Sports Nutrition, Recovery and Hydration
Endurance Events

- Carbohydrate-Loading
  - Eat a high carbohydrate diet
    - 3-5 days prior to events
    - 60-70% of your diet
Endurance Events

- Reduce training while carb-loading
  - Allows muscles to repair
  - Allows muscles to replenish
    - Increase glycogen
    - Maximize hydration
Endurance Events

- Events where exercise may last more than 75 minutes
  - Military exercises and operations
  - Pack marches
  - Marathon, half-marathon
  - Triathlon
  - Bike race
  - Long, hard workouts
# Carbohydrate & Exercise Guide for Endurance Events

<table>
<thead>
<tr>
<th>Number of days before race</th>
<th>Exercise duration</th>
<th>Training diet (% Carbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>90 min</td>
<td>60%</td>
</tr>
<tr>
<td>5</td>
<td>40 min</td>
<td>60%</td>
</tr>
<tr>
<td>4</td>
<td>40 min</td>
<td>60%</td>
</tr>
<tr>
<td>3</td>
<td>20 min</td>
<td>70%</td>
</tr>
<tr>
<td>2</td>
<td>20 min</td>
<td>70%</td>
</tr>
<tr>
<td>1</td>
<td>Rest</td>
<td>70%</td>
</tr>
<tr>
<td>Event</td>
<td>Go for it!</td>
<td>Small meal before event</td>
</tr>
</tbody>
</table>
Endurance Events

• Use sports drinks or gels during glycogen depleting events
  • Events greater than 60-75 minutes
  • Food is not available / allowed

• Salt tablets are not recommended unless for medical reasons
  • Physician prescribed
Sports Drinks

- Improve endurance performance
  - Carbohydrate (6-8%)
  - Potassium
  - Sodium
  - Water
Sports Drinks Cont.

- Help to
  - Hydrate
  - Maintain hydration
  - Re-hydrate
  - Maintain blood glucose
  - Keep up with calorie needs
    - Endurance athletes can need 2-5 times the calories of sedentary people
Sports Drinks Cont.

- All Sport (7%) 17 g / 8 fl.oz
- Gatorade (6%) 14 g / 8 fl.oz
- 10-K (6%) 14 g / 8 fl.oz
- Power Ade (4%) 19 g / 8 fl.oz
- Accelerade (+Pro) 16 g / 8 fl.oz
- Gatorade Endurance 14 g / 8 fl.oz
Gels

- Gel packets can also be used for endurance events
- Most gels contain about 25-30 grams of carbohydrate per packet
- Drink 5+ ounces of fluid with each gel pack consumed
- Some companies add caffeine and protein to their packets
Sports Drinks w/ Protein

- Some companies use small amounts of amino acids to enhance sports drinks
  - Accelerade
  - Endurox
  - Amino Vital
Protein group had fewer issues

The bar chart shows the percentage of Medical issues for different groups:
- Medical visits: 33%
- Viruses: 28%
- Heat Illness: 83%
- Muscle or Joint: 37%

The x-axis represents Medical Issues, and the y-axis represents the percentage range from -90 to 0.
Non-Endurance Athletes

- No specific diet
  - (5K, PRT, PFT, CFT, track & field, recreational sports)

- Priority is to optimize skill and body composition
  - Carbohydrate should be 45-70%
  - Fat should be 20-30%
  - Protein should be 12-20%
Non-Endurance Athletes

Sport-specific diets are not always healthy!

- Weight sports:
  - Bodybuilding
  - Boxing
  - Wrestling
  - Rowing

- Aesthetic Sports
  - Figure-skating
  - Gymnastics
Pre-Event Meal

- Carbohydrate and Protein
  - 300-500 calories about 3-4 hours prior to event
  - 50-100 calorie snack about 1 hour prior
    - Granola bar
    - Low-fat milk
Pre-Event Meal

- Cold cut sandwich
- Pasta with meat or meat sauce
- Rice and beans
- Meat with mashed potatoes or rice
- Shake
Sports Nutrition Recovery

- Recover immediately post-event with a shake or beverage
  - Flavored milk
  - Skim milk
- Then a well balanced post-event meal similar to pre-event meal
Low-Fat Milk

• Perfect for non-endurance athletes
• Very good for endurance athletes
• Provides
  • Carbohydrate
  • Protein
  • Electrolytes
  • Vitamins
  • Minerals
Carb Recommendations

- 2.7-4.5 grams of carbohydrate per pound of body weight per day
  - Adjust based off activity level
- Choose Whole Grain Carbohydrates
  - Whole wheat bread, pasta, rice, cereals, wraps, oatmeal
  - Fruit and Vegetables

Protein Recommendations

- Very Active Individual
  - 0.6-0.8 grams of protein/lbs.
  - 0.9+ grams of protein/lbs is unnecessary

Fat Recommendations

- Not as precise as protein and carbohydrate
- 20-30% of intake should be from fat
- Maintain calorie balance with nutrient dense fat choices
  - Nuts
  - Seeds
  - Nut butters
  - Olive oil
  - Canola oil
  - Fish
Electrolytes

• Electrolytes will replenish easily with a balanced post-exercise meal or snack

• Sodium
  • Low-fat milk, pretzels, bread, yogurt

• Potassium
  • Fruit, vegetables, yogurt, low-fat milk, potatoes

Water

- Transport mechanism
  - Main component of blood
- Eliminates waste products
- Temperature regulation
  - Heat escapes in sweat
- Involved in biochemical reactions
  - Digestion and energy production
- Lubricates joints and cushions organs

Dehydration Decreases Performance

- **Loss of 1 Liter (1.4% body weight) of water causes**
  - 8 extra heart beats/min
  - Cardiac output to decline by 1 Liter/minute
  - Core body temp to increase by 0.3 degrees C

- **2 Liters (3% body weight) of water loss causes**
  - 10% loss of contractile strength
  - 8% loss of speed
  - Lack of concentration
  - Difficulty breathing

Sweat Rate

- Average sweat rates
  - 1 Liter per hour
  - 3-4 Liters per hour depending on:
    - Intensity and duration of activity
    - Age
    - Fitness level
    - Air
    - Temperature
    - Humidity
    - Cloud cover
    - Clothing
    - Individual sweat rate
Hydration Guidelines

• Golden Rules of Endurance Exercise
  • 8-10 cups of fluid a day
  • Consume 2 cups-2 hours prior
  • ½-1 cup 10 minutes prior
  • 1 cup every 20 minutes during
  • 1 pound of body weight lost= 2-3 cups of fluid

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Hydration Guidelines

• Drink before you’re thirsty!
  • Thirst is a sign that you are already dehydrated

• Slightly yellow = 1 canteen (32 ounces)

• Dark yellow = 1 canteen in 15 minutes
  • Then drink a second

• Orange or almost orange
  • 2-3 canteens as quickly as possible
  • In addition to a meal, snack and/or sports drink to ensure electrolyte replenishment

• 2-4 canteens a day
Hydration Status

- Fluid intake should match fluid losses
- Monitor urine
  - Pre-exercise urine should be ~3
  - If urine color darker than 6-7 increase liquid
- Dehydration and hyponatremia are unacceptable and avoidable
- Dehydration is not an outcome of exercise, combat or operations
Risk Factors for Heat Illness

- 2 workouts a day
- 80+ degrees F
- 40%+ humidity
- Un-acclimated

- Low levels of fitness
- Overweight
- Supplements
- Dehydrated
Preventing Dehydration

• Stay hydrated!

• Know your sweat rate and replace lost sweat

• Weigh yourself before PT and again after PT

• With every pound of weight lost
  • Consume 20-24 fluid ounces
Preventing Dehydration

- Avoid losing significant weight during your workout by replacing your fluids during your workouts
  - If you lost 1 pound during your workout and didn’t drink during your workout, add 16 ounces to your next workout
  - 4 ounces every 15 minutes would suffice
10 Rules for Results

1. Eat more calories to gain muscle!
   - Multiply your bodyweight in pounds by 15-17 to get calories needed for the day
   - A 150 lb x 15-17 = 2,250-2550 calories each day
   - Cardio increases, calorie needs increase
2. Think carbohydrates and protein!

- Weight lifters should consume:
  - 4-6 grams of carbohydrate per pound to get bigger
  - 0.6-0.9 grams of protein for every pound per day
3. Stay Hydrated!

- 2 Liters (3% body weight) of water loss causes
  - 10% loss of contractile strength
  - 8% loss of speed
  - Lack of concentration
  - Difficulty breathing

4. Eat breakfast!

- Individuals who eat breakfast on most days tend to have a lower BMI
- Eat a small meal prior to physical training, especially weightlifting to prevent muscle breakdown
5. Eat within 20 minutes of PT!

- It’s the window of opportunity!
  - Optimize glycogen storage
  - Reduce muscle breakdown
  - Enhance protein rebuilding
  - Replenish creatine phosphate and ATP

- Good food choices are:
  - 2 cups of chocolate milk or flavored soy milk
  - 2 cups of Low-fat milk
  - A sandwich with 2-3 ounces of meat
10 Rules for Results

6. Graze like a cow!

- Small snacks instead of big meals
- Avoid more than 3-4 hours without eating a small PFC snack or meal (i.e., protein, fat, carbohydrate)
- Avoid eating a P, F, or C snack only
7. Eat fat to look phat!

- Eat mono and poly-unsaturated fats:
  - Flaxseed, fish, olive oil, canola oil, nuts, seeds, and nut butters

- Avoid *Trans* fat and saturated fat
  - Even skinny athletes have to worry about heart disease!
8. Legs, legs, legs!

- Working big muscles
  - Increases the release of growth hormone and testosterone
  - Creates balance
  - Reduces chance of injury
  - Increases power and functional strength
9. Sleep!

- 7-9 hours per night
- No. 1 most powerful stimulator of natural growth hormone release
- Sleep also affects appetite regulating hormones and insulin sensitivity
  - Leptin lowers appetite
  - Grehlin increases appetite
10 Rules for Results

10. Be patient!

- Muscle hypertrophy takes several weeks depending on the resistance training program
- Maximum testosterone levels are not reached until late 20’s or early 30’s
Questions?