What is a young athlete

Aged 18 or younger, competing in sports

Varies significantly based on age, sport, and level of play
Benefits of good nutrition for athletes

Provide the fuel for activity; decrease fatigue
Assist in preventing injury and disease
Promote strength and endurance
Maintain a healthy weight
Optimize recovery
Physical growth and development

Prepubertal stage

- Boys and girls share similar attributes such as:
  - Body fat percentage
  - Height
  - Weight
  - Hemoglobin levels
  - Sexual maturation rating 1
Physical growth and development

Pubertal development
- Process of physical and psychological maturation from childhood to adulthood
- Characterized by:
  - Increases in height and weight,
  - Changes in body composition,
  - Increases in Calorie and protein needs,
  - Sexual development, and
  - Increases in skeletal mass and density
Physical growth and development

Pubertal development

- Interaction of genetic traits and environmental influences
- Age of menarche has declined steadily in the past 50 years
- Great variability seen in timing and tempo of puberty
  - Chronological age is not a reliable marker for estimating energy and protein needs
- Tanner stages, or sexual maturity ratings, may be used to assess growth and development
## Sexual maturity rating and nutritional implications for girls

<table>
<thead>
<tr>
<th>Stage</th>
<th>Development</th>
<th>Nutritional Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>No pubic hair or maturation of genitalia</td>
<td>Calories based on Dietary Reference Intakes (DRIs)</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Sparse public hair; small breast buds; increased sweat gland activity; initiation of peak height velocity (PHV); growth spurt of 3-5 inches; average age: 10.6 years</td>
<td>Calories increase to their highest levels in adolescence; girls experience an increase peak in weight velocity ~6-9 months before PHV; they “grow out, then up”</td>
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<tr>
<td>Stage 3</td>
<td>Pubic hair increases and is darker and curly; breasts are larger; acne may occur; end of PHV</td>
<td>Nutritional guidance needed to improve nutrient density</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Menarche begins at average age of 12.5 years; 98% of adult height achieved</td>
<td>May occur earlier in girls who are obese; may be delayed with malnutrition or decreased energy availability</td>
</tr>
<tr>
<td>Stage 5</td>
<td>Adult breasts and pubic hair; increase in fat and muscle mass</td>
<td></td>
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Sexual maturity rating and nutritional implications for boys

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<td>Penile enlargement; scrotum reddens and changes texture; increased activity of sweat glands</td>
<td>Lack of androgen limits lean mass accrual; strength training can improve neuromuscular control and strength without increase in mass</td>
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<td>Stage 3</td>
<td>Faint noticeable mustache; voice begins to change; acne may occur; beginning of PHV; growth spurt of ~6-8 inches</td>
<td>Peak weight velocity and peak height velocity coincide; Calories and protein increase to their highest levels</td>
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<td>Stage 4</td>
<td>Voice deepens; acne may be severe</td>
<td>Muscle mass increases</td>
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<td>Stage 5</td>
<td>Able to grow full beard; linear growth ceases between ages 18-21 years</td>
<td>Muscle mass increases; Calorie and protein needs equal to an adult</td>
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Normal psychological development

Changes occur in cognition, psychosocial relationships, and emotional development

- Transition from concrete to abstract thinking
- Adolescent brain appears to be more sensitive to reward
- Psychosocial development includes identity formation and autonomy
Exercise physiology in children and teens

Most nutrition guidelines established for adults are based on well-researched concepts of exercise physiology.

In children and teens, growth, development, and pubertal status also influence muscular function and fuel utilization:

- Nutritional requirements may be impacted by the surge of hormones related to puberty such as growth hormone, insulin-like growth factor, catecholamines, and sex steroid hormones.
Thermoregulation and fluid requirements

Research on the link between dehydration and athletic performance in children is lacking

- Wilk and colleagues (2002) found that dehydration levels of 1% negatively impacted endurance performance in 10- to 12-year-old boys.
- AAP’s policy statement (2011) on climatic heat stress and exercising children and adolescents suggests 100-250 mL every 20 minutes for 9- to 12-year-olds and 1-1.5 liters per hour for 13- to 18-year-olds, assuming adequate hydration prior to event
Thermoregulation and fluid requirements

Preactivity hydration status is important

- Recent illnesses, such as a bout of a gastrointestinal illness, can be a risk factor for dehydration
- Alcohol use and some dietary supplements may also increase risk
- The use of a sports drink for exercise lasting longer than 1 hour can promote adequate fluid consumption along with replenishing electrolytes and carbohydrates
  - For events lasting less than 1 hour, water is sufficient for rehydrating
Dietary assessment

Alcohol consumption

- As risk taking behaviors increase, alcohol intake increases significantly
  - Between 36% and 50% of high school students currently drink alcohol and up to 60% of them report binge drinking.
  - Nutrition status can be compromised by excessive alcohol intake, particularly related to the B vitamins, magnesium, and other trace minerals

Dietary assessment

HEALTHY EATING PLATE

- Use healthy oils (like olive and canola oil) for cooking, on salad, and at the table. Limit butter. Avoid trans fat.

- The more veggies—and the greater the variety—the better. Potatoes and french fries don’t count.

- Eat plenty of fruits of all colors.

STAY ACTIVE!

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The Nutrition Source
www.hsph.harvard.edu/nutritionsource

Harvard Medical School
Harvard Health Publishing
www.health.harvard.edu

WATER

Drink water, tea, or coffee (with little or no sugar). Limit milk/dairy (1-2 servings/day) and juice (1 small glass/day). Avoid sugary drinks.

Vegetables

The more veggies—and the greater the variety—the better. Potatoes and french fries don’t count.

Fruits

Eat plenty of fruits of all colors.

Whole Grains

Eat a variety whole grains (like whole-wheat bread, whole-grain pasta, and brown rice). Limit refined grains (like white rice and white bread).

Healthy Protein

Choose fish, poultry, beans, and nuts; limit red meat and cheese; avoid bacon, cold cuts, and other processed meats.
Dietary assessment

Carbohydrate

◦ Provides the glucose needed for energy
◦ Good sources of carbohydrates would be whole grain products, vegetables, fruits, milk and yogurt
  ◦ Try to eat at least 5 servings of fruits and vegetables each day
  ◦ Aim for 3 servings of dairy products each day
  ◦ Avoid high fiber foods just before activity or competition
◦ Strive to limit simple sugars like those found in candies, soft drinks, ice cream, and other desserts
Dietary assessment

Protein

◦ Needed to build and repair muscle, skin, hair, and nails
◦ Desirable sources of protein include lean meats, fish, eggs, reduced fat dairy products, seeds, nuts, and legumes
  ◦ Plan for a source or protein with each meal or mini-meal
  ◦ Keep protein distributed throughout the day; 20-30 grams at each meal and 10-15 grams per snack or mini-meal
◦ Protein status may be compromised in athletes who follow restrictive diets, dietary fads, or inappropriately planned vegetarian diets
Dietary assessment

Dietary fat

- Quality sources of dietary fat can serve as a valuable source of Calories, assist with the absorption of fat-soluble vitamins, and increase palatability of foods.
- Optimal sources of fat would include unsaturated oils in a variety of foods such as nuts, nut butters, avocados, and salad dressings.
Dietary assessment

Vitamin D
- Helps the body absorb calcium
- Bone formation peaks during puberty
- Vitamin D can be found in fortified foods such as milk and orange juice
- Additionally, the body is capable of making vitamin D through safe sun exposure
Dietary assessment

Calcium

◦ Needed to build strong bones which can resist fracturing, normal enzyme activity, and muscle contractions
◦ Intake of calcium in children, teens, and adults is lower than the recommended level
◦ About half of total body calcium is laid down during puberty in girls and up to two-thirds in boys by the end of puberty
◦ Calcium can be found in dairy products like milk, cheese, and yogurt, fortified grain products, broccoli, and spinach

Dietary Assessment

Iron
- Necessary to carry oxygen throughout the body
- Needs increase primarily due to the rapid expansion of blood volume in adolescents
- Iron deficiency is the most common mineral deficiency in the United States
- Rich sources of heme iron include lean red meats, eggs, and seafood; nonheme sources of iron include fortified grain products, some vegetables, nuts, and beans
Dietary assessment

Pregame nutrition

◦ To increase energy stores and prevent hunger
◦ High carbohydrate, low fat meal or snack with about 10-25% of Calories coming from protein
◦ Avoid foods high in sugar, fat, and fiber
◦ Examples could include:
  ◦ Scrambled eggs or an omelet, whole grain toast, and fresh fruit
  ◦ Oatmeal with nuts and fruit
Dietary assessment

Nutrition during competition

◦ To sustain energy and prevent or prolong hyophydration
◦ 150-300 mL of water every 15-20 minutes, when possible
◦ For events lasting less than 60 minutes, fueling during competition is not necessary
◦ During long competitions, consumption of water-rich fruits like oranges and melons can provide a hydration source packaged with a variety of vitamins and minerals
Dietary assessment

Post-game nutrition, or recovery foods

◦ To support recovery and repair
◦ Consumed within 30 minutes of exercise and again within 1-2 hours of exercise
◦ Carbohydrates help repack muscles with glycogen while protein provides the amino acids needed to build and repair
◦ Recovery food options may include foods like graham crackers and peanut butter with chocolate milk or juice; yogurt with fresh fruit
Ergogenic aids

The use of ergogenic aids to improve body composition has been reported as high as 58% of high school athletes.

Very little is known about the effects of these substances in the pediatric population due to ethical constraints in research.

Recommendations are to fuel the body with a high quality diet.

Breaking obstacles to healthy eating - Athlete

Skipping breakfast

- “I don’t have time,” “I’d rather sleep in”
  - Try a grab-and-go breakfast
- “I’m not hungry in the morning”
  - Start small; anything is better than nothing
- “Eating in the morning makes me sick”
  - Try liquid options to kick off the day

Breaking obstacles to healthy eating - Athlete

School lunch
- “The school lunch isn’t enough for me”
  - Eat a packed lunch in addition to school lunch or pack a larger meal to eat during lunch
  - Pack an additional snack or mini-meal to have right after school (before practice)

Breaking obstacles to healthy eating - Athlete

Missing meals

- “My morning practice is at 5:30, and that’s too early to eat”
  - Drink a sports drink or smoothie before practice, and have a portable breakfast after practice
- “I go directly from school to practice and do not have any time to eat”
  - Pack a snack that is nutrient rich and balanced but portable, quick to eat, and quick to digest

Breaking obstacles to healthy eating – Athlete

Missing meals
- “I have evening practices and often miss dinner”
- Eat your dinner before practice, and be sure to have a recovery meal or mini-meal
Breaking obstacles to healthy eating - Athlete

Time pressures

◦ “By the time I get to my homework, it is 8:00 at night. I use energy drinks to keep be awake because I get so tired”
◦ Dependence on energy drinks creates a vicious cycle of energy drink consumption → insomnia → fatigue
◦ Prioritize day-to-day nutrition, hydration, and sleep (allowing for greater attention and clarity when completing school work)

Breaking obstacles to healthy eating – Athlete

Travel

◦ “I have to eat where the bus stops, and that is often fast food”
◦ Make the best choice from what is available
◦ Pack your own food – this allows you to eat throughout the day, even planning an appropriate recovery meal

Breaking obstacles to healthy eating – Parent or caregiver

Family differences
- “The kids are very hungry as soon as they get home, but I can’t make dinner that quickly.”
  - Bulk-cook ahead of time
  - Use a slow cooker
  - Stop for a healthy fast-food meal
  - Load up your cooler and take food with you
  - Have a frozen meal

Breaking obstacles to healthy eating – Parent or caregiver

Family differences

◦ “I make a healthy dinner, but my kids won’t eat it”
  ◦ Serve 2 dinners; or serve the meal before they fill up on snacks
◦ ”All of my kids are picky and like different foods”
  ◦ Offer choices
  ◦ Engage children in meal planning
  ◦ Create a meal rotation which ensures a favorite for each child once a week

Breaking obstacles to healthy eating – Parent or caregiver

Family differences

- “All of my children play different sports and have different practice times. A family meal will not work”
- Think outside a normal definition of a meal
- “My family is never home at the same time”
- Schedule a family meal or date night

Breaking obstacles to healthy eating – Parent or caregiver

Family differences
◦ “My athletic teenagers are eating me out of the house. My grocery bill is outrageous.”
◦ Create a grocery list based on your weekly meal rotation (and stick to it)
◦ “Eating healthy food is expensive”
◦ Choose store brands over popular brands, when possible
◦ Buy in bulk

Breaking obstacles to healthy eating – Parent and caregiver

Family differences

◦ “Fresh fruits and vegetables are expensive”
  ◦ Buy frozen

◦ “High-quality protein is expensive; the leaner portions tend to be even more expensive than the higher fat versions”
  ◦ Buy less expensive types of protein such as milk, canned tuna, eggs, cottage cheese, and yogurt

In summary

Nutritional needs of a young athlete are based on gender, stage of growth and development, and sport.

Physical development (as noted by sexual maturity ratings) should guide nutrition instead of chronological age.

Key recommendations for young athletes are for carbohydrate, protein, fat, vitamin and mineral intake, and hydration goals.

Vitamin D, calcium, and iron are nutrients of concern for this populations.
References


References


