Welcome to Week 5 HELLO Hydration

Introduction:

Hydration is the single most important factor in athletic performance however, there is no single recommendation for daily fluid intake. This is related to individual differences in age, gender, health status, body composition, environmental exposure and physical activity level. A general recommendation has been published by the U.S. Department of Agriculture (USDA) of 3.7 liters (L) per day (16 cups) for men and 2.7 (12 cups) for women ages 19 to 70 yo.[1] This recommendation can be met by water, milk, 100% fruit juice, sports drinks, coffee, tea and soup. Furthermore, it is estimated that 20% of your hydration needs come from the foods you eat including fruit and vegetables.[2] This week we will focus on how to assess individual hydration status and discuss strategies for maintaining optimal hydration during sports and physical activities.

Background:

Water is an inorganic (H_2O) substance and absorbed directly by the intestines. Water provides the shape and rigidity of our cells, regulates body temperature, lubricates our joints, transports vitamins, removes waste products and is a medium for a multitude of different chemical reactions in the body. Moreover, approximately 70% of your muscles and organs are water.[3]

Body water balance fluctuates according to urine/sweat output and waste removal. While you may believe thirst is an early sign of dehydration, it is actually a delayed response. Typically the body has already lost 1 to 2 L of water by the time you actually feel thirsty. The benefits of optimizing hydration in athletes is to heightened utilization of muscle glycogen stores, increase blood volume & flow, reduced elevation of heart rate and better maintain core body temperature.[1(pp.177)] Sports drinks are often consumed before/during/after exercise to provide a steady supply of carbohydrate as fuel and to maintain or restore electrolyte balance. In this module we will provide specific recommendations for when to drink water vs. sport drink replacements.

Week 5 Focus:

1. Monitor personal fluid intake and assess individual hydration status
2. Review warning signs of dehydration, hydration and sport beverage guidelines
3. Develop a hydration fueling plan

Week 5 Challenge: Meet individual hydration goal

Connect: To connect with us, follow us on Instagram. Direct message (DM) us for general questions about the Nutrition Basic Training program.

Coach: Individual coaching is available upon completion of this Nutrition Basic Training Program. Please eMail a brief note regarding the coaching or culinary service you are requesting.

Week 5 Instructions: This week each participant will complete 4 steps. First you will review warning signs of dehydration, assess your individual hydration status and develop of hydration fueling plan.

Week 5 Tip: Use the information in this module to assess and enhance your hydration status. As you begin to improve hydration you will discover you have more energy to move through life and perform optimally. Say good-bye cramps and **Hello Hydration**!

Step 1: Review warning signs of dehydration in Table 1

Table 1: Warning Signs of Dehydration

Stage	Symptom	Action
Mild to Severe Dehydration can progress very quickly Treat Early!!	Thirst, headache, reduced urine output, dry mouth & muscle cramping starts, loss of energy & irritability, sunken eyes, lethargy, difficulty spitting, dry skin	Stop activity immediately & HYDRATE! Sport Drink containing CHO & sodium Flat cola and salty cracker (if sport drink is not available) *Avoid carbonated beverages as they may cause GI distress*
Severe	Low blood pressure, nausea, vomiting, dizziness, chills	Instant sugar; Glu gel, sugar cubes, popsicle Rehydration/sport drink w/CHO & sodium
Life Threatening	Dark urine with little to no output Reduced or limited neuromuscular control	IV Fluid asap! Rest

Note: Adapted from Bush B, Battista R, Swan P, et. al. ACSM's Resource For the Personal Trainer, 4th Edition. Loppincott Williams & Wilkins, United States Library of Congress Cataloging-in-Publication Data. 2014; pp. 179

Step 2: Conduct a hydration assessment and review general hydration guidelines

Hydration Assessment
Part 1: Assess urine color, if it is light colored you are well hydrated (note vitamins such as B-complex can change the color of your urine)
Part 2: Check body weight before and after exercise to assess your personal fluid and sweat losses, use **Table 2** below for replacement guidelines

Table 2: General Hydration Guidelines

Exercise	Hydration Recommendations	Fluid Type
Before	5 to 7 mL/kg body weight (b.w.) 2 to 4 hours before exercise (Approximately 16-20 fluid ounces)	Beverage to include sodium (Na) and/or eat a small salted snack or a
	8-12 Fluid oz. water (10-15 minutes before start of activity)	**Water (H20)**
During	3-8 fluid oz. every 15-20 minutes for exercise less than 60 min.	**Water (H20)**
	3-8 fluid oz. every 15-20 minutes for exercise greater than 60 min. Goal: 30-60g CHO/hr.	**Sport drink**
After	1.5 L per kg weight loss or 20-24 fluid oz. for every one pound lost	Combination **Sport drink** and **Water (H20)**

HYPONATREMIA PRECAUTION		
Hypo-natremia *aka water intoxication* (the result of drinking too much fluid)	Exercise-induced hyponatremia (low blood sodium concentration) can happen when an athlete is overconsuming fluids (sports drink or water). This more commonly occurs during long, slow events (>4 hours of continuous exercise) or after a marathon race. Drinking too much flood can dilute the blood causing extra body water and this can become dangerous. Early signs of hyponatremia are weight gain, puffiness (swollen fingers, rings, watches), nausea, vomiting, headache and can progress to confusion irritability seizures and if untreated result in coma or death.	Limit fluid intake, increase salt Consult your doctor immediately

Note: Adapted from Jeukendrup, A., & Gleeson, M. *Sport nutrition: An introduction to energy production and performance (2nd edition).* Champaign, IL: Human Kinetics; 2010:197-218 and Sawka, M, Burke L, Eichner, et al. Exercise and Fluid Replacement. Position Stand. American College of Sports Medicine. *Medicine & Science in Sports & Exercise.* 2007; 377-390, and Dunford M. *Sports Nutrition. A Practice Manual for Professionals. 4th Edition.* United States of America. Library of Congress Cataloging-in-Publication Data. 2006;108-109

Step 3: Review Tables 3 & 4 Sport Beverages, Summary & Homemade Sport Drinks

Table 3: Sport Beverages

Sports Drink Recommendations	Carbohydrate (CHO) 20-60 (g/L) (5-8% Glucose)	Na (sodium) 20-60 (mmol/L)	K (potassium) 2-5 (mmol/L)	Osmolality <290 (mOsmol/kg)
Water	None	None	None	None
Orange juice	104	0	9	612
Coca-Cola	105	3	0	650
Gatorade	60	18	3	349
Powerade	60	24	4	285
Skratch	40	32	5	280
Accelerade	59	25	6	365

Note: Adapted from:Jeukendrup, A., & Gleeson, M. *Sport nutrition: An introduction to energy production and performance (2nd edition).* Champaign, IL: Human Kinetics; 2010:197-218 and Selecting and Effectively Using Sports Drinks, Carbohydrate Gels, and Energy bars. American College of Sports Medicine. 2011. https://www.acsm.org/docs/brochures/selecting-and-effectively-using-sports-drinks-carbohydrate-gels-and-energy-bars.pdf.

Summary: To maintain optimal hydration under non-exercise conditions, water and food alone are sufficient to meet needs. In hot climates or during endurance exercise, sport beverages are necessary to maintain energy, electrolyte & hydration status. **Table 3** *above* provides differences among various beverages. Powerade & Skratch are preferred sport beverages. Skratch offers ***slight*** advantages over Powerade related to performance, gastric emptying, restoring plasma fluid volume, preventing muscle cramps and extending time to fatigue however, costs more. Beverages such as juice, soda, or energy drinks are typically too high in CHO which can perpetuate dehydration and bloating. Furthermore, *water, cola and juice are not recommended beverages* for hydration replenishment during endurance exercise as they may contribute to GI distress and do not provide sufficient sodium necessary to prevent over-hydration.

Table 4 provides guidance on how to make your own sport beverage at home. These recipes provide an alternative to those who prefer not to purchase a commercial sport beverage.

Table 4: Homemade Sport Drinks		
Option 1	**Option 2**	**Option 3**
20 ounce Water ¼ c OJ ¼ pure Maple Syrup ¼ tsp Sea Salt	20 ounces of Coconut Water ½ c Water 1 Fresh Lemon or Lime (Squeezed) ¼ Tsp. Sea Salt	20 ounces of Water ¼ c Black Cherry Juice 1 Fresh Whole Lime (Squeezed) ¼ Tsp. Sea Salt
Note: Adapted from: http://www.runnersworld.com/drinks-recipes/make-these-healthy-homemade-sports-drinks		

Step 4: Calculate your hydration plan

The template below will guide you in creating your own hydration plan for your specific sport or activity.

Table 5: Hydration Plan	
Activity Description	**Example:** 125 lbs. Field Hockey Player Preparing for Tournament 4-6 games (30-45 minutes each)
Preload hydration 2 to 4 hours before start of exercise	**Calculation: Body weight (kg) x 5 to 7 mL/240mL = cups** **Example:** 125 lbs./2.2 = 56 kg x 5 to 7 ml = 294 to 392 ml/240ml/cup = **1.2 to 1.6 cups** (10 to 14 oz. **Sport Drink** preload)
10 to 15 minutes prior to start	8-12 Fluid oz. **Water** 10 to 15 minutes before start
Exercise less than 60 minutes	3-8 fluid oz. **Water** every 15-20 minutes of activity
Exercise more than 60 minutes	3-8 fluid oz. every 15-20 minutes (**Sport drink**/**Water**) Goal: 30-60g CHO/hr. of activity
After exercise	20-24 fluid oz. for every one pound of weight lost (**Sport drink**/**Water**)
Note: Adapted from Sawka, M, Burke L, Eichner, et al. Exercise and Fluid Replacement. Position Stand. American College of Sports Medicine. *Medicine & Science in Sports & Exercise.* 2007; 377-390, and Dunford M. *Sports Nutrition. A Practice Manual for Professionals. 4th Edition.* United States of America. Library of Congress Cataloging-in-Publication Data. 2006;108-109	

Step 5: Transfer results to the SportFIT Nutrition Plan

Transfer the hydration plan calculated in **Step 4** to your **SportFIT Nutrition Plan**. Next week we'll complete your customized nutrition plan with fueling frequency guidelines, take a look at the **SportFIT Macro Map** quick guide & get **SportFIT Cookin'!** If you have any questions or need specific guidance, please contact us to schedule a coach connect session.

Resource List

Web Based References

American College of Sports Medicine www.acsm.org
Academy of Nutrition and Dietetics www.eatright.org
Runners World www.runnersworld.com

Books and Articles

1. Clark, N. Sports Nutrition Guidelines. American College of Sports Medicine. Spring 2011. https://www.acsm.org/docs/fit-society-page/2011springfspn_nutrition.pdf?sfvrsn=0
2. Dunford M. Sports Nutrition. A Practice Manual for Professionals. 4th Edition. United States of America. Library of Congress Cataloging-in-Publication Data. 2006
3. American Dietetic Association. Sports Nutrition. A practice manual for professionals (4th edition). United States Library of Congress Cataloging-in-Publication Data. 2006
4. Bush B, Battista R, Swan P, et. al. ACSM's Resource For the Personal Trainer, 4th Edition. Loppincott Williams & Wilkins, United States Library of Congress Cataloging-in-Publication Data. 2014
5. Jeukendrup, A., & Gleeson, M. *Sport nutrition: An introduction to energy production and performance (2nd edition)*. Champaign, IL: Human Kinetics; 2010:197-218
6. Sawka, M, Burke L, Eichner, et al. Exercise and Fluid Replacement. Position Stand. American College of Sports Medicine. *Medicine & Science in Sports & Exercise*. 2007; 377-390.
7. Selecting and Effectively Using Sports Drinks, Carbohydrate Gels, and Energy bars. American College of Sports Medicine. 2011. https://www.acsm.org/docs/brochures/selecting-and-effectively-using-sports-drinks-carbohydrate-gels-and-energy-bars.pdf. Accessed January 27, 2017
8. Jeukendrup A. Nutrition for endurance sports: Marathon, triathlon, and road cycling. *Journal of Sports Sciences*. 2011; 29(S1): S91-S99.