Effects of menthol solutions on the general populations' perceptual measures at rest in the heat and humidity

Rachana Naicker, Peter Maulder & Russ Best
Centre for Sport Science and Human Performance
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Background

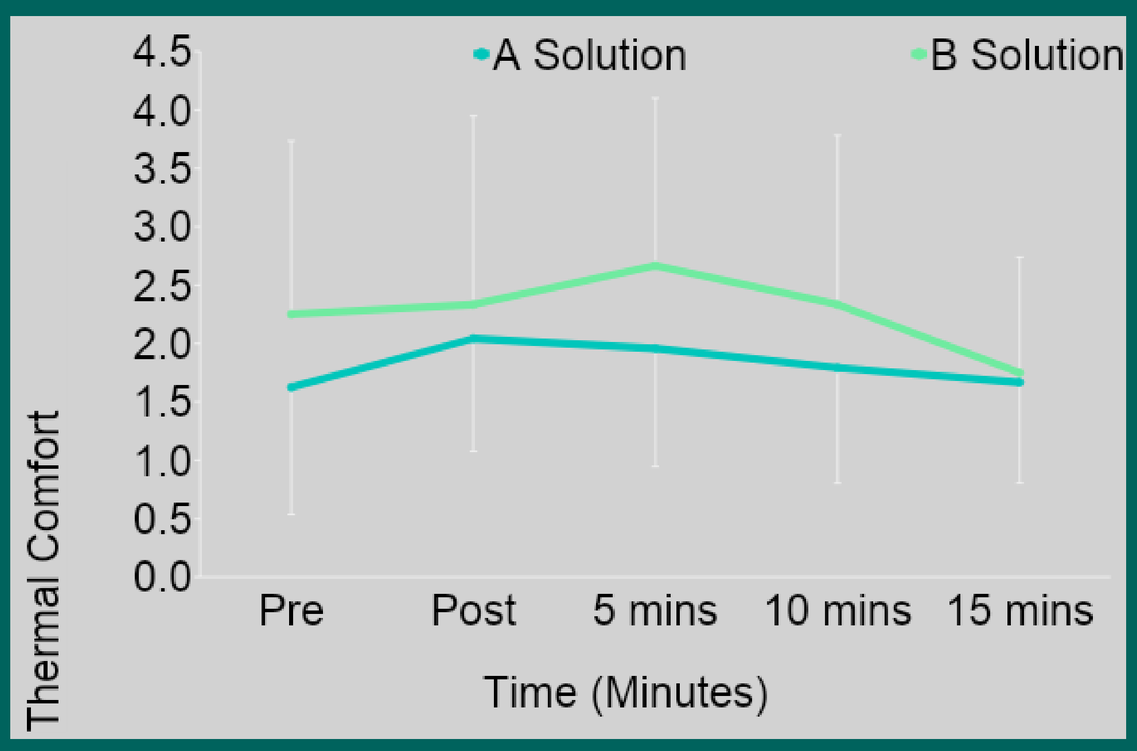
- Heat acclimation and ergogenic effects on responses to heat have been gaining research interest recently, especially given the expected hot temperatures in Tokyo for the 2020 Olympics.
- Menthol via ingestion or swilling has been gaining positive support to mitigate the perceptual sensations of heat, allowing athletes to feel colder and perform better for longer (Jeffries et al. 2018).
- Information is limited concerning the natural responses of heat at rest and whether menthol mouth rinses may be effective.
- Furthermore, the effect of differing solution characteristics on heat responses at rest is unknown.

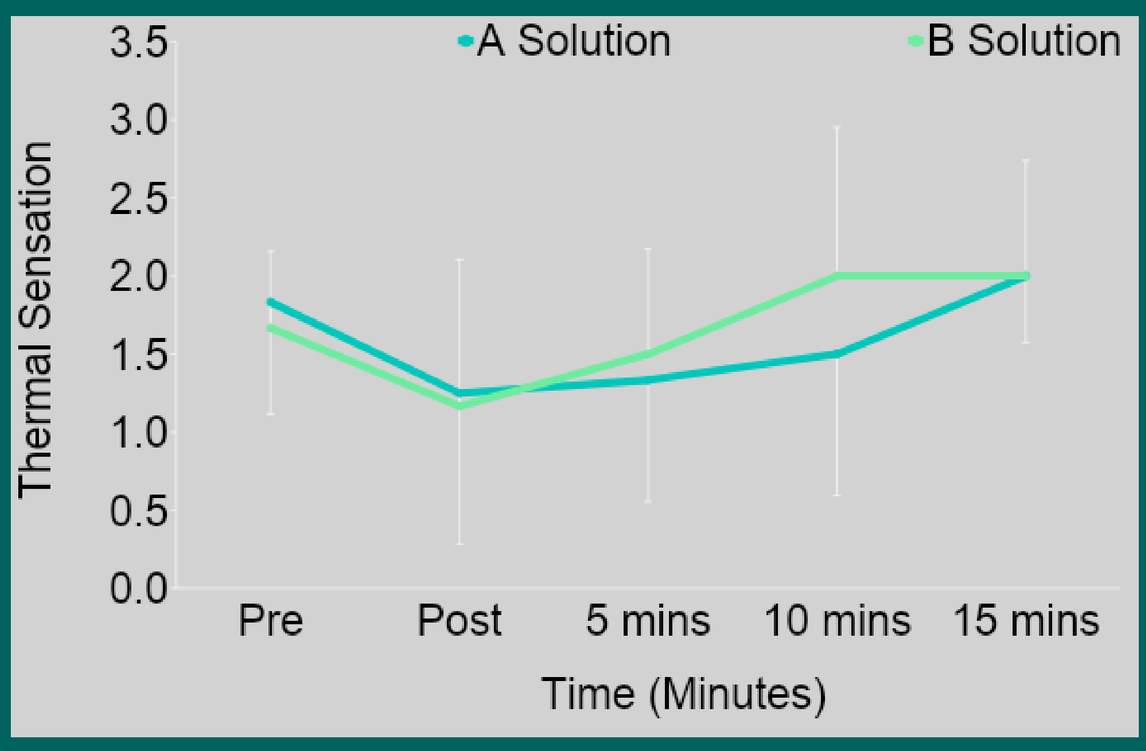
Methods

- Double blind randomised cross over research design
- Twelve (6 males, 6 females) non-heat acclimated participants
- 2 x 60 minute sessions; 1 solution per session
- Participants were required to sit in a heat chamber set to 35° C and 40% relative humidity for 10 minutes before swills were provided and measures were recorded.
- Thermal comfort, thermal sensation, heart rate, tympanic temperature was recorded ~ 30 seconds prior, immediately ~ 30 seconds post, ~ 5 minutes post, ~ 10 minutes post and ~ 15 minutes post swill of the solutions.
- Menthol Swills 25ml with a drop (~ 0.5 ml) of green food dye

Main Findings

- Menthol A Solution and B Solution provided similar effects on the participants' heart rate, thermal comfort, thermal sensation and tympanic temperature over a 15 minute period when at rest in an environment of 35° C and 40% relative humidity.
- The majority of participants preferred swilling Menthol A Solution likely due to it's low intensity nature.





Menthol A Solution

Characteristics:
Low intensity, slow-acting, and long-lasting effects (Best et al. 2018)

Formulation:
Menthol crystals are dissolved in ethanol, to produce a 5% menthol solution.
The mixture are then diluted with distilled water to have a concentration of 0.1%

Findings:
Does not improve comfort over time, but does provide continuous cooling sensations over a 15 minute period when at rest in an environment of 35° C and 40% relative humidity.

Menthol B Solution

Characteristics:
High intensity, fast-acting, and short-term effects (Jeffries et al. 2018)

Formulation:
Menthol crystals are dissolved in deionised water, heated to 40°C to have a concentration of 0.1%. The solution are then cooled and stored until use.

Findings:
Improves comfort for initial 5 minutes and provides continuous cooling sensations over a 15 minute period when at rest in an environment of 35° C and 40% relative humidity.