Fueling for Optimal Performance
Brett Singer MS,RD,CSSD,LD
@bsinger10

Follow Us on Twitter
@bsinger10
Topics

- General nutrition
- What occurs during exercise
- Pre training/competition
- Recovery
- RED-S (Relative Energy Deficiency in Sport)

Carbohydrates
Protein

Protein: Alternative Sources

[Images of different protein sources]
Protein

Three T’s
– Total
  • 20-30g @ each meal
– Timing
  • Every 3-4 hours
– Types
  • High quality

Portions
• Meat ~3oz.
  – Palm of hand/Deck of cards
  – Deli meats: 3 CD sized
  – Fish: cell phone
• Eggs ~2-3
• Dairy ~8 oz (1 cup).
  – 20 oz. (2.5 cups)
• 1 cup of low fat milk or yogurt
Daily Nutrition Goals

1. Eat 4-6 times a day
2. Include carbohydrate with each meal
3. Consume protein at each meal/ snack
4. Fruit and veggie at each meal
5. Hydrate throughout the day
Fueling

When water loss is greater than water consumption, resulting in 2% or greater weight loss

Water Loss
- Respiration
- Urine
- Sweat
- Fecal Route

Water Gained
- Fluids
- Food
Dehydration

<table>
<thead>
<tr>
<th>% Body Weight Loss</th>
<th>Physiological Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2%</td>
<td>Thirst, some fatigue, some strength loss, power loss, decreased endurance</td>
</tr>
<tr>
<td>3-4%</td>
<td>Decreased aerobic endurance, decreased thermoregulation</td>
</tr>
<tr>
<td>5-6%</td>
<td>Decreased concentration and focus, decreased cardiac output, nausea, chills, hyperventilation</td>
</tr>
<tr>
<td>7-10%</td>
<td>Dizziness, muscle spasms, poor balance, delirium, potential for cardiogenic shock</td>
</tr>
</tbody>
</table>

Daily Hydration Tips

- Carry fluids at all time
- Cold/flavored fluids typically more palatable
- Juice, tea, milk, sports drink, flavored water all counts toward hydration
- Alarms/Reminders/Volume Goals can keep you on track
## Fluid Options

<table>
<thead>
<tr>
<th>Category</th>
<th>Water</th>
<th>Low/No Calorie Sports Drink</th>
<th>Sports Drink</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contains</td>
<td>Fluid</td>
<td>Fluid, Electrolytes</td>
<td>Fluid, Electrolytes, Carbohydrates</td>
</tr>
</tbody>
</table>
| Best For | • Daily Hydration  
• Light Intensity  
• Short Duration  | • Heavy Sweating  
• Light Intensity  
• Short Duration  | • High intensity efforts  
• Long duration activity  
• When peak performance is needed |

---

**Pre/During/Post Exercise Nutrition**
Muscle Energy Usage

At Rest

Moderate Exercise

Intense Exercise

• Easily digestible carbohydrates
• Fluids
• Small portion of lean protein if preferred
What to Avoid Right Before an Event/Game

- High fiber foods
- High fat foods
- Greasy foods
- Too large of portions

Pre Competition Meal

PRE-COMpetition FUELING

Your pre-competition meal (3-4 hours before) should be high carbohydrate, moderate protein & lower fat. As competition time gets closer, the size of meals/snacks should decrease and shift towards mostly carbs with minimal protein & fat.
Pre Competition Meal

<table>
<thead>
<tr>
<th>3-4 Hours Before</th>
<th>1-2 Hours Before</th>
<th>&lt; 1 Hour Before</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oatmeal with Dried Fruit and Honey</td>
<td>Bagel with small portion of Peanut Butter and Honey</td>
<td>Applesauce</td>
</tr>
<tr>
<td>Banana</td>
<td>Water</td>
<td>Water</td>
</tr>
<tr>
<td>Sports Drink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 Eggs Scrambled</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Should you eat breakfast?

Yes!

• Energy to focus during class or practice
• Protein for muscle growth and repair

Do you have to eat breakfast when you first wake up?

• Eat at school/ first period (if allowed)
What to eat for breakfast?

Breakfast before school:
- **Protein source** - eggs, greek yogurt, kefir, cottage cheese, milk, etc.
- **Carbohydrates** - cereal, oats, granola, fruit
- **Fluids** - Water, 100% juice, milk

Breakfast before morning practice?

Recovery

3 R's of recovery:
- Replenish
- Repair
- Rehydrate

Sleep
- Importance of sleep
- Sleep hygiene
Three R’s of Recovery

• Rehydrate: With fluid and electrolytes
  – 20-24 oz. for every lb. lost
• Replenish: Glycogen with carbohydrates
  – ½ g / lb. of total body weight
• Repair: With protein
  – 15-30g protein

Sleep: How Much?

• 8.5-9.5 hours a night for teens ages 12-17
• 7-9 hours a night for adults 18 and up
• Athletes likely need more.
Tips for improving Sleep Hygiene

• Be consistent with bed time and wake up time
• Start winding down before bedtime
  • Turn off TV/Phone
  • Turn lights down or off
• Use bed for sleeping only
• Keep noise to a minimum
• Keep room cool and dark

Contact Me

• Email: Brett.singer@memorialhermann.org
• Twitter: @bsinger10;
• http://ironman.memorialhermann.org/
Resources

- **ACSM**: [http://journals.lww.com/acsm-msse/pages/collectiondetails.aspx?TopicalCollectionId=1](http://journals.lww.com/acsm-msse/pages/collectiondetails.aspx?TopicalCollectionId=1)
- **RED-S Article**: [http://bjsm.bmj.com/content/48/7/491.full](http://bjsm.bmj.com/content/48/7/491.full)
- **SCAN: Sports, Cardiovascular and Wellness Nutritionists**: [http://www.scandpg.org/](http://www.scandpg.org/)
- **USOC USA Olympic Dietitians and Resources**: [http://www.teamusa.org/About-the-USOC/Athlete-Development/Sport-Performance/Nutrition](http://www.teamusa.org/About-the-USOC/Athlete-Development/Sport-Performance/Nutrition)
Female Athlete Triad

Low Energy Availability (EA) = Dietary intake does not meet the needs of energy expenditure

- Can lead to disruptions in menstrual function and poor bone health
- Amenorrhea: an absence of the menstrual cycle for 3 consecutive months

Figure 1: The spectrums of the Female Athlete Triad including energy availability, menstrual function and bone mineral density exist on a continuum between health and disease.
Examples for Increasing Energy Intake

<table>
<thead>
<tr>
<th></th>
<th>+++</th>
<th>++++</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>8 fl oz of milk</td>
<td>16 fl oz of milk</td>
<td>2 slices of bread 2 tablespoons of peanut butter</td>
</tr>
<tr>
<td>1/2 cup of cooked oatmeal</td>
<td>1 cup cooked oatmeal</td>
<td>1 cup of cooked oatmeal 1 cup of milk 1 large banana</td>
</tr>
<tr>
<td>1 tablespoon of peanut butter</td>
<td>2 tablespoons of peanut butter</td>
<td>1 cup cooked pasta 3 oz chicken 1 cup grapes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 cups of cooked pasta or rice 3 oz chicken Cooked vegetables with a little oil</td>
</tr>
</tbody>
</table>

Low Energy Availability

- May affect male or female athletes
- Intentional or unintentional
  - Healthy balanced eating most of the time with occasional use of short-term weight loss methods
  - Less than 30 calories/kg of FFM/day
- Energy Balance: 45 calories/kg of FFM/day
Questions to Ask:

- Do you have an abnormal relationship with food?
- Do you skip meals or snacks?
- Are you trying to lose weight?
- Do you weigh regularly?
- Have you lost more than 15 pounds in 2-3 months or 5 pounds in 1 month?
- Would you say food dominates your thoughts, mood, life?
- If you eat a food that you consider “bad,” do you think about it all day?
- For females: Are you having regular periods? Are you on OC?

Treatment

- Multidisciplinary team:
  - Sports medicine physician, exercise physiologist, sports dietitian, sports psychologist, athletic trainer, coaches and family
- Regain normal menstrual function
- Adjust energy intake to meet training and competition needs
- Treat nutritional problems and monitor nutrient status (iron, calcium, vitamin D)
Treatment for Low Energy Availability

- Increase energy intake
- Reduction of exercise

- One strategy would be adding a liquid meal replacement drink + one day of rest.
- Meal plan that includes an additional 300-600 calories per day as well as addressing excessive energy use exercise throughout the day.

Potential Performance Effects of Relative Energy Deficiency in Sport (*Aerobic and anaerobic performance).


Copyright © BMJ Publishing Group Ltd & British Association of Sport and Exercise Medicine. All rights reserved.