Abstract: The common practice of workers resting in the shade to dissipate body heat can be complemented by ingestion of crushed ice or immersion in temperate water to rapidly lower core body temperature.

The conversion of ingested ice to liquid uses body heat to lower Tc. In addition to ice and water, this cooling method only requires an ice shaver or blender and access to power. Crushed ice ingestion during rest breaks has demonstrated its superiority to resting in the shade among firefighters (Walker et al., 2014) and has been implemented for electrical utility crews (Brearley, Harrington, Lee, & Taylor, 2015), construction teams, and underground miners working in hot and humid conditions. Although the specifics of each worksite dictate cooling requirements, crushed ice ingestion of 4 to 5 ml per kg body mass is a recommended starting point during rest periods (Brearley, 2012).

The logistics of establishing reservoirs of water restrict the broad application of immersion cooling to occupational settings. However, cooling by immersion is well suited to workplaces with high risk of heat-related illness that necessitate frequent rest periods. Although whole body immersion in cold water achieves the highest Tc cooling rates, it is well tolerated and effective when limited to the lower body (Walker et al., 2014). Temperate water immersion is also well tolerated and rapidly lowers Tc when large body surface areas are exposed to circulating water (Taylor, Caldwell, Van den Heuvel, & Patterson, 2008). Restricting water immersion to small regions such as the hands and forearms drastically reduces the Tc cooling rate (Brearley & Walker, 2015), limiting the effectiveness of this approach. When establishing water immersion in work settings, schedule approximately 20 minutes to incorporate doffing and donning protective clothing and chlorinate water to maintain hygiene standards.

Programs to prevent heat-related illness should include monitoring employee Tc and heart rate (Brearley et al., 2015) to complement subjective feedback from workers about cooling methods, thereby ensuring programs are guided by evidence.

Keywords: heat stress, hot and humid, ice, occupational health, water immersion

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References

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