Disclosure

I have no relevant financial relationships with the manufacturers of any commercial products and/or provider of commercial services discussed in this CME activity

I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation
Introduction
Objectives

1. To discuss the increased requirements and barriers to optimal nutrition in competitive adolescent athletes

2. To describe key sports nutrition concepts and sound resources for competitive adolescent athletes

3. To provide appropriate baseline sports nutrition education and referrals for individual nutritional assessment for competitive adolescent athletes
Stats on Teen Athletes

• Current estimates indicate that 55.5% of high school students compete in sports\textsuperscript{1}

• Texas has the greatest number of high school athletes\textsuperscript{1}

• Most coaches and athletes have inadequate knowledge of sport specific nutrition\textsuperscript{2}

• Parents want more positive messages about nutrition from health care professionals that are specific to youth\textsuperscript{3}
Who Plays What?

• Boys¹
  - Football, track, basketball, baseball, soccer, wrestling

• Girls¹
  - Track, basketball, softball, soccer, cross country

• 6% of high school football players will play in college⁴

• Early specialization can cause burn out; overuse injuries

¹ Source: Lucky Dragon USA – Fotolia.com
Sports Nutrition

• Sports nutrition can help promote optimal training, body composition, performance, growth, healing and immunity in teen athletes\(^5\)

• Without proper nutrition, athletes are at risk for suboptimal growth\(^6\)

• A dietitian specialized and credentialed in sports nutrition is a CSSD\(^5\)

  - Certified Specialist in Sports Dietetics
Barriers to Optimal Nutrition in Teen Athletes

• Poor knowledge base
• Poor organization of food and meal times
• Pubertal body changes
• Body dissatisfaction
• Lack of parental support

• Concrete thinkers
• Lack of financial resources
• Obesogenic society
• Interest in supplements & fad diets
• School challenges
### Calories - New School Lunch Program

<table>
<thead>
<tr>
<th>GRADES</th>
<th>LUNCH (kcal)</th>
<th>BREAKFAST (kcal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-5</td>
<td>550-650</td>
<td>350-500</td>
</tr>
<tr>
<td>6-8</td>
<td>600-700</td>
<td>400-550</td>
</tr>
<tr>
<td>9-12</td>
<td>750-850</td>
<td>450-600</td>
</tr>
</tbody>
</table>

Is it enough?

© Michael Flippo – Fotolia.com
Sports Nutrition Basics
What Type of Athlete?

**Anaerobic**
- Max effort-short duration
- Lineman
- Sprinters
- Stop and go sports

**Aerobic**
- Distance running
- Triathlons
- Cycling

© Shariff Che’Lah – Fotolia.com
Hydration

• Never underestimate the value of hydration
• Differences in thermoregulation exist between children and adult athletes
• Teen athletes are particularly poor at hydration
  - Thirst is not a good indicator of dehydration in sports
• AAP policy statement for children & adolescents\(^8\)
  - Adolescents may consume up to 1-1.5 liters of fluids every hour of exercise
  - Who is at highest risk?
Hydration

• ACSM exercise and fluid replacement position stand\(^9\)
  - Pre-pubescent children have lower sweat rates than adults
  - Performance is impaired with a \(>2\%\) loss in body weight

• How to monitor hydration status
  - Urine color/Chart\(^10\)
    - [http://www.csbsju.edu/Documents/CSB%20Campus%20Rec/Scan_Doc0011.pdf](http://www.csbsju.edu/Documents/CSB%20Campus%20Rec/Scan_Doc0011.pdf)
  - Sweat rate\(^9\)
  - Urine specific gravity\(^9\)
Fluid Intake Recommendations

• Before Exercise:
  - 2-3 cups fluid 4 hours before
  - 1½ - 2 cups 15-30 minutes before

• During Exercise:
  - ½ - 1 cup every 15-20 minutes

• After exercise:
  - 2½ - 3 cups for every pound lost
# Comparison of Popular Fluids

<table>
<thead>
<tr>
<th>Beverage</th>
<th>CHO %</th>
<th>CHO (gm)</th>
<th>Calories</th>
<th>Sodium (mg)</th>
<th>Potassium (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Propel Sport Water</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>Pedialyte</td>
<td>2.5</td>
<td>6</td>
<td>24</td>
<td>407</td>
<td>183</td>
</tr>
<tr>
<td>G2</td>
<td>3</td>
<td>7</td>
<td>20</td>
<td>110</td>
<td>30</td>
</tr>
<tr>
<td>Coconut Water</td>
<td>4</td>
<td>11</td>
<td>42</td>
<td>28</td>
<td>484</td>
</tr>
<tr>
<td>Vitamin Water</td>
<td>5.5</td>
<td>13</td>
<td>50</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gatorade</td>
<td>6</td>
<td>14</td>
<td>50</td>
<td>110</td>
<td>30</td>
</tr>
<tr>
<td>Powerade</td>
<td>8</td>
<td>19</td>
<td>72</td>
<td>53</td>
<td>33</td>
</tr>
<tr>
<td>Coke</td>
<td>11</td>
<td>27</td>
<td>100</td>
<td>30</td>
<td>1</td>
</tr>
</tbody>
</table>
Food Is Fuel

• High school athletes tend to
  - Skip breakfast
  - Eat at least one meal at school
  - Come to practice 4+ hours after eating

• Consequences of under-fueling
  - Loss of lean body mass
  - Earlier fatigue/suboptimal performance
  - Increase risk for injury & illness
  - Prolonged recovery & healing
  - Menstrual dysfunction
Daily Calorie Requirements

AVE TEEN FEMALE
1700-1800 calories

FEMALE ATHLETE
2200-3000 calories

AVE TEEN MALE
2200-2400 calories

MALE ATHLETE
3000-4000 calories
## Calories - New School Lunch Program

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</tbody>
</table>

Is it enough? Often not for competitive athletes.
Timing is Key – The Training Diet

2 TRAININGS/DAY
• Wake up
• Pre-training meal (breakfast)
• Training (fluids)
• Recovery meal/fluids
• Between training meal (lunch)
• Training (fluids)
• Recovery meal/fluids
• Post training meal (dinner)
• Bedtime (snack)

1 TRAINING/DAY
• Wake up
• Breakfast meal
• Lunch meal/fluids
• Pre-training snack
• Training (fluids)
• Recovery meal/fluids
• Post training meal (dinner)
• Bedtime (snack)
Optimal Training Diet

• Abundant in Fluids
  - Drink all day

• Ample in nutrient dense carbohydrates
  - 50-70% of total calories

• Adequate in protein
  - 15-20% of total calories

• Balance of fat
  - 20-35% of total calories

Water, milk, 100% juice, sports drinks

Whole grains:
breads/pasta/cereals, fruits, vegetables, low fat milk/yogurt, beans, energy bars

Lean meats and fish, low fat dairy, nuts, beans

Dairy products, nuts, heart healthy oils and butters, avocado
Carbs are King!

• Main source of energy for working muscles & academic brain

• Inadequate carbohydrate consumption can lead to glycogen depletion

• Younger athletes have smaller glycogen stores and more limited glycolytic capacity than adults\textsuperscript{12}
Carbohydrates

• Low intensity, skill based athletes with large body mass or energy restriction
  - 3-5g/kg/d

• Moderate Exercise Program ~1 hour per day
  - 5-7g/kg/d

• Endurance Program 1-3 hour moderate to high intensity
  - 7-10g/kg/d

• Extreme Commitment >4-5h per day moderate to high intensity
  - 8-12g/kg/d
Pre-workout Fuel

• Ideally 3-4 hours before event/practice, maybe again 1 hour before
• High in carbohydrate, low or moderate in protein, low in fat, low in fiber
• High individual tolerance
• Race day NOT a good time to try a new food!
During Exercise

- Prepubertal athletes may rely more on exogenous carbohydrate intake during exercise than post \(^{12}\)
- 30 grams (120 calories) of carbohydrate per hour during 1 to 2 hours of exercise
- 60-90 gram (240-360 calories) of carbohydrate per hour for exercise lasting more than 2.5 hours
- Easily absorbed carbohydrates
  - Sports drinks, banana, gummy candy, gels, dried fruit
  - Swish and spit?
Protein

• Post Pubertal Non exercising: 
  - 0.8 gm/kg/day

• Maintenance/Endurance athletes
  - 1.2-1.4 gm/kg/day

• Strength/resistance athletes
  - 1.4-1.8 gm/kg/day

• Teens
  - 1.4-1.5 gm/kg/day (can be higher if actively growing)

• Most teens exceed this intake\textsuperscript{12}
Fat$^{12}$

• Few studies have investigated fat intake for active teens

• Recommendations are the same as general for age - 20-35% daily calories

• Younger athletes rely more on fat as fuel than adults

• Especially important for endurance athletes

• Restriction of fat intake in non-obese children may result in impaired growth and development
Post-workout Fuel: Recovery

- Muscles replenish energy stores most efficiently within 30 minutes after exercise
- Type of carbohydrate
  - Fructose alone less effective than glucose and sucrose
- Addition of protein promotes maximal repair and anabolism
  - Carbohydrate to protein ratio of 3:1 or 4:1
- Goal: 1.5 grams of carbohydrate per kg with 0.3-0.5 grams/protein/kg per 2 hour interval
Key Nutrients of Interest

• Calcium & Vitamin D
• Iron, Zinc, Magnesium
• B Vitamins
• Vitamin C, E, Beta carotene, selenium
• Sodium, chloride, potassium
• Omega 3 Fatty Acids

Use of a multivitamin supplement does not improve performance in athletes consuming nutritionally adequate diets.
Vegetarian Athletes\(^5\)

- Variety & monitoring body weight/body composition is important to ensuring adequacy of diet
- Protein recs increase to 1.3-1.8gm/kg/day
- Protein quality may be of concern if athlete is a vegan
- May be at risk for low intakes of energy, fat, vitamin B12, riboflavin, vitamin D, calcium, iron, zinc
- Females may be at greater risk for developing iron deficiency anemia
Female Athlete Triad Spectrum$^{13,14}$

Reduced or Low Energy Availability

Low Bone Mineral Density or Osteoporosis

Subclinical Menstrual Disorders or Amenorrhea
Disordered Eating in Teen Athletes

• Increased incidence at the onset of adulthood (18-25 years) supports prevention strategies in adolescence

• Female athletes and those with >16 hours/week of activity have an increased tendency toward disordered eating

• “Anorexia Athletica”

• “Lean-build sports” - cross country & track runners, swimming, gymnastics, cheerleading, yoga, wrestling, dancing
Alcohol and Teens\textsuperscript{21}

• Drinking alcohol after exercise negates training effect, hinders recovery, increases likelihood for injury, decreases immunity

• Alcohol can increase appetite and promote weight gain

• Males athletes are more likely than females to drink heavily

• Team sports in adolescence increases likelihood of alcohol intoxication
Practical Tools & Meal Ideas
Athlete’s Meal Plate #1

Wt loss or low intensity/no workout day

- Fruits and Veggies
- Lean Protein
- Grains
Athlete’s Meal Plate #2

Moderate/usual intensity workout day

- Lean Protein
- Fruits and Veggies
- Grains
Athlete’s Meal Plate #3

High intensity or double workout day

- Veggies
- Lean Protein
- Grains
- Fruit

USOC ATHLETE PLATES: http://www.teamusa.org/About-the-USOC/Athlete-Development/Sport-Performance/Nutrition/Resources-and-Fact-Sheets
Pre-Exercise Meals (2-4 hours)

Breakfast
- Cold or hot cereal, fruit, and low-fat or nonfat milk
- Pancakes or waffles with maple syrup, fruit
- English muffin with peanut butter, banana, and fruit juice
- 2 eggs, potatoes or wheat toast, fruit, milk or yogurt
- Bagel with low fat cream cheese, oatmeal, fruit
- Granola bar, cereal with milk & almonds, fruit
- Liquid meal replacement or smoothie
Pre-Exercise Meals (2-4 hours)

Lunch or Dinner

- Pasta with tomato sauce, grilled chicken, steamed vegetables, low-fat milk, canned fruit
- Baked or grilled fish or lean beef; steamed rice, roll, green beans, yogurt, and fruit juice
- Grilled chicken sandwich, baked potato with low-fat sour cream or salsa, and low-fat frozen yogurt
- Turkey or tuna sandwich, baby carrots, trailmix with nuts, low fat milk
- Tacos, rice, salad with dressing, fruit, milk
Pre-Exercise Meals (<1hour)

• Simple/Refined:
  - Banana, gummy candy, dried fruit, pretzels, applesauce, honey, fig bars, sports drinks, gels

• More complex:
  - oatmeal, bagel, banana, dried fruit, energy bar, yogurt, liquid nutrition supplement

• Some choose to refrain from food and fluids just before and during exercise
The Athlete’s Pantry

- Trailmix
- Mini-wheats
- Dry cereal
- 100% juice
- Sports drinks
- Sports bars
- Graham crackers
- Canned tuna

- Canned tuna
- Canned beans
- Canned fruits/veggies
- Low fat sandwiches
- Granola bars
- Peanut butter
- Oatmeal

- Whole wheat pasta/bread
- Instant brown rice
- Tomato sauce
- Nuts
- Dried fruits
- Pretzels
- Light popcorn
- Beef jerkey
The Athlete’s Cooler

- Fresh fruit
- Cottage cheese
- Fresh vegetables
- Yogurt
- Hummus
- Turkey sandwich
- Food bar
- Low-fat choc milk

- Meal replacement drinks
- Peanut butter & crackers

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## What Makes a Good Post Exercise/Recovery Food?

<table>
<thead>
<tr>
<th></th>
<th>Snack Food</th>
<th>Post Exercise Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>15-30gm</td>
<td>30-100gm</td>
</tr>
<tr>
<td>Protein</td>
<td>&lt;6gm</td>
<td>6-25gm</td>
</tr>
</tbody>
</table>
## Recovery Snack Ideas

<table>
<thead>
<tr>
<th>Fluids</th>
<th>Food</th>
<th>Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-fat choc milk</td>
<td>Lean meat or PBJ sandwich</td>
<td>PowerBar Recovery</td>
</tr>
<tr>
<td>Smoothie</td>
<td>Yogurt &amp; granola</td>
<td>Clif bar</td>
</tr>
<tr>
<td>Carnation Instant Breakfast</td>
<td>Banana &amp; PB</td>
<td>Luna Sunrise Bar</td>
</tr>
<tr>
<td>Boost/Ensure</td>
<td>Tuna w/ crackers</td>
<td>Gatorade Energy Bar</td>
</tr>
<tr>
<td>Gatorade Recovery</td>
<td>Trailmix &amp; juice</td>
<td>Kashi Go lean</td>
</tr>
<tr>
<td>Muscle Milk</td>
<td>Cheese &amp; fruit</td>
<td>Balance Bar</td>
</tr>
<tr>
<td></td>
<td>Pita &amp; hummus</td>
<td></td>
</tr>
</tbody>
</table>
Recovery

• Fruit smoothie made with yogurt or milk
• Turkey sandwich with a piece of fruit
• Yogurt with berries and granola
• Bowl of minestrone soup with whole grain crackers and low fat cheese
• Oatmeal with milk, raisins, and slivered almonds
• Peanut butter and banana sandwich
• Vegetable omelet with toast
Travel & Eating Out (night before)

- 2 cheese pizza slices with added grilled chicken, green salad, 100% juice
- Turkey & cheese sub sandwich, baked chips, fruit, low-fat milk
- Grilled chicken soft tacos, rice, beans, tomatoes, corn
- Spaghetti with meat sauce, bread, green salad with dressing, low fat milk
- Baked potato with chili and broccoli
- 2 burgers, extra veggies, no fries, water
Grocery Store Tips for Athletes

- Perimeter of store = good
- Middle aisles = not as good
- Fruits & veggies = fluids & vitamins
- Round or Loin = leaner cuts
- Olive & canola oil = heart healthy
- 100% whole wheat = Magnesium
- Blue/red/purple foods = helps delay muscle soreness
To Gain Lean Body Mass

• Weight (muscle) gain is as hard to do for some as weight loss

• Needs more than just protein but also, strength training stimulus and extra calories

• Increasing calorie intake 300-500 calories per day equates to $\frac{1}{2}$-$1$ pound of body weight per week

• Late-maturing adolescents usually most concerned about gaining muscle and size
To Gain Lean Body Mass

• Always eat breakfast
• Eat every 3-4 hours
• Pack high calorie snacks
• Add fluids that contain calories to meals
• Increase portion sizes
To Lose Body Fat

• A combination of proper training, calorie deficit, plenty of protein, & enough, but not too many, carbohydrates

• Cutting back on about 300-500 calories equates to \( \frac{1}{2} \) -1 pound of body weight per week

• Body composition assessment techniques

• Lowest reference body fat for adolescents\(^\text{16}\)
  
  - 7% males, 14% females – adolescents
To Lose Body Fat

• Don’t skip or restrict meals
• Fill up on fruits and vegetables
• Avoid foods with added fats and sugars
• Decrease carbohydrates in meals that are not before workouts
• Increase aerobic exercise as needed
NOTHING BEATS REAL FOOD

THE KITCHEN SHOULD BE AS CRUCIAL AS THE VITAMIN STORE

SUPPLEMENTS CAN HARM AN ATHLETE AS MUCH OR MORE THAN THEY CAN HELP
Athletes & Supplements

• An athlete is fully responsible for all prohibited substances found in his/her body

• Athletes generally don’t ask their doctors for advice on taking supplements - you need to ask them!

• Scientifically testing products is becoming more common, but the industry is still highly unregulated
Teen Athletes and Supplements\textsuperscript{12,17}

- Supplements for adolescents are generally not recommended
  - Very few studies in children and adolescents

- Nonetheless, supplements are very popular among adolescents
  - Most commonly used are sports drinks, multivitamins, vitamin C, iron, whey protein, caffeine, & creatine

- Younger elite athletes tend to be more performance focused and less health conscious than adults with regards to supplements
Look at Your Label

VS

Nutrition Facts

Supplement Facts

Ingredients: Cod liver oil, gelatin, water, and glycerin.
Whey Protein Powders

• Helps in conjunction with CHO
• Increases muscle mass more aggressively than other proteins
• Enhances immune function
• Effective for those who don’t eat enough
• Isolate vs concentrate
• No more or less effective than food!
Creatine

• Amino acid that provides energy to muscles, usually as phosphocreatine
• Delays fatigue during explosive exercise
• May benefit those who are naturally deficient

• Dose: -20 gm total/day (divided) for five days, followed by 3-5 gm per day to maintain.

• Sources: red meat, poultry, fish
• Water retention
Creatine Guidelines for Teen Athletes\textsuperscript{18}

• Only recommended when the athlete is a serious competitor and is post-puberty.

• The athlete is eating a well-balanced sports diet that optimizes performance.

• Both athlete and parents understand the effects of creatine supplementation and approve of taking the supplement. No one can guarantee safety.

• Qualified professionals supervise the supplementation of only reputable brands of creatine supplements.

• The athlete does not take more than the recommended dose.
Caffeine

• Both a CNS and muscular stimulant
• Increases alertness and decreases perception of fatigue
• May increase fat utilization & decrease CHO
• Sources: Energy drinks, coffee, tea
• Optimal Dose: 3-6mg/kg taken ~1 hr prior
• Doping threshold in urine
• Symptoms of caffeinism
• Adolescents may be more sensitive to effects
## Common Caffeine Sources

<table>
<thead>
<tr>
<th>Beverage/Food</th>
<th>Caffeine (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee, brewed</td>
<td>110-150</td>
</tr>
<tr>
<td>Coffee, instant</td>
<td>40-108</td>
</tr>
<tr>
<td>Tea</td>
<td>20-58</td>
</tr>
<tr>
<td>Chocolate, 1 oz</td>
<td>6-13</td>
</tr>
<tr>
<td>Soda</td>
<td>30-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beverage/Food</th>
<th>Caffeine (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Bull</td>
<td>80</td>
</tr>
<tr>
<td>5-Hour Energy</td>
<td>208</td>
</tr>
<tr>
<td>NoDoz or Vivarin</td>
<td>200</td>
</tr>
<tr>
<td>Coffee Ice cream</td>
<td>10-50</td>
</tr>
</tbody>
</table>
Branched Chain Amino Acids

- Leucine, isoleucine, valine – essential amino acids known to fuel skeletal muscle
- Assists in synthesis of other amino acids
- Helps muscles absorb BG for energy
- Slows water absorption
- Food Sources: Dairy, eggs, red meat, fish, legumes
- Dose: 1-5gm/day
Beet Root Juice\textsuperscript{19}

- Modulation of nitric acid
- Reduces oxygen demand
- Optimal for events lasting 5-30 minutes
- Poor taste
- Dose: 300-500mg
- Food sources: beets, Chinese cabbage, leeks, spinach, arugula, endive, fennel, parsley, celery, kohlrabi
Sodium Bicarbonate

• Base that buffers lactic acid in the blood
• Delays onset of intracellular acidosis
• Enhances anaerobic exercise performance
• Ideal for 400-800 meter runs
• Dose: 0.3+gm/kg 1-2 hrs prior
• Diarrhea side effect
Beta-Alanine\textsuperscript{20}

- An amino acid building block for carnosine, a compound naturally found in muscle
  - Leads to a gradual increase in muscle carnosine, which buffers muscle acids produced during high-intensity physical activity
  - Reduces muscle burn and fatigue

- Dose: 3-6 g/day

- Relatively new, promising, but only a few well designed studies have shown beneficial as well as no improvements
Sports Nutrition Links & Resources

- www.scandpg.org
- www.eatright.org
- www.sportsnutritionresource.com
- www.healthydiningfinder.com
- http://www.teamusa.org/About-the-USOC/Athlete-Development/Sport-Performance/Nutrition
Sports Nutrition Links & Resources

- [http://kidshealth.org/teen/food_fitness/sports/eatnrun.html](http://kidshealth.org/teen/food_fitness/sports/eatnrun.html)
- [www.americanathleticinstitute.org](http://www.americanathleticinstitute.org)
- [www.femaleathletetriad.org](http://www.femaleathletetriad.org)
- [www.gssiweb.com](http://www.gssiweb.com)
- [www.supertracker.usda.gov](http://www.supertracker.usda.gov)
- [www.nal.usda.gov/fnic](http://www.nal.usda.gov/fnic)
- [www.ounceofprevention.org](http://www.ounceofprevention.org)
Be Supplement Savvy

- www.drugfreesport.com
- www.informed-choice.org
- www.nsfspor.com
- www.consumerlab.com
- www.supplement411.org
- www.ods.od.nih.gov

- www.usada.org
- www.supplementwatch.com
- www.supplementsafetynow.com
- www.naturaldatabase.com
- www.wada-ama.org

- FDA MedWatch Hotline
  800-332-1088
How to Find a Sports RD

• Commission on Dietetic Registration Specialist Locator Directory
  - www.cdrnet.org/applications/directory

• Find a SCAN RD
  - www.scandpg.org

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RD’s Who See Teen Athletes in Texas

• Houston
  - Roberta Anding, RD, CSSD & Lisa Hastings, RD, CSSD
  - Texas Children’s Hospital Sports Medicine Clinic
  - 832-822-4887
  - http://www.texaschildrens.org/sportsmed/

• Dallas-Fort Worth-Keller
  - Eve Pearson, RD, CSSD
  - 214-793-2223
  - www.nutritionworkscnc.com
RD’s Who See Teen Athletes in Texas

• San Antonio
  - Mandy Taylor, RD
  - Power at Play, LLC
  - 210-286-7346
  - tylera@satx.rr.com

• El Paso
  - Marilyn Rotwein, RD
  - 915-255-0487
  - EPsportsRD@gmail.com
Summary

• Nutrition can play an essential role in the health and performance of competitive adolescent athletes

• Adolescent athletes require more fluid, calories, carbohydrates, proteins, and many key vitamins than their non-athletic peers

• Meal time constraints, poor nutrition knowledge, and pubertal body changes are among the many barriers to optimal sports nutrition for adolescents
Summary

• Timing and composition of meals before, during, and after exercise are crucial for optimal sports performance and recovery

• Adolescent athletes at highest risk for suboptimal nutrition are those who under-fuel, are vegetarian, have disordered eating, or abuse alcohol

• Although supplements are popular and commonly used among adolescents, they are not generally recommended

• Individual assessment by a CSSD is recommended to best meet an elite athlete’s nutritional needs
Bibliography

1. National Federation of State High School Association 2011-2012
2. Torres-McGee et al, J of Athletic Training, 2012
6. Stang & Story, Guidelines for Adolescent Nutrition Services, 2005
Bibliography


11. Institute of Medicine Dietary Reference Intakes. Estimated Energy Requirements, 2005


Bibliography


Questions?

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832-822-4154