

Sports Nutrition

By Abby VanLuvanee

Abby VanLuvanee

- Senior graduating in Spring 2015
- Double Major:
 - Kinesiology: Movement Science Option
 - Nutritional Sciences: Dietetics Option
- Florida State University
 - Master's degree: Sports Nutrition
 - Waiting to hear from their dietetic internship
- Pursuing a career in Sports Nutrition
- Currently volunteer in PSU Sports Nutrition office

Today's Outline

- Sports Nutrition Overview
 - Portfolio Activity
- Common Nutrition Myths
- Supplements
- Nutritional Coaching Concerns
- Quiz!

Sports Nutrition Overview

- Proper nutrition = optimal performance!
- Overview:
 - Fueling our bodies for exercise
 - Nutrient Timing
 - Pre, during, post workout meals/snacks
 - Weight gain and weight loss
 - Hydration
 - Pre-season, in-season, post-season

What fuels us?

- Glucose!
 - Body's primary source of energy
- Ingested carbohydrates broken down into glucose molecules
- Glucose can be used right away or can be stored in the body
- Glycogen is the stored form of glucose

Glycogen Stores

- Glycogen stores are found in the muscle and liver
- At rest: muscles can store 12-16g/kg
- Liver glycogen: ~80-110g
- With exercise, these stores empty
 - After 1 hour of exercise, stores at 50% or even less
 - After 2 hours of exercise, stores completely depleted

Nutrient Timing

- What an athlete eats can dramatically affect their performance, however, WHEN an athlete eats is just as important
- As coaches, need to make sure your athletes are eating their meals at the right times and with the appropriate nutrients
- Each nutrient has a different digestion rate (carbohydrates being the quickest)
 - Very important to time these nutrients in order to properly fuel your athletes (want full glycogen stores) and optimize their performance

Pre-Workout Foods

- Meals eaten two hours prior to exercise/competition have time to digest
 - Carbohydrates, protein, some fat (healthy fats)
- Meals or snacks within an hour of exercise or competition
 - Should be smaller—don't want anything to make athlete feel weighed down or cause any GI discomfort
 - Primarily carbohydrates
 - Fruit, white bread, granola bars, bagels

How to fuel DURING exercise!

- During exercise, as athletes deplete those glycogen stores, they will need fuel to get their blood glucose levels up
- Athletes want to something that will get that glucose into their bloodstream quick!
- Different carbohydrates have different absorption rates

Glycemic Index (GI)

- GI is a measure of how the body reacts to certain amounts of foods in terms of blood glucose and insulin
- High GI foods will absorb faster into the bloodstream than lower GI foods and are therefore an optimal source for fuel during exercise
- High GI foods: Gatorade, sports gels, white bread
- Low GI foods: Milk, yogurt, baked beans, peanuts, rye bread

Post-Exercise Foods

- Athlete wants to replenish their depleted muscle and liver glycogen stores as well as stop further muscle breakdown and aid in recovery
- Window of opportunity!
 - Glycogen synthesis is at its highest within two hours post exercise
 - Goal should be to eat within first 15 minutes post exercise to initiate replenishment of these glycogen stores
- Found that carbohydrate AND protein together are better for post-exercise recovery than either nutrient alone
 - Chocolate Milk
- Good to have lower GI foods after exercise
 - Foods slowly digest and keep the athlete fuller longer

Case study

- Male athlete has reported very low energy at practice—we asked him to record a typical day of eating.
 - Breakfast, 7:30am– bowl of cereal and milk
 - Snack, 10am– doughnut
 - Lunch, 12pm– Meatball sub
 - Practice, 4pm
 - Dinner, 7:30pm– pizza, french fries, soda
- Review his diet and see if you can find any reasons why he might be feeling low energy at practice? What might be some solutions for this low energy? Can discuss in groups or with neighbor if you'd like!

Portfolio Activity

In-season competition day sample meal plan

- *Your athletes have been questioning you on what is best to eat on a competition day in order to have full energy when they have to perform. Your goal is to list example meals based off of what you know about nutrition, nutrient timing and pre, during, and post exercise/competition as well as the Glycemic Index that your athletes can use as a guide in the future.*

Weight Gain

- Healthy weight gain: 1-2lbs/week
- 3500 calories/pound
 - 500 additional calories/day
 - Consistency is key!
- Magical formula for muscle gain:
 - Protein + carbohydrates + resistance training
- Good weight gain foods
 - Chocolate milk, olive oil, peanut butter, lean proteins

Weight Loss

- Healthy weight loss: 1-2lbs/week
 - Rapid weight loss will affect performance and is also dangerous
- Energy output > energy input
- 3500 calories/pound
 - Subtracting 500 calories/day
 - Consistency is key!
- Weight loss tips
 - Portion control, monitor intakes

Ideal Protein Diets

- What do you know about them?

Ideal Protein Diets!!!

- These very low or no carbohydrate diets, ketosis can occur
- What is ketosis?
 - Use of ketone bodies (produced by the liver from fatty acids) as energy source instead of glucose
 - Typically occurs during periods of fasting, starvation, extremely low carbohydrate levels (no glucose available)
- Ketosis
 - Short term: not harmful
 - Long term: nausea, fatigue, foul breath, risky low blood pressure, inflammation of joints for those prone to gout, in pregnant women, fetal harm and stillbirth, ketoacidosis
- Rapid weight loss—Water weight, then plateaus when glycogen stores deplete
 - 1g glycogen—storing ~ 3g water
 - Initial weight loss=muscle wasting, lose glycogen stores, therefore water stores
- Not sustainable!
- Expensive

Hydration

- 1-2% body weight loss due to sweat is considered dehydration and performance will be affected
- 5% body weight loss due to sweat can decrease exercise capacity by 30%
- To prevent this, athletes should be drinking water throughout the day
- For every 1 lb of weight loss via sweat and athlete should consume 16oz fluids
- Water vs. Gatorade in extreme workout environments
 - Gatorade has electrolytes to replenish those lost in sweat—loss of electrolytes will cause cramping to occur
- Thirst is NOT a good indicator of dehydration, but a symptom
 - If an athlete is thirsty, they are already dehydrated

Pre-Season, Post-Season Nutrition

- Out of season, athletes will not have as rigorous of a practice and workout schedule, this could affect calorie needs
 - Important to monitor to maintain weight if desired
- Time for dietary changes
 - If an athlete does want to gain or lose weight, off season is the time to do so
 - Allows athlete to focus on nutritional change without the fear of affecting performance

In-Season Nutrition

- NOT the time for weight loss/weight gain
 - These body composition and dietary changes can affect energy levels during practice or competition
- Want to focus on:
 - Balanced meals to not only optimize performance, but maintain athlete's health
 - Hydration! Don't want performance to be affected due to inadequate intakes

Common Nutrition Myths!

- Everyone's an expert right?
- Easy to fall for common misconceptions

Protein Needs

- Numerous studies on protein
 - Makes it a very controversial subject in terms of supplements, amounts
- People think that ingesting more protein alone will result in muscle gain
 - Not the case, cutting out other nutrients can inhibit performance
- Protein Plateau
 - Studies have found that body can only take in ~30g protein at once
 - Excess protein puts stress on the kidneys and liver
- Calculating Protein Needs
 - Normal population: 0.8g protein/kg bodyweight
 - Endurance athletes: 1.2-1.8g protein/kg bodyweight
 - Strength athletes: 1.6-1.7g protein/kg bodyweight

Carbs are the enemy?

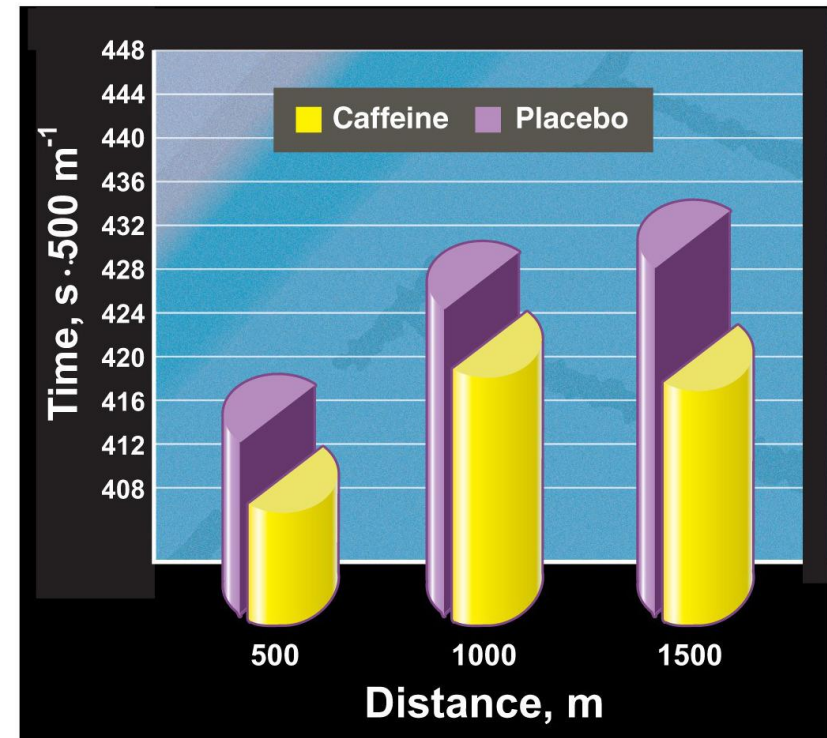
- Common misconception that carbohydrates are the enemy and should be cut out of any diet
- For athletes: carbohydrates = gold
- We know that glucose is the primary energy source for exercise
 - Also, for our brains—VERY important for our student athletes— want them to perform on the court and in the classroom!
- Eliminating carbohydrates would force body to draw energy from protein stores
 - Takes protein away from primary functions like muscle growth/repair

How low is too low?

- Another misconception with athletes is the thought that the lower the body fat, the better the performance
- Can be true to an extent, optimal body compositions for certain sports
- Body fat is essential!!
 - Bone marrow, organ function/protection, hormones
- Risky zones:
 - Males: <5% body fat
 - Females: <15% body fat

Caffeine = Ergogenic Aid

- Caffeine is often classified as a bad substance in terms of athletic performance
- BUT caffeine is actually ergogenic aid
 - Helps spare muscle and liver glycogen stores by facilitating use of fat as an exercise fuel
 - Studies have shown caffeine to enhance exercise capacity
- There is a banned amount by NCAA
 - 12 micrograms/L of caffeine (drinking 5 large Starbucks in a row)



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Supplements

- Supplements are always a hot and controversial topic in terms of athletic performance and sports nutrition
- As coaches, if your athletes are taking them, need to make sure they are not banned substances
- Do we even need supplements?
 - Studies contradict each other all the time, both sides representing valid arguments– effects of supplementation can be seen to the same extent through food sources

Food > Supplements

- Nutrients in supplements can all be supplied to body by food sources
 - Often times, convenience is the biggest factor for supplement use
- What is bioavailability?
 - How well something is absorbed and can be used by its target tissue
- Foods have a greater bioavailability than supplements
 - Body can absorb nutrients more efficiently from food than supplements
 - Ex. Eggs can be 99-100% bioavailable to the body, GREAT protein source, body uses entire egg

Creatine

- Legal supplement
- Body can synthesize about 1-2g of creatine daily
- Along with proper diet and sleep habits, creatine supplements can:
 - Decrease lactic acid buildup after a tough workout
 - Delay the onset of fatigue during workouts
 - Improve short bursts of muscular endurance
 - Provide for greater muscular overload to enhance training effectiveness
- Creatine sources: meat, poultry, fish

Multivitamins

- Multivitamins are good for athletes who are maybe not getting all these nutrients from food
 - Vegetarians, allergies, intolerances to foods
- Common misconception is that these multivitamins provide energy and thus enhance performance
 - Not true, these multivitamins do not provide calories and therefore do not provide any energy to the body to aid in practice or competition

Fasted Cardio

- Thoughts?

Fasted Cardio- Very controversial

- Does fasted cardio burns more fat?
- Current findings:
 - Conflicting results
 - No alterations in body composition
 - Fuel sources during aerobic/anaerobic conditions

Vitamin C saves the world!

- Studies have found that vitamin C supplementation is only effective after periods of extreme cold environment exposure and extremely intense exercise and even then, the vitamin will not prevent or cure any cold, but MAY only lessens symptoms
- SAVE YOUR MONEY!

Nutritional Coaching Concerns

- Who to give nutrition advice to?
- Allergies, intolerances, limitations
- Disordered eating
 - Female athlete triad

Nutrition Advice

- Coaches need to understand the age group of their athletes
 - Obviously elementary/middle school athletes do not have much say in their own diets, nor will they fully understand nutrition advice
 - Still growing, have different nutritional needs than high school and college athletes
- High school and especially college athletes and beyond can appreciate this nutrition advice the most
 - Main focus is to enhance their performance

Allergies/Intolerances/Limitations

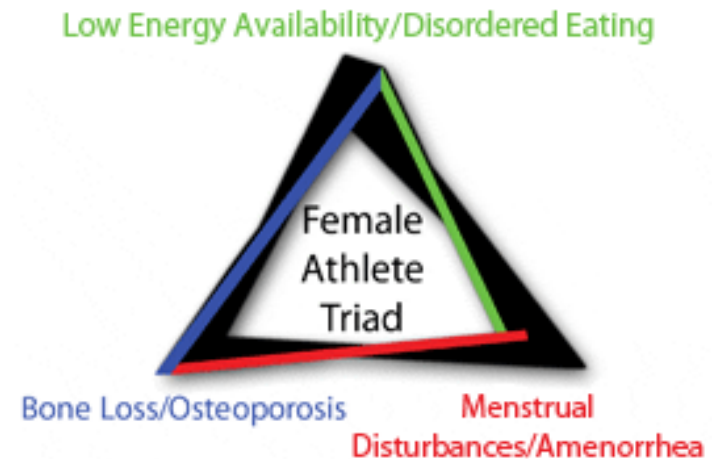
- Coaches need to be aware if any athletes have dietary limitations
 - Ex. Gluten free, allergies, vegetarians
- Special diets can eliminate nutrients necessary for optimal athletic performance
- As a coach, should look for sources to replace these nutrients that fit their athlete's dietary needs
 - Ex. Protein sources for vegetarians

Disordered Eating

- Disordered eating is common in sports, especially aesthetic sports like gymnastics or diving or weight-dependent sports like wrestling
- As coaches, you should familiarize yourselves with all the signs and symptoms of disordered eating
 - Behavioral, psychological, physical, oral categories
- Disordered eating will not only impact performance but it is highly dangerous for an athlete's health
- Sometimes, disordered eating might even occur just due to lack of nutrition education

Female Athlete Triad

- Disordered eating/low energy available: body recognizes this lack of energy and will conserve it for systems essential for survival—as a result sacrificing reproductive processes
- Amenorrhea—This energy conservation will cause the body to stop releasing menstrual-triggering hormones like estrogen
- Osteoporosis—without the hormone estrogen, calcium absorption is dramatically impaired—as a result, bones will become deprived of calcium and may soften or fracture easily. If condition worsens, osteoporosis can occur.



Quiz Time!

- What is the stored form of energy in our muscles and liver?

Quiz Time!

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 - GLYCOGEN!

Quiz Time!

- TRUE OR FALSE: Weight loss and weight gain are highly recommended during season!

Quiz Time!

- TRUE OR FALSE: Weight loss and weight gain are highly recommended during season!
 - FALSE! Weight loss and weight gain are not recommended during season so performance isn't affected

Quiz Time!

- Name the three components of the female athlete triad.

Quiz Time!

- Name the three components of the female athlete triad.
 - Disordered eating/ Low energy availability
 - Amenorrhea
 - Osteoporosis

Quiz Time!

- TRUE OR FALSE! Thirst is a great indicator of dehydration.

Quiz Time!

- TRUE OR FALSE! Thirst is a great indicator of dehydration.
 - False—if your athlete is thirsty, they are already dehydrated

Quiz Time!

- 2% body weight loss due to sweat can decrease exercise capacity by 30%.

Quiz Time!

- ?% body weight loss due to sweat can decrease exercise capacity by 30%.
 - 5%

Workshop and Application

- **In-Season Competition Day Sample Meal Plan**
- *Your athletes have been questioning you on what is best to eat on a competition day in order to have full energy when they have to perform. Your goal is to list example meals based off of what you know about nutrition, nutrient timing and pre, during, and post exercise/competition as well as the Glycemic Index.*
- **Breakfast**
- **Morning Snack:**
- **Lunch:**
- **Afternoon Snack (1 hour prior to competition):**
- **During competition:**
- **After competition:**

ePortfolio Application

(F)Teaching Plans *examples templates (lesson plans)

- 1. Season plan – calendar schedule**
- 2. Daily plan – practice schedule**

(G)Evaluation Methodologies *example templates

- 1. Pre-season**
- 2. Post-season**

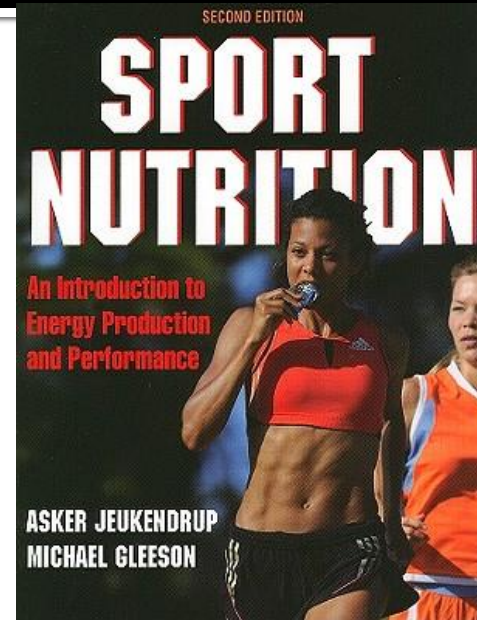
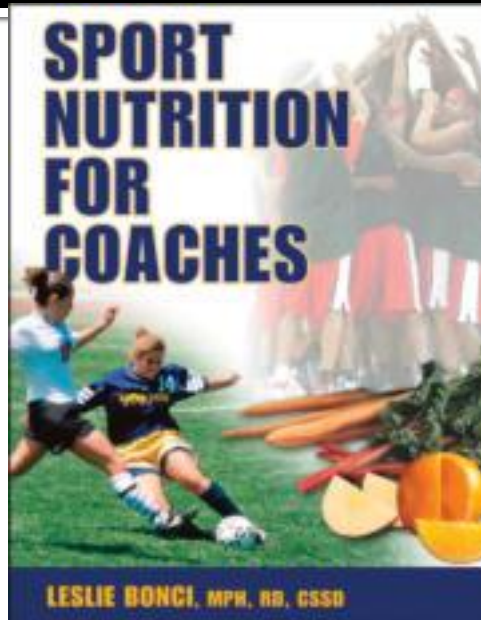
(H)Physical Training-Fitness Plans *example templates

- 1. Pre-season**
- 2. In-season**
- 3. Off-season**

(I)Risk Management Plans *example templates

- 1. Facility and equipment inspection**
- 2. Emergency plan (checklist and / or card)**
- 3. Athletic Training Staff and Support Staff roles**
- 4. Staff Crisis Management Plan (safety – legal)**
- 5. Players Crisis Management Plan (safety – legal)**

Other Sources for Information



- Nutrition 407—Nutrition for Exercise and Sports
 - Dr. Kris Clark—Director of Sports Nutrition
 - Prerequisite: Nutrition 251
 - Chooses independent study students to work in the sports nutrition office

THANK YOU!!