THE SCIENCE OF HYDRATION

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Hydration is a complex topic, with even more complex physiology. In this carb-centric society, the emphasis in sports nutrition has been on carbohydrate availability in fluid form, but this neglects the true meaning of "Hydration".

hy·dra·tion (hī-drā'shən) - n.

1. The addition of water to a chemical molecule without hydrolysis.
2. **The process of providing an adequate amount of liquid to bodily tissues.**

Optimal hydration requires a balance of both fluids and electrolytes.

HYDRATION BENEFITS

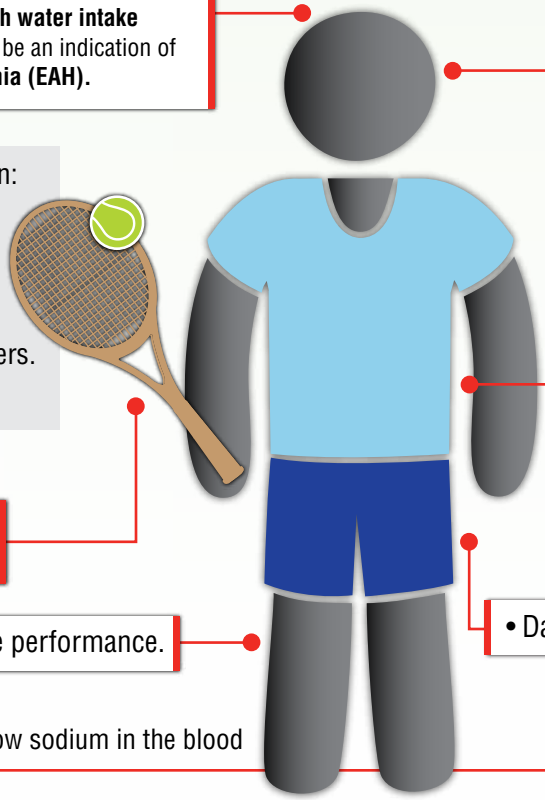
- ☑ Moistens tissues in eyes, nose, mouth.
- ☑ Assists the body in thermoregulation via sweat.
- ☑ Provides lubrication to the joints.
- ☑ Is the medium for transportation (of nutrients, oxygen, waste products) of the blood and across cells.
- ☑ Muscles are 75% water.

POSSIBLE INDICATORS OF UNDER-HYDRATION:

- Headache post-training, with high sweat rate or low fluid intake pre and during training - hypohydration.
  - *Headaches post-training with **high water intake** during long training sessions may be an indication of **exercise associated hyponatraemia (EAH).**
- Dizziness/light-headedness.
- Fatigue.
- Moodiness/irritability.
- Thirsty = drink.

Possible Causes of Under-Hydration:

- High volume of sweat, intense workouts, long workouts.
- Heavy workouts in cold weather with multiple layers.
- Hot & humid conditions.



- Poor appetite and elevated metabolism >1hour post exercise = dehydration.
- Nausea.
- Cramps – *May also be caused by neuromuscular issues and/or electrolyte depletion – research still equivocal on one specific cause.
- Heat intolerance during exercise-hypohydration.
- Decreased endurance performance.
- Dark, low volume of urine = dehydration.

*Exercise associated hyponatraemia - low sodium in the blood

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DRINK TO THIRST OR ON A SCHEDULE?

DRINK TO THIRST DURING EXERCISE IF:

- The athlete has pre-hydrated, otherwise can be susceptible to injury (e.g. rhabdomyolysis, poor recovery, decreased motivation).
- The athlete is heat acclimated (for hot training and games/racing/events).
- The athlete is trained.
  - After significant time off with lower fitness levels, hypohydration and exercise stress can exacerbate thermal strain and decrease performance metrics.
- If the athlete is a woman in the luteal phase of her menstrual cycle or on the progestin-only mini-pill (high estrogen and progesterone decrease plasma volume and lower plasma osmolality, predisposing a woman to hyponatremia).
- If the athlete has a history of EAH or has Syndrome of Inappropriate Antidiuretic Hormone secretion (SIADH).

DRINK ON A SCHEDULE (NOT TO EXCEED 800ML/H IN A TEMPERATE ENVIRONMENT- SMALLER INDIVIDUALS NEED LESS, LARGER NEED MORE; IN THE HEAT, MORE FLUID WITH SODIUM MAY BE NEEDED) IF THE ATHLETE:

- Is a junior athlete (e.g. has not gone through puberty).
- Has 2+ heavy training sessions/day (to avoid systemic dehydration).
- Is unacclimated and training at altitude.
- Has a history of heat illness.
- Is drinking plain water.
- Is hypohydrated, traveling, has low glycogen, or in a hot/humid environment.

HOW TO ASSESS HYDRATION?

In the Morning:

- Use **WUT**– Possible dehydration if 2 or more below markers are present:
  - **Weight** – Ensure maintaining stable body weight day-to-day within 1%.
  - **Urine** – Darkened first morning urine or reduced daily frequency.
  - **Thirst** – Dry mouth or the craving of fluids.

Multiple Practices in a Day or <24 Hours Between Practices:

- Pay attention to urine color and drinking something with salt and/or salted watery fruits or veggies.
- Pre/post-weight – check to assess fluid loss.
  - Ensure not just drinking plain water but added sodium.

PRE Training:

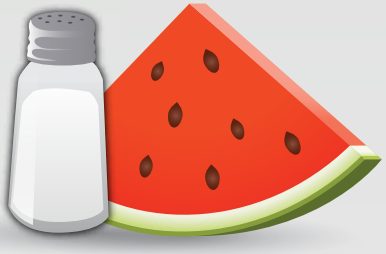
- Salted watery fruits and vegetables (e.g. salted tomatoes, apples, watermelon).
- Water with a dash of salt (1/16th tsp table salt per 20oz water).
- Use a specific hyperhydration beverage or high sodium broth/soup.

DURING Training:

- Drink appropriately (i.e. to thirst or on a schedule if the athlete meets the scheduling criteria) a beverage that contains per 8 fluid ounces: Sugars (from glucose and sucrose): 7 – 9.5 grams (3-6% carbohydrate solution); Sodium: 150-180mg; Potassium: 60-75mg.

POST Training/Acute Rehydration:

- Urine should be clear 2-3 hours post-training.
- Protein+carbohydrate-based recovery drink/smoothie.
- Low-carbohydrate electrolyte drink.
- Soups.
- Salted watery fruits/veggies (salted tomatoes, salted [water]melons).



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