Objectives

1. Learn the basics of sports nutrition and how to communicate that information to players/teams for better performance

2. Understand the recommendations for hydration, fueling and refueling

3. Review the latest science on supplementation and ergogenic aids as they relate to sport and performance
Cooper Landmark Study

*Exercise is defined as moderate physical activity.
Journal of the American Medical Association, 1989
Performance Strategy

Sports Nutrition

Training

Sleep

Get Cooperized™

Cooper Clinic™ Nutrition Services
A Cooper Aerobics Company
Goals for Training

- Maintain desirable/competitive weight
- Provide adequate fluids, nutrients and electrolytes
- Promote muscle development and endurance
- Avoid fatigue
Factors Affecting Performance

- Environment (climate, altitude, pollution)
- State of health
- Level of fitness
- Physical conditioning
- Sleep
- Diet!
Water (<60-90 minutes of play)

• Nutrient most neglected by athletes
• A loss of 2% of body weight can impair function
• Thirst is not a reliable stimulus for fluid needs!
Water

• Adverse effects of dehydration
  – ↓ blood volume
    • ↓ cardiac stroke volume; increased heart rate
    • competition between muscles and skin for available water
    • reduced muscle strength and endurance
    • decreased sweat rate; impaired temperature regulation
    • heat cramps, heat exhaustion, heat stroke, coma, death
Choosing a Sports Drink (> 60-90 minutes of play)

• An optimal sports drink should provide:
  – a mix of CHO (sucrose, glucose, fructose)
  – 4-8% CHO (9-19 grams per 8 ounces)
  – sodium (most amounts in drinks are low)
  – palatable
Going Nuts Over Coconut Water

- Coconut water is the clear liquid found inside the coconut
- 1 cup of coconut water has 46 calories, 600 mg of potassium, 252 mg of sodium, 2.6 g of fiber
- Although not a cure all, coconut water is a natural rehydration drink
Fluid Replacement Recommendations

• Before exercise -
  – well hydrated during previous 24 hours
  – about 14-22 ounces (approx. 2-3 cups) 2-3 hours before exercise
  – Practical test: look at color and volume of urine (should be light-colored, without a strong odor)
Fluid Replacement Recommendations

• During exercise
  – match fluid intake to sweat output
  – 4-6 ounces every 15-20 minutes
  – begin at start of exercise
Fluid Replacement Recommendations

• After exercise
  – Weigh-in
    • for every pound lost, drink 16-24 ounces (2-3 cups) of fluid
  – Fastest rehydration is achieved with ingestion of adequate intake of water and sodium chloride
  – Forego alcoholic and caffeinated beverages
First fluids, then FOOD!!!
Bottom Line?

(Quality) CALORIES COUNT!!

Eat a balance of carbohydrates, protein, and healthy fats
Calorie Distribution

- 30–50% Physical Activities
- 10% Thermal Effect of Food
- 50–65% Basal Metabolism
Fruits

Non-starch Vegetables

Lean protein (ex. meat, fish, or poultry, beans/legumes)

Starches/Starchy Vegetables

Get Cooperized™
Carbohydrates = ENERGY
Carbohydrate Sources

- Starch/grains group: 15 grams/serving
- Milk group: 12 grams/serving
- Fruit group: 15 grams/serving
- Vegetable group: 5 grams/serving
Carbohydrates

• Should comprise approximately 55-60% of total daily calories
• About 3 to 4.5 grams of CHO per pound of body weight
• Eating enough CHO before and after an event/training helps maximize glycogen storage in muscles and liver
• Eating CHO during event can delay the use of glycogen (e.g., “glycogen-sparing”)
Carbohydrates

Before an Event

• CHO “loading”
  – for continuous events that last longer than 90 minutes (e.g., marathon, triathlon)
  – Days 2-3 before an event - exercise at low intensity for 20 minutes; eat 4.5 grams CHO per pound body weight
  – Day 1 before – minimal exercise; eat 4.5 grams CHO per pound body weight
Carbohydrates

Carbohydrate “loading”
for a 150 lb. athlete

150 x 4.5 g/lb = 675 grams
Carbohydrates

Before an Event

• Pre-event meal
  – 3 to 4 hours before
  – high in CHO (“top off the glycogen tank”)
  – moderate in protein
  – low in fat and fiber
  – experiment before the event
## Carbohydrate-Rich Foods (Strive for 45)

<table>
<thead>
<tr>
<th>Food</th>
<th>Carb (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole wheat bagel (large)</td>
<td>60</td>
</tr>
<tr>
<td>Pasta/rice (1 cup cooked)</td>
<td>43</td>
</tr>
<tr>
<td>Shredded wheat cereal</td>
<td>34</td>
</tr>
<tr>
<td>Baked potato with skin</td>
<td>31</td>
</tr>
<tr>
<td>Bread (2 slices)</td>
<td>30</td>
</tr>
<tr>
<td>Gatorade (16 ounces)</td>
<td>28</td>
</tr>
<tr>
<td>1 medium banana</td>
<td>25</td>
</tr>
<tr>
<td>1 cup FF milk</td>
<td>12</td>
</tr>
</tbody>
</table>
Foods With 25 to 30g Carb

- 1 cup of juice or 1 large piece of fruit
- 1 bagel or 2 slices of bread
- 1 cup of most cereals
- 2 cups of milk
- ⅔ cup of dried beans
- 1 cup of rice or corn
- 2 cups of commercial sports/electrolyte replacement drink
- ½ to 1 energy bar (1 bar ≈ 25 to 45 g carbohydrate)
- 1 pack of energy gel (≈ 25 g carbohydrate)

Energy Bars

- **Performance bars**
  - High CHO bars (at least 30-45 g) best eaten 45 – 60 minutes before aerobic exercise.
  - Ex: Clif Bar, Odwalla Bar, PowerBar.

- **Snack bars**
  - Fewer CHO and calories, but good alternative.
  - Ex: Luna Bar, Pria Bar, Nature Valley granola bar, Balance Bar, Clif Mojo Bar.

- **Meal replacement bars**
  - Calorie range 300 – 400 and greater than 15 g high quality protein.
  - Ex: MetRX Big 100, Protein 21, PowerBar ProteinPlus.
# Popular Gels for use during competitions or longer endurance workouts

<table>
<thead>
<tr>
<th>Name</th>
<th>oz</th>
<th>Kcal</th>
<th>CHO (g)</th>
<th>Sodium (mg)</th>
<th>Potassium (mg)</th>
<th>Protein (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboom</td>
<td>1.4</td>
<td>107</td>
<td>27</td>
<td>50</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>GuGel</td>
<td>1.1</td>
<td>100</td>
<td>25</td>
<td>20</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Accel Gel</td>
<td>1.4</td>
<td>90</td>
<td>20</td>
<td>N/A</td>
<td>N/A</td>
<td>5</td>
</tr>
<tr>
<td>Clif Shot</td>
<td>1.1</td>
<td>100</td>
<td>25</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Power Gel</td>
<td>1.4</td>
<td>110</td>
<td>28</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>
For best results with these products

• Consume gel gradually if possible. Ingesting large amounts of concentrated CHO at once can lead to GI discomfort.

• Drink water when consuming gels to help digestion.

• Use a variety of gels during training to ensure tolerance.

• Avoid using products during competitions that were not used in training. Competition is not the time to be experimenting.
Carbohydrates

During Exercise

– enhances endurance by increasing blood glucose (rely less on stored glycogen)
– 30-60 grams (120-240 kcal) per hour
– can be in form of liquid or solid
– experiment with different methods before event
– fructose ingestion increases gastric distress
Carbohydrates

After Exercise

• Consume immediately after event to optimize glycogen replenishment
  – within 30 minutes strive for .7 grams per pound
  – every 2 hours after (for 4-6 hours) strive for an additional .7 grams per pound

• Starch or sugars PLUS protein (3:1 ratio)
Without nutrient intervention, the metabolic window begins to close within forty-five minutes following exercise.
Protein

- Not a primary energy source during exercise
- 10 - 20% of daily calories (depends on total energy intake)
Protein Sources

- Milk group: 8 grams/serving
- Meat, Poultry, Fish: 7 grams/ounce
- Grains/starch group: 3 grams/serving
- Vegetable group: 2 grams/serving
Protein (Goal: 20-30g at a time)

• Approximate Protein Requirements
  – Sedentary 0.4 g per pound
  – Endurance athlete 0.5-0.6 g per pound
  – Strength athlete 0.8 g per pound

Example:
150 pound weight lifter
(150 x 0.8 = 120 grams of protein)
20 grams of protein, in the recovery period, creates the maximal amount of muscle tissue regeneration.
Protein

Sample Plan

• Meat (2 X 4 ounces) 56 grams
• Grains (12 servings) 36 grams
• Milk (3 servings) 24 grams
• Vegetables (6 servings) 12 grams

128 grams
Protein

• Dangers of excess intake
  – protein catabolism requires water → water loss → dehydration risk
  – increase urinary calcium loss
  – may increase risk for coronary artery disease
  – supplemental amino acids may cause imbalance, absorption difficulties, toxicity
  – may contribute to kidney problems in some people
Fat

• Less than 30% of daily caloric needs

• Restrict saturated/hydrogenated fat for overall health benefits
Fat

• Source of energy during aerobic exercise

• Some fats are essential to maintain normal biological function

• Required for absorption of fat-soluble vitamins A,D,E,K

• High fat intake prior or during activity may affect performance

• Choose healthier fats: canola or olive oil, nuts, seed, avocado
Vitamins and Athletes

• Essential for optimal function of your body
  – Athletes likely need additional vitamins and minerals
  – A balanced diet with adequate calories should provide enough…not many athletes are doing this

• Functions:
  – Digestion of food
  – Muscle contraction
  – Release of energy stores
  – Growth and development

• **Provide no calories (or energy)**
General Supplementation

– Remember to get:
  • Vitamin D 1,000-2,000 IU’s/day
  • Omega-3 (DHA +EPA) 1,000-2,000 mg/day
  • Calcium supplementation, if needed
  • Multivitamin
    – Multivitamins do not replace healthy foods

You can’t supplement a “bad” diet!
Inflammation Reduction Through Diet

- Omega-3 (1000 mg DHA + EPA)
- Antioxidants
  - Vitamins C and E, beta-carotene
- B Vitamins
  - B12, B6, folic acid
- Tumeric/cucumin
  - Ex. Curry often found in Indian and Asian food
- CoQ10
- Flavonoids
  - Stearic acid in dark chocolate
Inflammation and food

- **Reduce:**
  - Omega 6 to devote calories to increased Omega 3
  - Nitrites (processed meats)
  - Saturated fats, fried foods, trans-fats, hydrogenated fats
  - Excessive sugars
Ergogenic Aids

- Nitric oxide, glycine, carnitine, lecithin, brewer's yeast, hoodia, etc.

are very popular with athletes, but…

are they helpful?

(many are not)
Ex. of Ergogenic Aids

- Alcohol
- Amino Acids
- Amphetamines
- Anabolic Steroids
- Androstenedione
- Blood Doping
- Caffeine
- Creatine
- DHEA

- HMB
- Ephedrine (ma huang)
- Epinephrine
- Growth Hormone
- Hypnosis
- Nicotine
- Oxygen
- Oxygenated Water
- Pyruvate
NCAA Banned Drug Classes

1. Stimulants (amphetamine, ephedrine, ritalin, ecstasy)
2. Anabolic agents (andro, testosterone)
3. Street drugs (heroin, marijuana)
4. Peptide hormones (EPO, growth hormone)
5. Diuretics and urine manipulators
6. Anti-estrogens (clomiphene, tamoxifen)
Over the counter supplements are not strictly regulated by the Food & Drug Administration (FDA)

- **What does this mean for your team?**

  1. The list of ingredients and claims made by a manufacturer are not necessarily backed up by reliable, scientific research
  2. You *can’t be sure* of a product’s purity or safety
  3. What is on the label – may not be what is in the bottle
  4. Athletes are advised that the use of dietary supplements is at their own risk
Sleep More, Perform Better

• Goal: 7-9 uninterrupted hours/night.
  – Less than seven hours increases the risk of obesity approximately 30 percent and adds an extra five pounds
• Sufficient sleep enhances neural processing for motor skills, insights and perceptions
• Too little sleep alters leptin, the “fullness” hormone, and ghrelin, the “appetite” hormone.
Are You Kidding?  
(Just for fun…)

- **Enchiladas**
  - 1,870 Calories
  - 46g Fat

- **Lasagna**
  - 1,360 Calories
  - 38g Fat

- **Quesadillas**
  - 1,860 Calories
  - 52g Fat
In Summary
Food + Training = Performance

• Water (fluids) is the most neglected nutrient by athletes
• Carbohydrates are primary nutrient of interest for athletes
• Athletes *do* have greater nutrient needs than sedentary people. Often this need can be met with an intentional, healthier food plan
Recommended Reading/Resources

- Academy of Nutrition and Dietetics – www.eatright.org
- www.scandpg.org/sports-nutrition/sports-nutrition-fact-sheets/
- Re: Supplements –
- *Power Eating* by Susan Kleiner, RD
Consult your friendly dietitian!

Thank you for coming!

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