

Outline

1. Why we Need Water
2. Water Composition in Body
3. Hydration – Just the Facts
4. Fluid Intake Guidelines
5. History of Hydration
6. Before, During, and After a Workout
7. Type of Fluid – Water, Food, Sports Drink.
8. Hydration – Myths & Truths

- Why we Need Water?**
- Basis of body fluids
 - Medium for chemical reactions
 - Helps illuminate waste products
 - Regulates body temperature

- Why we Need Water?**
- Helps digest food
 - Cushions organs
 - Participates in metabolic reactions
 - Stabilizes cell membranes
 - Transports nutrients

Water Composition of Tissues and Organs



% water by weight:

- blood 83%
- heart 79%
- muscle 76%
- skin 72%
- liver 68%
- bone 22%
- adipose tissue 10%

Body has no provision for water storage.
Water must be replenished by regular intake.

Hydration – Just the Facts

Despite water’s importance, the research that serves as a basis for determining requirements for fluid intake, or even recommendations for humans, is limited compared to most other nutrients (Popkin, D’Anci, & Rosenberg, 2010).

8 glasses of water / day?



Hydration – Just the Facts

Protein = 1 gram / kg body weight.

CHO = 45 to 65 % of calories from carbohydrates.

Water? “Just drink!”

The Rise and Fall of Bottled Water, 2007 Report

“We find the main reason consumers are drinking so much water is it seems to alleviate stresses and tensions caused by a lack of ritual in the workplace and in home life....”

“In essence the ... bottles of water kept at hand by countless millions have begun to resemble the security blankets of childhood”

**TP
https://www.nutrition.org.uk/attachments/444_Collins.pdf

Hydration – Just the Facts

“Drink eight glasses of water a day.”

False.

This number has no scientific basis.

Optimal hydration depends on many variables:

- climate
- activity level

National Academies of Sciences

- 13 cups total fluid for men
- 9 cups for women
- Assumes we’re getting about 20% of fluid from food.
- Anything we drink counts toward hydration: milk, juice, beer, coffee & tea (more later).

Hydration – Just the Facts

If sweat loss is slight, dehydration may not be an issue.

When a client sweats a lot, dehydration can have negative consequences.

Dehydration:

- reduces blood volume
- makes blood thicker
- increases heart rate
- more difficult for the body to lose heat

Hydration – Just the Facts

Proper Hydration:

- exercise will "feel" easier
- clients can increase intensity of exercise
- work-out longer
- better results
- client and trainer both have advantages to being hydrated

Best advice for drinking . . . sip fluid throughout the day ... instead of guzzling before or after work-out ... but that's ok too.

Copious and Clear!!
USA Deaflympic Hockey Team

Hydration – Just the Facts

Best method of estimating proper hydration?

Copious and Clear!!

Urine color.



The History of Hydration: A Lesson in the Scientific Method and the Hype Cycle.
The Science of Running: www.scienceofrunning.com

Early days of marathon running ... fluids during races "not needed and detrimental"

Runners were studied at end of race, winners/top finishers lost the most water weight.

Therefore ... losing fluids was necessary to maximize performance.

Top runners were most dehydrated, so dehydration was good!

This line of thinking is still used, i.e. The Kenyans do X, so X should be done....

Should we do something just because the "fastest" "best" people do it?

The History of Hydration: A Lesson in the Scientific Method and the Hype cycle.
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Rise of mass participation running/fitness, increased awareness of "dehydration illnesses" ... we overreacted.

Went from drinking little - to replacing ALL fluid loss during exercise.

Measuring weight before & after exercise to calculate hydration reached "mantra status" with coaches, nutritionists, trainers, & common exercise.

Heat exhaustion and similar illnesses became more prevalent ... with the rise of mass participation.

If we eliminate dehydration, will heat exhaustion and similar illnesses be eliminated? Dehydration is bad only if it gets to a dangerous point. **TP

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With overreaction (drinking a lot) came a new problem called hyponatremia. But now we corrected our mistakes and found a nice balance.

Research consistently shows that dehydration by a couple % is fine. 1-2% loss of body weight during a long performance may be the sweet spot in terms of maximizing performance ... maybe they were right?

Marino et al. 2011 (*British J of Sports Med*) showed the body goes through several neuromuscular adjustments to maintain core body temperature, despite fluid losses.

Problem is people inundated with recommendations on drinking water during exercise [i.e. those who carry a water/fuel belt on a 30 minute run!] many have forgotten how to drink by thirst and need to reawaken that ability.

The History of Hydration: A Lesson in the Scientific Method and the Hype cycle.
The Science of Running: www.scienceofrunning.com

Tim Noakes (2010) showed, just like early studies, top runners seemed to drink less. http://running.competitor.com/2010/12/news/new-study-finds-drinking-less-running-faster_19567

Noakes didn't say dehydration is desirable.

Instead, drink by thirst, or just enough, is needed.

We've seemed to reach that happy medium ... took about a century.

Hydration & Older Adults

Aging causes changes:

- in body water composition
- renal function
- thirst perception declines

(Davies, et al., 1995, Malmrose, et al., 1993, & Lindeman, et al, 1985).

Dehydration can be a side effect of diuretics, diarrhea, and diabetes.

Aging makes people less aware of thirst and also lowers the body's ability to regulate its fluid balance.

Hydration & Fitness Professionals

Fluid is lost by projecting voice and talking.

Hydration decreases amount of pressure required to initiate vocal sounds.



Hydration increases viscosity in the vocal folds/cords.

(Verdolini-Marston et al., 1994; Verdolini et al., 2002).

Hydration – Best Fluids

Plain water ... most people don't drink enough ... water turns off thirst too soon.

Lightly flavored water with few calories (<25 Kcal/serving) can help hydration by stimulating drinking. **TP

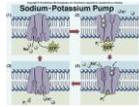
Exercisers drink more when given a flavored beverage.

"Complete rehydration" requires sodium and potassium replacement ... if we work-out a lot and sweat a lot.

Sodium and Potassium

Sodium and potassium to start and end contraction.

Too much ... too little ... muscles unable to function properly.



Sports Drinks



Sports Drinks

Main goals of sports drinks:

1. Replace fluid.
2. Replace electrolytes lost in sweat.
3. Replace carbohydrates (Coombs & Hamilton 2000).

Most commercial sports drinks provide 50–80 calories and contain 14–17 grams of CHO / 8 ounces (Stover & Murray 2007).

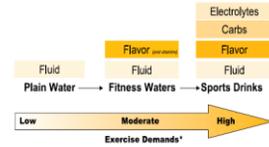
Sports Drinks

This is a 6%–8% carbohydrate solution.

Maximizes:

- Gastric emptying ... don't feel bloated.
- Enhances fluid absorption from intestine
- Supplies energy to the muscles ... when training a lot.

(Sawka et al. 2007 and Coombs & Hamilton 2000)



* Exercise Demands include: exercise intensity, exercise duration, exercise goals, environmental conditions, and sweat rate.

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Functional Fluids

Water or Flavored water

Sports Drinks

Soup

Juice ... Regular or diluted

Milk ... Low fat milk

Tea, coffee, herbal tea

Alcohol ... Lite Beer

Fruit ... Watermelon 90% water, oranges, grapefruit, cantaloupe & honeydew melon.

Soda ... Regular or Diet?

Are all Fluids Hydrating?

The Effect of Caffeinated, Non-Caffeinated, Caloric and Non-Caloric Beverages on Hydration

Grandjean, A.C., et al. *J Am Coll Nutr.* 2000

- 18 healthy males
- crossover study
- drank combination of four different beverages

1. Caffeinated cola
2. Caffeine free cola
3. Coffee
4. Spring water

Are all Fluids Hydrating?

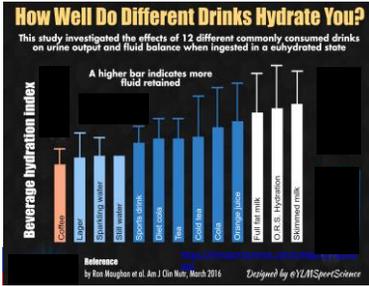
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CONCLUSION:

No significant difference between the fluids for hydration status.

The source of fluid didn't matter when outcome is hydration.

"Advising people to not drink caffeinated beverages as part of the daily fluid intake is not substantiated by the results of this study."



Myths & Truths of Hydration

- Coffee and tea count toward hydration.
True. Coffee/tea are mild diuretics, but can still hydrate.
- Coconut water hydrates better than water.
False. Coconut water can hydrate — but no more than plain water.
- Food does not contribute to hydration.
False. Moisture in food accounts for about 20% of fluid intake ... water-rich foods ... in-season fruits and vegetables.

Myths & Truths of Hydration

- Drinking water may help you lose weight.
True. Some evidence drinking water before a meal may help you eat less.
- A sports drink is necessary if you're working out in the heat.
Depends. Hard training hour or more ... sports drink can help. Physical activity ... low intensity ... not long ... water is fine.
- You need to drink before you get thirsty.
False & True. For most, thirst is a good indicator to hydrate. Elderly, and people with medical conditions, thirst is not a good indicator.

Thank you for being in this session!

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