MAINTENANCE OF THE ADOLESCENT ATHLETE

PHYSICAL, NUTRITIONAL AND SOCIAL CONSIDERATIONS FOR YOUTH SPORTS

BECKY MERCURO, DPT/S, CPT, ACE FITNESS NUTRITION SPECIALIST

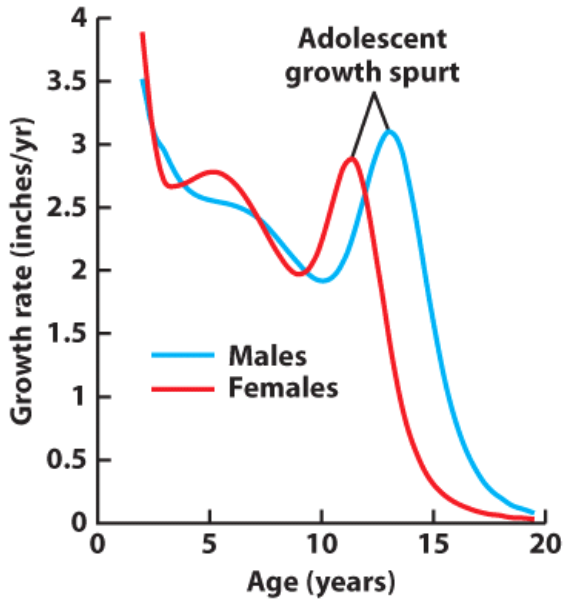
WHO IS AN ATHLETE?

An athlete is a person who is trained or skilled in exercises, sports, or games requiring physical strength, agility, or stamina
- **Merriam-Webster Dictionary**

- What makes our athletes perform?
  - Skills
  - *Strength, agility, stamina*
- What impacts our athletes' performance?
  - Direct trauma (contact injuries)
  - Non-contact injuries stemming from breakdowns in *strength, agility and stamina*
  - Physical and psychosocial health
- What can we do about it?
  - Incorporate programming to specifically target *strength, agility and stamina* separately from skills training to allow for symmetrical muscular stability, flexibility and body-awareness to keep our athletes healthy throughout the demands of the sport
  - Educate athletes on proper health and eating habits, while monitoring for any warning signs of distress

FACTORS TO CONSIDER IN THE ADOLESCENT POPULATION

- Physical Growth
  - Hormonal changes, environmental stressors, musculoskeletal changes, body composition, injuries
- Nutritional Requirements
  - Adult metabolism, increased demands with sports
- Hydration Requirements
  - Maintenance of proper fluid balance and replacement strategies
- Social and Behavioral Change
  - Mental health disorders, psychosocial environment



PATHOLOGY OF INJURY

- Incidence of soccer injuries
  - In the 2002 World Cup, 29% of European footballers were injured and 32% underperformed, which was directly correlated to number of matches played in the preceding weeks
  - Common soccer injuries include ACL tears, hamstring strains, groin strains, patellar tendonitis, Achilles tendonitis and more
  - Many of these non-contact injuries can be prevented with proper recovery and programs with neuromuscular control, balance, coordination, flexibility, strengthening and endurance
    - Sports specialization without adequate cross-training may contribute to fatigue and overuse
- Time away from sport
- Long-term sequalae
  - Re-injury
  - Osteoarthritis



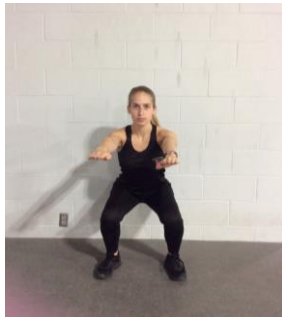

NEUROMOTOR CONTROL

	Correct Mechanics	Incorrect Mechanics
Frontal plane		
Sagittal plane		

- Poor proprioception
  - Awareness of one's body position in space
- Poor dynamic Q-angle
  - Medial migration of the knees during activity
- Other poor dynamic mechanics
  - Excessive anterior migration of the knee during activity
  - Poor dynamic control of plyometric activity
- The way an athlete moves statically at baseline will impact dynamic performance in a game

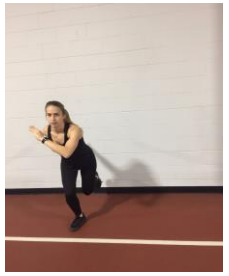
CORRECT NEUROMUSCULAR EXECUTION

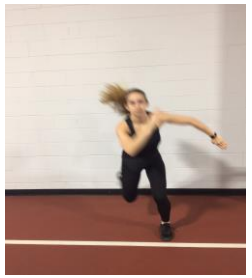
- Initiation with simple movement patterns

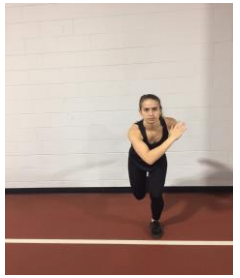


- Progression to increased load

- Progression to dynamic activity

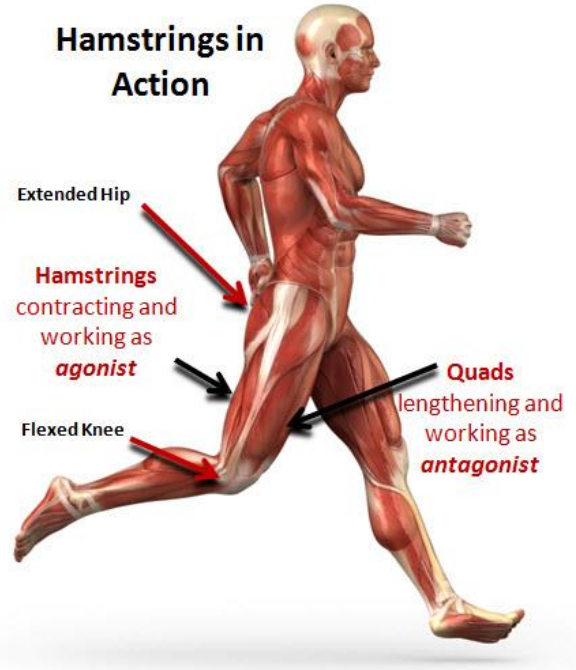


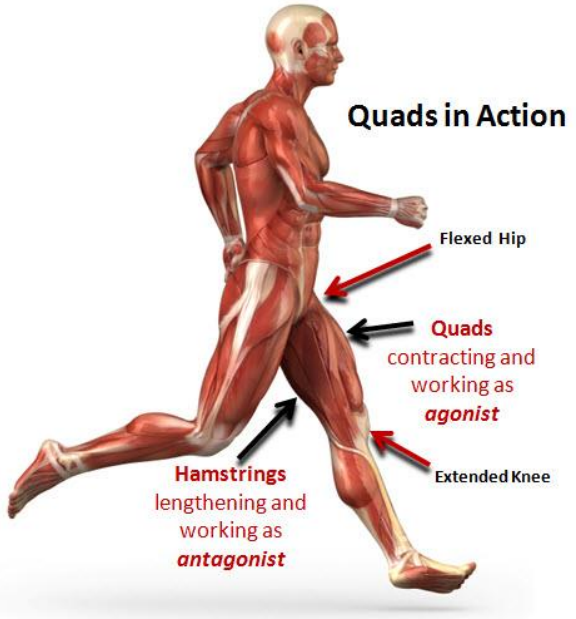




MUSCULAR BALANCE

- Muscle Strength
  - Agonist and antagonist groups
  - Anatomical Planes: strengthening in all directions
- Muscle Length
  - Optimal length for function
- Muscle Firing
  - Coordination between agonist and antagonist muscle groups
  - Effective control of compound movements





CROSS-TRAINING PROGRAMMING

- Dynamic warm-up
  - Prepare the body for exercise
  - Promote extensibility of muscle tissue
- Part 1: Neuromuscular Initiation
  - Major muscle group strengthening
  - Focus on form and stability
  - Balance
- Part 2: Dynamic Progression
  - Challenging muscular strength in more explosive and demanding movements
  - Plyometrics
  - Maintenance of strength
- Stretching
  - Optimal muscle length for peak function

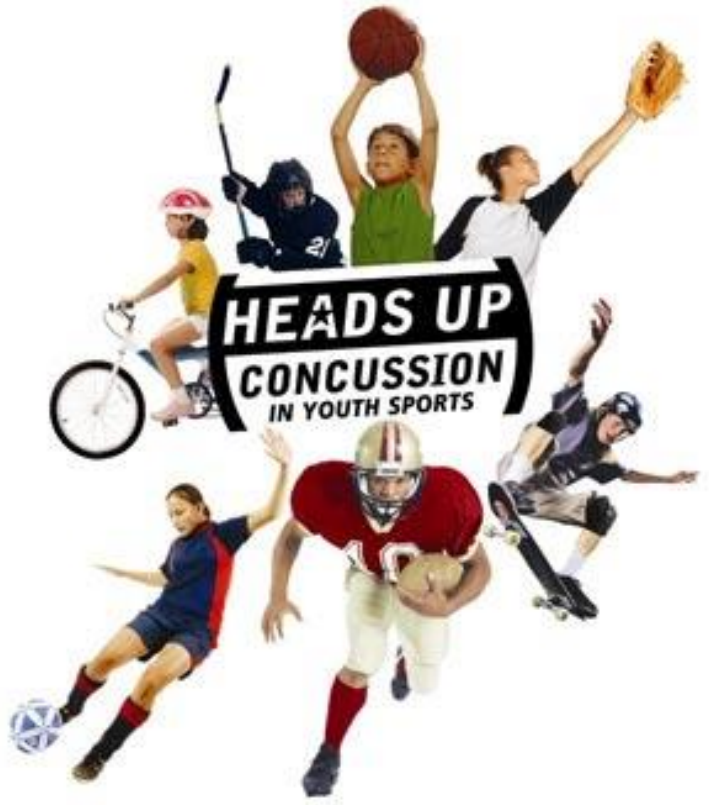
IMPORTANCE OF REST

- ACSM Standards: 48 hours between major muscles groups
  - Prevent excessive catabolism and muscle wasting
  - Can utilize active recovery: dynamic stretching, foam-rolling
- Replacement of essential building blocks
  - Proper hydration
  - Appropriate macronutrient intake
- Sleep
  - Muscle rest
  - Skill acquisition
  - Growth and performance

CONCUSSION AWARENESS

- **Mild Traumatic Brain Injury**: an insult to the brain caused by an external force, such as direct impact, changes in acceleration, or increased pressure
- Results in functional deficits in brain processing
- Signs: confusion, memory loss, uncoordinated, mood changes
- Symptoms: headache, nausea/vomiting, vision issues, grogginess, confusion

- Role of coach: recognition of condition, referral to medical professional, prevention of recurrent injury through activity moderation



Pocket CONCUSSION RECOGNITION TOOL™

To help identify concussion in children, youth and adults

RECOGNIZE & REMOVE

Concussion should be suspected **if one or more** of the following visible clues, signs, symptoms or errors in memory questions are present.

1. Visible clues of suspected concussion

Any one or more of the following visual clues can indicate a possible concussion:

Loss of consciousness or responsiveness
Lying motionless on ground/Slow to get up
Unsteady on feet / Balance problems or falling over/Incoordination
Grabbing/Clutching of head
Dazed, blank or vacant look
Confused/Not aware of plays or events

2. Signs and symptoms of suspected concussion

Presence of any one or more of the following signs & symptoms may suggest a concussion:

- Loss of consciousness
- Seizure or convulsion
- Balance problems
- Nausea or vomiting
- Drowsiness
- More emotional
- Irritability
- Sadness
- Fatigue or low energy
- Nervous or anxious
- "Don't feel right"
- Difficulty remembering
- Headache
- Dizziness
- Confusion
- Feeling slowed down
- "Pressure in head"
- Blurred vision
- Sensitivity to light
- Amnesia
- Feeling like "in a fog"
- Neck Pain
- Sensitivity to noise
- Difficulty concentrating

3. Memory function

Failure to answer any of these questions correctly may suggest a concussion.

"What venue are we at today?"
"Which half is it now?"
"Who scored last in this game?"
"What team did you play last week/game?"
"Did your team win the last game?"

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, and should not be returned to activity until they are assessed medically. Athletes with a suspected concussion should not be left alone and should not drive a motor vehicle.

It is recommended that, in all cases of suspected concussion, the player is referred to a medical professional for diagnosis and guidance as well as return to play decisions, even if the symptoms resolve.

RED FLAGS

If ANY of the following are reported then the player should be safely and immediately removed from the field. If no qualified medical professional is available, consider transporting by ambulance for urgent medical assessment:

- Athlete complains of neck pain
- Increasing confusion or irritability
- Repeated vomiting
- Seizure or convulsion
- Weakness or tingling/burning in arms or legs
- Deteriorating conscious state
- Severe or increasing headache
- Unusual behaviour change
- Double vision

Remember:

- In all cases, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the player (other than required for airway support) unless trained to so do
- Do not remove helmet (if present) unless trained to do so.

from McCrory et. al, Consensus Statement on Concussion in Sport. Br J Sports Med 47 (5), 2013

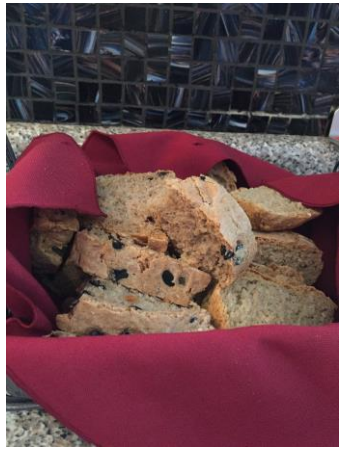
WHAT IS NUTRITION?

Nutrition involves the interaction of food and other nutrients in the maintenance, growth, reproduction, health and disease of an individual

- Proper nutrition should be balanced with an exercise program for optimal health and wellness

MACRONUTRIENTS

- Macronutrients are nutritional intakes needed by the body in large amounts to support cellular function
  - **Carbohydrates**
    - Body's preferred source of immediate energy: 4 calories/gram, 45-65% of the diet
    - Monosaccharides, polysaccharides, oligosaccharides
    - Excess carbohydrates will result in sugar storage as fat
    - Glycemic index: the impact of a carbohydrate on blood sugar levels
      - High GI foods break down quickly with a spike in BS
      - Low GI foods break down slowly for a more even increase in BS
    - Fiber



MACRONUTRIENTS (CONTINUED)

- **Protein**
  - Important for muscle structure, micronutrient transfer, and acid-base balance
  - 4 calories/gram, 10-35% of the diet
  - In the absence of carbs, muscle protein is relied on as fuel
  - Excess protein is converted to glucose or fat
  - Essential and nonessential amino acids

- **Fat**
  - Important for tissue protection, thermoregulation, nerve conduction, and vitamin transport
  - Most energy-dense macronutrient
  - 9 calories/gram, converted to adipose tissue when not immediately used
  - Essential and nonessential fatty acids
  - Unsaturated (double bonds) and saturated (single bonds)
    - Trans fats are unsaturated fats that have had their double bonds broken to be solid at room temperature
    - Amount of HDL ("good cholesterol") and LDL ("bad cholesterol")

MICRONUTRIENTS

- Needed in small amounts for optimal health and function
- Some function as antioxidants (prevent oxidative damage) and phytochemicals (reduce risk of disease)
- Vitamins
  - Water-soluble vitamins
    - **Thiamin** (B1): release of energy from carbohydrates during metabolism, growth and tone
    - **Riboflavin** (B2): release of energy from protein, fat and carbohydrates during metabolism
    - **Niacin**: carbohydrate, protein and fat metabolism
    - **Pantothenic acid**: release energy from fats and vegetables
    - **Vitamin** B6: build body tissue and metabolism of protein
    - **Folate**: genetic material development, RBC production
    - **Vitamin** B12: cell development, nervous system function, metabolism of protein and fat
    - **Biotin**: carbohydrate, protein and fat metabolism
    - **Vitamin** C: forms bone, cartilage, muscle and blood vessels; absorption of iron

MICRONUTRIENTS (CONTINUED)

- Fat-soluble vitamins
  - **Vitamin A:** skin, hair, mucous membranes, dim light vision, bone growth
  - **Vitamin D**: bone and tooth formation, heart and nervous system action
  - **Vitamin E**: protects cells, tissue and fatty acids from destruction
  - **Vitamin K**: blood-clotting functions
- Minerals
  - **Calcium**: bone, teeth, muscles; heart and nerve function
  - **Phosphorus**: bone development, macronutrient utilization
  - **Magnesium**: acid-base balance, macronutrient metabolism
  - **Sodium, Potassium, Chloride**: electrolytes (ions) for water and acid-base balance
  - **Sulfur**: component of amino acids, vitamins and heparin (anticoagulant)
  - Microminerals:
    - **Iron**: hemoglobin formation, resistance to pathology
    - **Iodine**: component of thyroxine (controls metabolism)
    - **Selenium**: protects from oxidation, radiation, pollution
    - **Zinc**: digestion, metabolism, healing

USDA DIETARY RECOMMENDATIONS

- USDA Eating Plan
  - Representation of Dietary Guidelines
  - Variety, vegetables, fruits, whole grains, seafood, fat-free
- Characteristics of healthy eating
  - High in fruits/vegetables
  - Whole grains
  - Moderate protein (seafood, beans, peas, nuts, seeds, soy, meat poultry, eggs)
  - Low sugar
  - More oils than solid fats
  - Low full-fat/milk products
  - **Colorful plate**

Average Daily Amounts in the Protein Foods Group in the USDA Food Pattern at the 2,000-calorie Level and its Vegetarian Adaptations

Food Category	USDA Food Pattern	Lacto-ovo Adaptation	Vegan Adaptation
Meats (e.g., beef, pork, lamb)	1.8 oz-eq[a]	0 oz-eq	0 oz-eq
Poultry (e.g., chicken, turkey)	1.5 oz-eq	0 oz-eq	0 oz-eq
Seafood	1.2 oz-eq	0 oz-eq	0 oz-eq
Eggs	0.4 oz-eq	0.6 oz-eq	0 oz-eq
Beans and peas[b]	N/A	1.4 oz-eq	1.9 oz-eq
Processed soy products	<0.1 oz-eq	1.6 oz-eq	1.4 oz-eq
Nuts and seeds[c]	0.5 oz-eq	1.9 oz-eq	2.2 oz-eq
Total per day	**5.5 oz-eq**	**5.5 oz-eq**	**5.5 oz-eq**

[a] Amounts shown in ounce-equivalents (oz-eq) per day. These are average recommended amounts to consume over time.

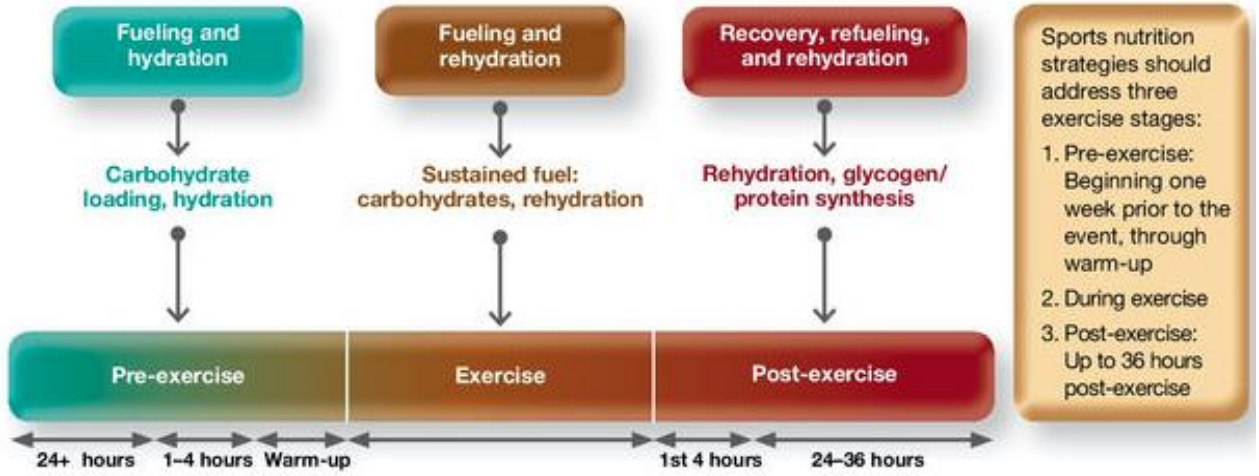
[b] Beans and peas are included in the USDA Food Patterns as a vegetable subgroup rather than in the protein foods group. Amounts shown here in the vegetarian patterns are additional beans and peas, in ounce-equivalents. One ounce-equivalent of beans and peas is 1/4 cup, cooked. These amounts do not include about 1½ cups per week of beans and peas recommended as a vegetable in all of the 2,000 calorie patterns.

[c] Each ounce-equivalent of nuts is 1/2 ounce of nuts, so on a weekly basis, the 2,000 calorie patterns contain from 2 ounces to 8 ounces of total nuts.

Reprinted from U.S Department of Agriculture (2010). *2010 Dietary Guidelines for Americans.* www.dietaryguidelines.gov

EATING AND EXERCISE:ATHLETIC CONSIDERATIONS

- Availability of glycogen stores in muscle
  - Maintained by a proper diet
- Small carbohydrate/protein snack before to increase glucose availability
  - Avoid exercise-induced protein catabolism
- If exercise lasts longer than an hour, may need additional carbohydrates
  - Small amounts in 15-20 minute intervals (immediate energy- sports drinks)
- Post-exercise eating goal is to restore glycogen and supply for muscle repair
  - Carbohydrates and protein (4:1 ratio for effective rebuilding)
- Maintenance of hydration and electrolytes
  - 1:1 fluid replacement during exercise



USDA

10 tips Nutrition Education Series

choose the foods you need to grow

10 tips for teen guys

Feed your growing body by making better food choices today as a teen and as you continue to grow into your twenties. Make time to be physically active every day to help you be fit and healthy as you grow.

1 get over the idea of magic foods

There are no magic foods to eat for good health. Teen guys need to eat foods such as vegetables, fruits, whole grains, protein foods, and fat-free or low-fat dairy foods. Choose protein foods like unsalted nuts, beans, lean meats, and fish. SuperTracker.usda.gov will show if you are getting the nutrients you need for growth.

2 always hungry?

Whole grains that provide fiber can give you a feeling of fullness and provide key nutrients. Choose half your grains as whole grains. Eat whole-wheat breads, pasta, and brown rice instead of white bread, rice, or other refined grains. Also, choose vegetables and fruits when you need to "fill-up."

3 keep water handy

Water is a better option than many other drink choices. Keep a water bottle in your backpack and at your desk to satisfy your thirst. Skip soda, fruit drinks, and energy and sports drinks. They are sugar-sweetened and have few nutrients.

4 make a list of favorite foods

Like green apples more than red apples? Ask your family food shopper to buy quick-to-eat foods for the fridge like mini-carrots, apples, oranges, low-fat cheese slices, or yogurt. And also try dried fruit; unsalted nuts; whole-grain breads, cereal, and crackers; and popcorn.

5 start cooking often

Get over being hungry by fixing your own snacks and meals. Learn to make vegetable omelets, bean quesadillas, or a batch of spaghetti. Prepare your own food so you can make healthier meals and snacks. Microwaving frozen pizzas doesn't count as home cooking.

6 skip foods that can add unwanted pounds

Cut back on calories by limiting fatty meats like ribs, bacon, and hot dogs. Some foods are just occasional treats like pizza, cakes, cookies, candies, and ice cream. Check out the calorie content of sugary drinks by reading the Nutrition Facts label. Many 12-ounce sodas contain 10 teaspoons of sugar.

7 learn how much food you need

Teen guys may need more food than most adults, teen girls, and little kids. Go to www.SuperTracker.usda.gov. It shows how much food you need based on your age, height, weight, and activity level. It also tracks progress towards fitness goals.

SuperTracker

8 check Nutrition Facts labels

To grow, your body needs vitamins and minerals. Calcium and vitamin D are especially important for your growing bones. Read Nutrition Facts labels for calcium. Dairy foods provide the minerals your bones need to grow.

9 strengthen your muscles

Work on strengthening and aerobic activities. Work out at least 10 minutes at a time to see a better you. However, you need to get at least 60 minutes of physical activity every day.

10 fill your plate like MyPlate

Go to www.ChooseMyPlate.gov for more easy tips and science-based nutrition from the Dietary Guidelines for Americans (www.DietaryGuidelines.gov).

USDA

10 tips Nutrition Education Series

eat smart and be active as you grow

10 healthy tips for teen girls

Young girls, ages 10 to 19, have a lot of changes going on in their bodies. Building healthier habits will help you—now as a growing teen—and later in life. Growing up means you are in charge of foods you eat and the time you spend being physically active every day.

1 build strong bones

A good diet and regular physical activity can build strong bones throughout your life. Choose fat-free or low-fat milk, cheeses, and yogurt to get the vitamin D and calcium your growing bones need. Strengthen your bones three times a week doing activities such as running, gymnastics, and skating.

2 cut back on sweets

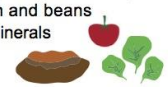
Cut back on sugary drinks. Many 12-ounce cans of soda have 10 teaspoons of sugar in them. Drink water when you are thirsty. Sipping water and cutting back on cakes, candies, and sweets helps to maintain a healthy weight.

3 power up with whole grain

Fuel your body with nutrient-packed whole-grain foods. Make sure that at least half your grain foods are whole grains such as brown rice, whole-wheat breads, and popcorn.

4 choose vegetables rich in color

Brighten your plate with vegetables that are red, orange, or dark green. Try acorn squash, cherry tomatoes, or sweet potatoes. Spinach and beans also provide vitamins like folate and minerals like potassium that are essential for healthy growth.



5 check Nutrition Facts labels for iron

Read Nutrition Facts labels to find foods containing iron. Most protein foods like meat, poultry, eggs, and beans have iron, and so do fortified breakfast cereals and breads.

6 be a healthy role model

Encourage your friends to practice healthier habits. Share what you do to work through challenges. Keep your computer and TV time to less than 2 hours a day (unless it's school work).

7 try something new

Keep healthy eating fun by picking out new foods you've never tried before like lentils, mango, quinoa, or kale.

8 make moving part of every event

Being active makes everyone feel good. Aim for 60 minutes of physical activity each day. Move your body often. Dancing, playing active games, walking to school with friends, swimming, and biking are only a few fun ways to be active. Also, try activities that target the muscles in your arms and legs.

9 include all food groups daily

Use MyPlate as your guide to include all food groups each day. Learn more at www.ChooseMyPlate.gov.

10 everyone has different needs

Get nutrition information based on your age, gender, height, weight, and physical activity level. Use SuperTracker to find your calorie level, choose the foods you need, and track progress toward your goals. Learn more at www.SuperTracker.usda.gov.

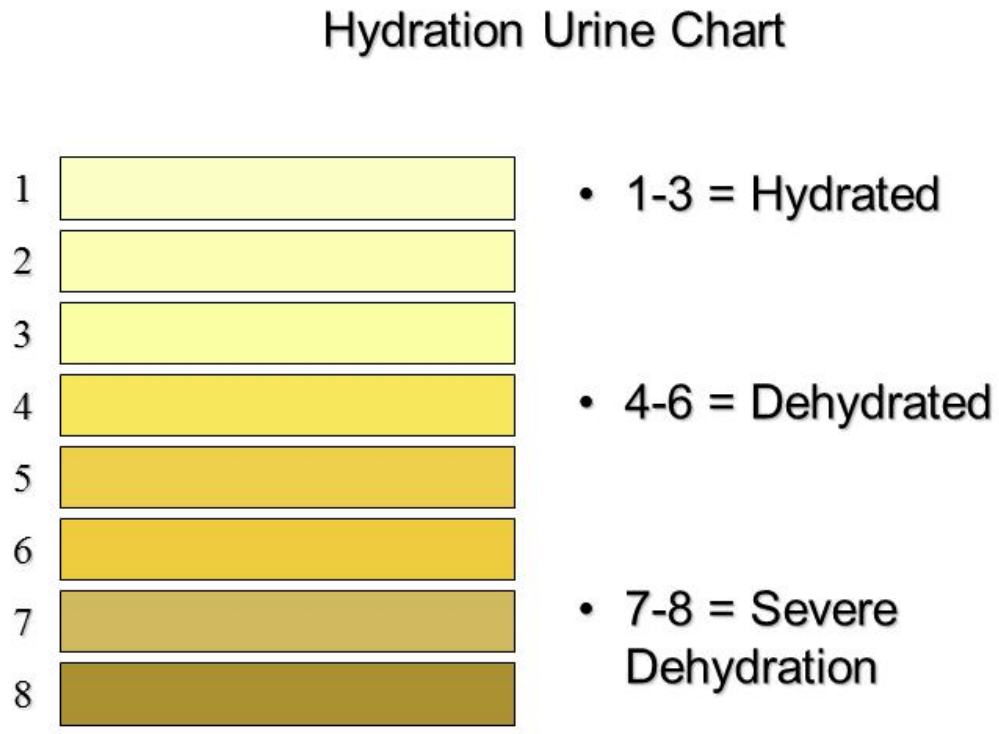
SuperTracker

HYDRATION

- Single largest component of the human body
  - 50-70% of weight
- Regulates body temperature, protects organs, assists in metabolism
- Dehydration: a harmful amount of body water loss
  - Can lead to heat exhaustion and heat stroke
  - Children have a lower capacity to remove excess heat
- Hyponatremia: low levels of sodium in the body
  - Can be due to overhydration
- 0.5-1.0 ounces per pound of body weight
  - Balance of intake and output (hydrate additionally with activity)
- Sports drinks
  - Addition of sodium can assist in retention of water and replenishment of electrolytes
  - Should not exceed 14g of carbohydrates/8ounces of water

HYDRATION (CONTINUED)

- Signs of Dehydration:
  - Increased thirst
  - Dry mouth
  - Weakness
  - Dizziness
  - Palpitations
  - Confusion
  - Fainting
  - Reduced sweat
  - Reduced urine



ACSM Information On…

Selecting and Effectively Using Hydration for Fitness

Water is the most essential component of the human body as it provides an important role in the function of cells. Important functions of water include transportation of nutrients, elimination of waste products, regulation and maintenance of body temperature through sweating, maintenance of blood circulation and pressure, lubrication of joints and body tissues, and facilitation of digestion. More than half of the human body is composed of water, and it is impossible to sustain life without it.

A COMPLETE PHYSICAL ACTIVITY PROGRAM

A well-rounded physical activity program includes aerobic exercise and strength training exercise, but not necessarily in the same session. This blend helps maintain or improve cardiorespiratory and muscular fitness and overall health and function. Regular physical activity will provide more health benefits than sporadic, high intensity workouts, so choose exercises you are likely to enjoy and that you can incorporate into your schedule.

ACSM's physical activity recommendations for healthy adults, updated in 2011, recommend at least 30 minutes of moderate-intensity physical activity (working hard enough to break a sweat, but still able to carry on a conversation) five days per week, or 20 minutes of more vigorous activity three days per week. Combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation.

Examples of typical aerobic exercises are:
- Walking
- Running
- Stair climbing
- Cycling
- Rowing
- Cross country skiing
- Swimming.

In addition, strength training should be performed a minimum of two days each week, with 8-12 repetitions of 8-10 different exercises that target all major muscle groups. This type of training can be accomplished using body weight, resistance bands, free weights, medicine balls or weight machines.

WATER LOSS

Exercise produces an elevation in body temperature, which depends on the intensity and duration of exercise, environmental conditions, clothing worn, and metabolic rate. In order to get rid of the excess heat, your body secretes sweat, which is primarily composed of water and electrolytes such as sodium. The evaporation of sweat is the primary mechanism of heat loss during exercise.

Exercise can lead to substantial water and electrolyte loss from sweat leading to dehydration and, in cases of excessive fluid intake, hyponatremia (low sodium in the blood). However, considerable variability exists from person to person with regard to sweat loss. Therefore, the fluid and electrolyte requirements needed for the athlete are variable from person to person as well. If water and electrolytes are not replaced from these losses, the athlete will have a decrease in performance and perhaps an adverse effect on his or her overall health.

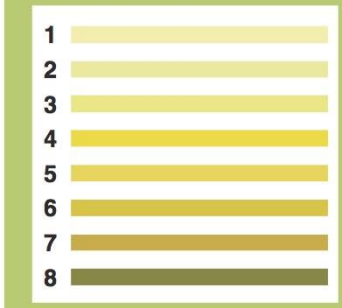
FLUID BALANCE

Thirst is a signal that your body is headed toward dehydration. Therefore, it is important to drink before you feel thirsty and to drink throughout the day. Thirst is not a good indicator of hydration and should not be used to monitor hydration status.

One way to check your hydration status is to weigh yourself before and after exercise. The before-exercise measurement is best as a nude weight first thing in the morning after urinating. Comparing your body weight before and after exercise can be used to estimate your sweat loss and your fluid requirements. Any weight loss is likely from fluid loss, so drinking enough to replenish these losses will maintain hydration. The table below shows us that over a one percent loss in body weight indicates dehydration and over five percent indicates serious dehydration. These fluid losses need to be replaced.

% Body Weight Change	
Well Hydrated	**-1 to +1%**
Minimal Dehydration	**-1 to -3%**
Significant Dehydration	**-3 to -5%**
Serious Dehydration >	**-5%**

Another way to check hydration status is the urine color test. A large amount of light-colored urine means you are well hydrated. The darker the color, the more dehydrated you are.



DEHYDRATION

Dehydration is the loss of fluids and salts essential to maintain normal body function. Dehydration occurs when the body loses more fluids than it takes in. Dehydration can lead to:
- Muscle fatigue
- Loss of coordination
- Inability to regulate body temperature
- Heat illness (e.g., cramps, heat exhaustion, heat stroke)
- Decreased energy and athletic performance

Moderate caffeine intake does not affect hydration status or urine output. However, alcohol will increase your urine output and decrease hydration.

Enhancing palatability of a fluid will help to encourage fluid consumption. This can be done with proper flavoring, proper salt (sodium) content and drinking a cold beverage (15-21 degrees Celsius).

SPORTS BEVERAGES

Carbohydrates within a sports beverage help to replenish your sugar (glycogen) stores and electrolytes help to accelerate rehydration. Sports beverages for use during prolonged exercise should generally contain four to eight percent carbohydrate, 20-30 meq/L of sodium, and 2-5 meq/L of potassium. The need for carbohydrates and electrolytes within sports beverages increases with prolonged activity.

Carbohydrate consumption helps to sustain and improve exercise performance during high-intensity exercise longer than one hour as well as lower-intensity exercise for longer periods. You should ingest one-half to one liter of a sports drink each hour to maintain hydration. Also, sports drinks should not exceed a carbohydrate concentration of eight percent.

HYDRATION BEFORE EXERCISE

Check your hydration status before exercise because there is a wide variability in fluid needs for each person.
- Drink 16-20 fluid ounces of water or sports beverage at least four hours before exercise.
- Drink 8-12 fluid ounces of water 10-15 minutes before exercise.

Consuming a beverage with sodium (salt) and/or small meal helps to stimulate thirst and retain fluids.

HYDRATION DURING EXERCISE

- Drink 3-8 fluid ounces of water every 15-20 minutes when exercising for less than 60 minutes.
- Drink 3-8 fluid ounces of a sports beverage (5-8 percent carbohydrate with electrolytes) every 15-20 minutes when exercising greater than 60 minutes.

Do not drink more than one quart/hour during exercise.

HYDRATION GUIDELINES AFTER EXERCISE

Obtain your body weight and check your urine to estimate your fluid losses. The goal is to correct your losses within two hours after exercise.
- Drink 20-24 fluid ounces of water or sports beverage for every one pound lost

OVERHYDRATION

Overhydration, also called water intoxication, is a condition where the body contains too much water. This can result in behavioral changes, confusion, drowsiness, nausea/vomiting, weight gain, muscle cramps, weakness/paralysis and risk of death.

In general, overhydration is treated by limiting your fluid intake and increasing the salt (sodium) that you consume. If overhydration is suspected, you should see your doctor for appropriate lab tests and treatment. You should not consume more than one liter per hour of fluid.

STAYING ACTIVE PAYS OFF!

Those who are physically active tend to live longer, healthier lives. Research shows that moderate physical activity – such as 30 minutes a day of brisk walking – significantly contributes to longevity. Even a person with risk factors like high blood pressure, diabetes or even a smoking habit can gain real benefits from incorporating regular physical activity into their daily life.

As many dieters have found, exercise can help you stay on a diet and lose weight. What's more – regular exercise can help lower blood pressure, control blood sugar, improve cholesterol levels and build stronger, denser bones.

THE FIRST STEP

Before you begin an exercise program, take a fitness test, or substantially increase your level of activity, make sure to answer the following questions. This physical activity readiness questionnaire (PAR-Q) will help determine if you're ready to begin an exercise routine or program.
- Has your doctor ever said that you have a heart condition or that you should participate in physical activity only as recommended by a doctor?
- Do you feel pain in your chest during physical activity?
- In the past month, have you had chest pain when you were not doing physical activity?
- Do you lose your balance from dizziness? Do you ever lose consciousness?
- Do you have a bone or joint problem that could be made worse by a change in your physical activity?
- Is your doctor currently prescribing drugs for your blood pressure or a heart condition?
- Do you know of any reason you should not participate in physical activity?

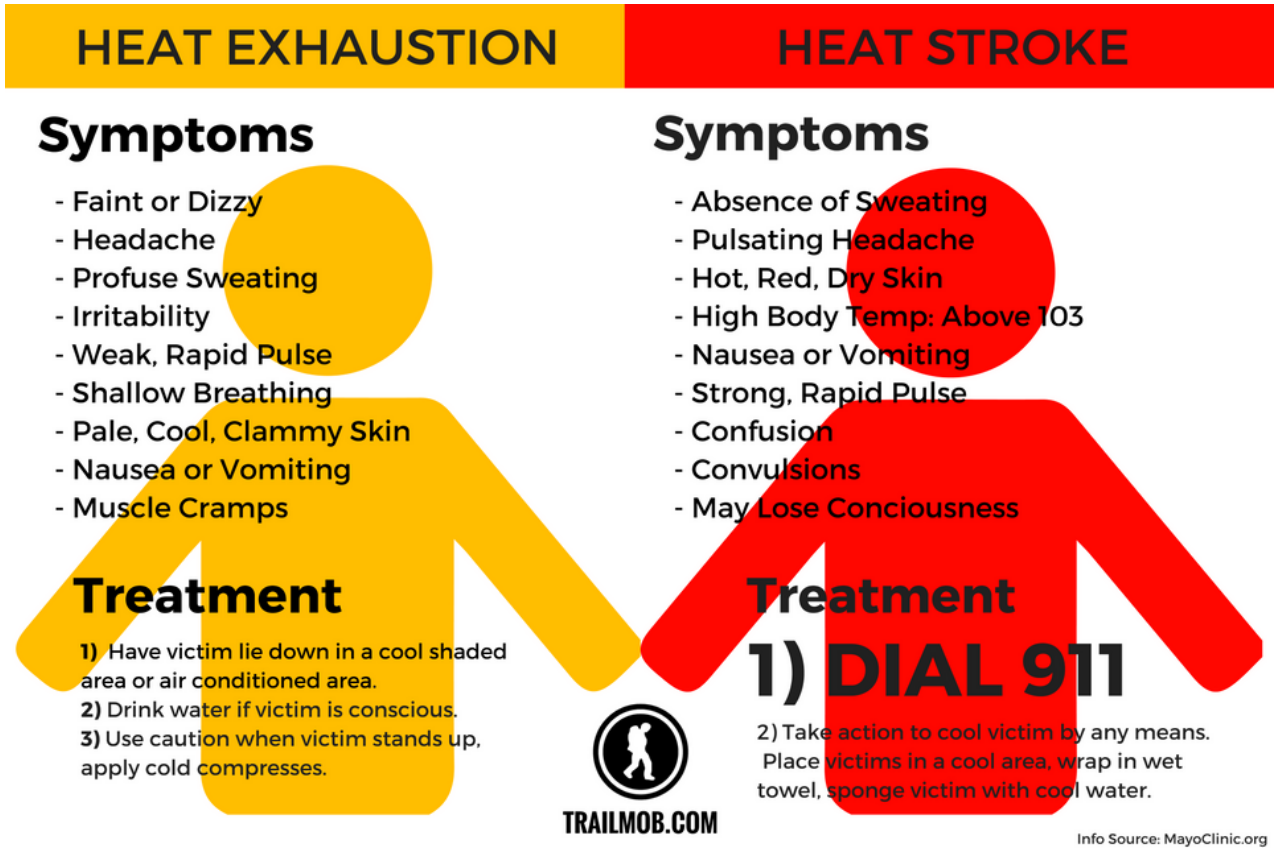
If you answered yes to one or more questions, if you are over 40 years of age and have recently been inactive, or if you are concerned about your health, consult a physician before taking a fitness test or substantially increasing your physical activity. If you answered no to each question, then it's likely that you can safely begin exercising.

PRIOR TO EXERCISE

Prior to beginning any exercise program, including the activities depicted in this brochure, individuals should seek medical evaluation and clearance to engage in activity. Not all exercise programs are suitable for everyone, and some programs may result in injury. Activities should be carried out at a pace that is comfortable for the user. Users should discontinue participation in any exercise activity that causes pain or discomfort. In such event, medical consultation should be immediately obtained.

AMERICAN COLLEGE of SPORTS MEDICINE
LEADING THE WAY

WEATHER RELATED INJURIES

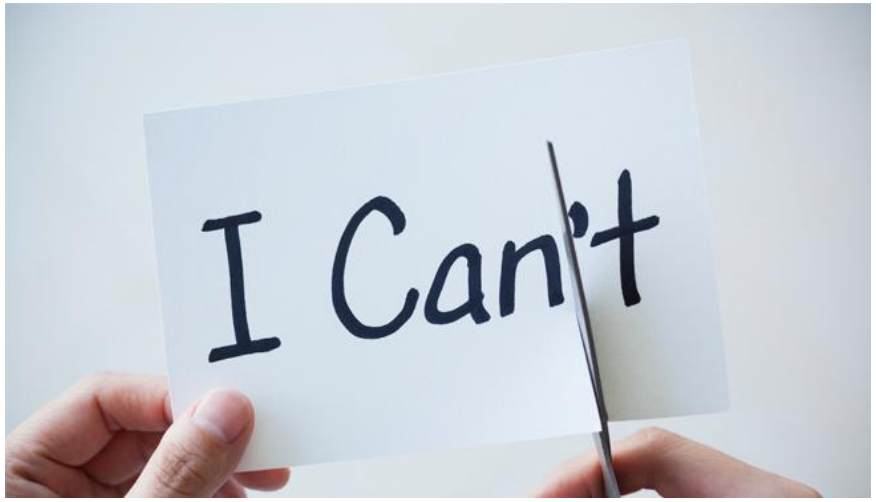


- Adolescents are less effective at thermoregulation (control of temperature- normal is 98.6°F)
  - Hyperthermia: excessive heat retention (often due to high heat and humidity)
  - Hypothermia: excessively reduced core body temperature

- Role of the coach:
  - Recognize warning signs and symptoms
  - Provide rest and recovery
  - Implement standards of rehydration
  - Avoid practicing at hottest times of the day
  - Education on proper layering of clothing and avoiding skin exposure with wind chill

PSYCHOSOCIAL GROWTH

- Puberty/hormones
  - Self-image and self-confidence
  - Self-identity and comparison to peers
  - Emergence of signs of eating or mental disorders
- Social inclusion/exclusion
  - New teams
  - New schools
  - Home changes
- Coping mechanisms
  - Increased difficulty with sports, school and other environments
  - Understanding the merit of failure



EATING DISORDERS

- Anorexia Nervosa
  - Intentional self-starvation, utilization of laxatives or vomiting, body distortion and image disorders
- Bulimia Nervosa
  - Alternating episodes of binge-eating and compensatory behaviors, such as utilization of laxatives or vomiting
- Binge-Eating Disorder
  - Regular episodes of excessive consumption of food in a short period of time
- Orthorexia Nervosa
  - Obsession with the idea of a perfect diet and insistence on adherence to a particular regimen
- Anorexia Athletica
  - Obsession with excessive, compulsive exercising
- Mixed Disorder
  - Characteristics of different conditions

FEMALE ATHLETE TRIAD

- Often present in sports that require a lean physique
- Health consequences can become fatal

- Triad includes:
  - Energy deficiency (due to disordered eating)
  - Menstrual Dysfunction (amenorrhea)
  - Low bone density (osteoporosis)

- Role of coaches: screening and prevention

OTHER BEHAVIORAL DISORDERS

- Anxiety: feelings of worry, fear or anxiousness that interfere with everyday life
  - Generalized, panic, social
- Stress-related: difficulty recovering from an experience
- Mood disorders
  - Depression, bipolar disorder, seasonal affective disorder
- OCD (obsessive compulsive disorder): excessive thoughts that lead to repetitive behaviors
- ADHD (attention defect hyperactivity disorder): difficulty paying attention and controlling impulsive behaviors

- Role of coaches: recognition and adaptation

RESOURCES

- Online Concussion Training:
  - https://www.cdc.gov/headsup/youthsports/training/index.html
- Nutritional Recommendations:
  - USDA: https://www.choosemyplate.gov/
  - Athlete considerations: https://medlineplus.gov/ency/article/002458.htm
- Hydration:
  - ACSM Hydration Guidelines: https://www.acsm.org/docs/brochures/selecting-and-effectively-using-hydration-for-fitness.pdf
- Psychosocial Assistance:
  - Adolescent suicide hotline: 800-621-4000
  - Violence and abuse hotline: 800-422-4453
  - National Alliance on Mental illness hotline: 1-800-950-6264
  - More: https://www.healthyplace.com/other-info/resources/mental-health-hotline-numbers-and-referral-resources/

QUESTIONS?

THANK YOU!

REFERENCES

- Definition of ATHLETE. *Merriam-webstercom*. 2018. Available at: https://www.merriam-webster.com/dictionary/athlete. Accessed January 27, 2018.
- Ekstrand J. A congested football calendar and the wellbeing of players: correlation between match exposure of European footballers before the World Cup 2002 and their injuries and performances during that World Cup. *Br J Sports Med*. 2004;38(4):493-497. doi:10.1136/bjsm.2003.009134.
- Jayanthi N, Pinkham C, Dugas L, Patrick B, LaBella C. Sports Specialization in Young Athletes. *Sports Health: A Multidisciplinary Approach*. 2012;5(3):251-257. doi:10.1177/1941738112464626.
- Valovich McLeod T, Decoster L, Loud K et al. National Athletic Trainers' Association Position Statement: Prevention of Pediatric Overuse Injuries. *J Athl Train*. 2011;46(2):206-220. doi:10.4085/1062-6050-46.2.206.
- Hewett T, Myer G, Ford K et al. Biomechanical Measures of Neuromuscular Control and Valgus Loading of the Knee Predict Anterior Cruciate Ligament Injury Risk in Female Athletes: A Prospective Study. The American Journal of Sports Medicine. 2005;33(4):492-501. doi:10.1177/0363546504269591.
- Alentorn-Geli E, Myer G, Silvers H et al. Prevention of non-contact anterior cruciate ligament injuries in soccer players. Part 1: Mechanisms of injury and underlying risk factors. Knee Surgery, Sports Traumatology, Arthroscopy. 2009;17(7):705-729. doi:10.1007/s00167-009-0813-1.
- Lohmander L, Östenberg A, Englund M, Roos H. High prevalence of knee osteoarthritis, pain, and functional limitations in female soccer players twelve years after anterior cruciate ligament injury. Arthritis & Rheumatism. 2004;50(10):3145-3152. doi:10.1002/art.20589
- Muth N, Tanaka M. *ACE Fitness Nutrition Manual*. 1st ed. San Diego, CA: American Council on Exercise, 2013. Print.
- MyPlate. *Choose MyPlate*. 2018. Available at: https://www.choosemyplate.gov/MyPlate. Accessed January 16, 2018.