

Sports Med. 2010 Feb 1;40(2):113-29. doi: 10.2165/11530760-000000000-00000.

Guidelines for glycerol use in hyperhydration and rehydration associated with exercise.

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Dehydration in athletes alters cardiovascular and thermoregulatory function and may inhibit endurance exercise capacity if fluid loss exceeds 2% of bodyweight (BW). If this level of dehydration cannot be prevented when starting from a state of euhydration, then athletes may create a state of hyperhydration by consuming extra fluid prior to exercise. From this hyperhydrated situation, individuals have a greater capacity to tolerate fluid loss before becoming dehydrated. Furthermore, excess pre-exercise fluid intake enhances thermoregulatory ability, as well as increasing plasma volume to maintain cardiac output. However, hyperhydrating before exercise is difficult, because a large fluid intake is typically accompanied by diuresis. Glycerol-containing beverages create an osmotic gradient in the circulation favouring fluid retention, thereby facilitating hyperhydration and protecting against dehydration. Many studies have shown that increases in body water by 1 L or more are achievable through glycerol hyperhydration. This article analyses the evidence for glycerol use in facilitating hyperhydration and rehydration, and provides guidelines for athletes wishing to use this compound. An analysis of the studies in this area indicates that endurance athletes intending to hyperhydrate with glycerol should ingest glycerol 1.2 g/kg BW in 26 mL/kg BW of fluid over a period of 60 minutes, 30 minutes prior to exercise. The effects of glycerol on total body water when used during rehydration are less well defined, due to the limited studies conducted. However, ingesting glycerol 0.125 g/kg BW in a volume equal to 5 mL/kg BW during exercise will delay dehydration, while adding glycerol 1.0 g/kg BW to each 1.5 L of fluid consumed following exercise will accelerate the restoration of plasma volume. Side effects from glycerol ingestion are rare, but include nausea, gastrointestinal discomfort and light-headedness. In summary, glycerol ingestion before, during or following exercise is likely to improve the hydration state of the endurance athlete.

PMID: 20092365 [PubMed - indexed for MEDLINE]