictate the most appropriate precooling strategy as metabolic heat production depends on exercise intensity and duration.

Internal precooling may be better suited to short duration events whilst EXT may be relevant for longer durations, such as the Australian Tennis Open.