Obesity is on the rise with American youth. And so are sports injuries. At either extreme—inactivity and activity—children are pushing their bodies far beyond healthy limits, at a time when their bodies are still developing and are much more vulnerable to the effects of abuse and overuse.

Stories about sports injuries have been featured regularly over the past 6–8 years in sync with the growing epidemic. Doctors report a huge rise in the number of kids coming in with overuse injuries. Young pitchers are beginning to need “Tommy John” (tennis elbow) surgery at age 14. Recently, the spotlight has been on a new concern: an alarmingly higher rate of injury in girls and young women.

In this Teachable Moment, students investigate the effects of intensive physical activity on the body and the differences between developing and mature bodies, as well as male and female bodies.

### National Standards Addressed

**Science Standards**
- Structure and function in living systems (anatomy of the human body)
- Develop an understanding of personal health

**Physical Education and Health Standards**
- Demonstrates competency in many movement forms and proficiency in a few movement forms
- Explains the relationship between positive health behaviors and the prevention of injury, illness, disease, and premature death
- Demonstrates the ability to influence and support others in making positive health choices

### Options for Using Student Activities and Worksheets

**Worksheet 1:** Start this Teachable Moment by seeing if students can brainstorm some of the factors behind youth injury trends. Briefly introduce the topic and then form small groups. Give students 15–20 minutes to answer the three questions, then discuss as a class. Add some of your own experiences and examples to help expand their thinking if needed.

**Worksheet 2:** You can assign this worksheet as homework, then discuss as a class. Your Web resources include a short audio interview with Warrior Girls author Michael Sokolove about injuries in girls. You may choose to play the video and discuss it in class.

**Worksheet 3:** Students can work individually, in pairs, or as trios and (with your approval) can pick an injury related to a physical activity they like.

### Possible extensions:
- Students can demonstrate techniques that can help prevent the injury they research. Examples include warm-up or cool-down exercises, proper taping techniques, or good vs. bad techniques for a particular skill or move in a sport.
- Talk about the forces and motion of parts of the body during particular sports moves (physics, biomechanics).
Web Sites and Online References

http://www.nytimes.com/2008/08/17/books/review/Morrice-t.html?pagewanted=all

International Herald Tribune: Old Before Their Time—Overuse Injuries Afflict the Young
http://www.iht.com/articles/2005/02/22/sports/hurt.php

Female Athletes Suffer Pain for Glory (15-minute audio interview and book excerpt)

About.com: Youth Sports and Overuse Injuries
http://sportsmedicine.about.com/od/children/a/overusekids.htm

About.com: Common Sports Injuries, Causes, Symptoms, Diagnosis and Treatments
http://sportsmedicine.about.com/od/paininjury1/u/Injuries.htm

American Academy of Pediatrics: Sports Shorts
http://www.aap.org/sections/sportsmedicine/SportsShorts.cfm

National Center for Sports Safety
http://www.sportssafety.org/

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Teacher Background Information

Doctors have seen a rapid rise in the number and severity of sports injuries in young patients. Most are overuse or overexposure injuries (rather than traumatic or acute injuries) that affect tissues, tendons, muscles, and growth plates/bones.

Experts attribute this “injury epidemic” to several key factors:

- Increased competition in youth sports: Competitive pressures are coming from kids themselves, from parents, and from our overall culture. Important advances such as Title IX legislation opened new paths and possibilities for women, but opportunity has also meant earlier and more intense competition.

- Specialization: Because of increased competition and increased opportunities (e.g., indoor facilities), more youth play the same sport year-round, sometimes on multiple teams in a single season (club team, school team). Muscles specific to the sport are overused and never get the rest they need, while other muscles that could be strengthened playing a different sport are underdeveloped.

- Poor training technique: Many coaches don’t understand youth/adolescent development and don’t know how to teach the proper stretching, play and cool-down techniques, or important differences in the anatomy and physiology of boys and girls. When injuries occur, many may not recognize them for what they are (a growth plate fracture might not feel much different from a slight sprain) and/or have a “play through pain” attitude. Youth exacerbate training problems by trying to imitate the techniques of adult athletes or by using equipment that is too big for them.

- Increase in the popularity of extreme sports

The American Academy of Pediatrics and many national youth sports organizations have created materials and run campaigns to promote sports safety and injury prevention. Some youth leagues now require mandatory certification courses for coaches. Even still, the problem persists and appears to be accelerating at a higher rate for girls and young women.
Worksheet 1: Injury Epidemic—What Do You Think?

Believe it or not, you and your friends are part of a growing epidemic of sports-related injuries among young athletes, especially girls. Compared to previous generations, you are playing differently. But how?

With other students in your class, try to identify some of the reasons behind these youth injury trends. Then answer the questions below.

1. What sports or physical activities are you involved in? Have you or other teammates experienced injuries? If so, what types?

2. In what ways do you think you are playing sports “differently” from previous generations? What is different? What has changed?

3. In 1972, a famous civil rights law known as “Title IX” was passed: “No person in the United States shall on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.” The law guaranteed equal educational opportunity regardless of gender—including equal athletic opportunity in schools receiving federal funding.

Have you heard of Title IX? Can you see any connections between “equal opportunity” for female athletes and today’s higher rate of injury among girls? What other reasons might explain girls’ increased injury rate?
Worksheet 2: Read Up on the Issue

Now that you have some initial ideas about why injuries are on the rise, use your resources to learn more about the problem and answer the questions below.

1. What types of injuries are on the rise in youth?

2. Why are young people particularly vulnerable to injury? Give at least 4 reasons.

3. What is a “growth plate”?

4. Why are female athletes experiencing a higher rate of injury than male athletes? Give at least three reasons. How do these compare with reasons you brainstormed earlier?

5. What are some of the ways doctors, coaches, trainers, and others try to prevent injury? Do you have any other ideas?
Worksheet 3: You’re the Sports Doctor

Now it’s your turn to practice a little sports medicine. Use your Web resources and other sources to research a common sports injury and create a poster that would educate people—kids, parents, coaches—about that injury. You’ve probably seen posters like this on the waiting room wall of your doctor’s office.

Pick an injury from the list below, or with approval from your teacher, select one of your own, perhaps from a physical activity you do or love (sports, dance, hiking, etc.).

Injuries:
- ACL tear
- “Tommy John” injury or Tennis Elbow
- Stress fracture
- Shin splints
- Tendonitis
- Bursitis
- Concussion

Include the following elements in your poster:
- Pictures: Include at least two pictures or illustrations that show the part of the body affected by the injury—a normal view and a view of the injury. Label key structures and features (names of the bones, muscles or tendons involved, effects/symptoms of the injury).
- Injury overview: Describe the injury and what causes it.
- Risk factors: Who is at risk and why? Is this injury more common in certain sports or for certain people?
- Treatment: How is the injury treated?
- Training and coaching recommendations: How can you prevent this injury? Are there specific training exercises that help?

Beyond the required elements, be creative! Try to make your poster interesting, eye-catching, and fun. For example, you might add a slogan or saying, create a special character, or add pictures that show how to do particular training exercises.
Answer Key

Worksheet 1

1. Answers will vary. You may want to record injury types on the board to see if there are any patterns.

2. Answers will vary. Students may identify some of the following changes and/or differences:
   - More competitive
   - Kids start younger
   - We play on more than just school teams (club teams, summer leagues, etc.).
   - More girls play; girls play more sports
   - Better equipment
   - We now have extreme sports, new sports that we didn't used to participate in.

3. Answers will vary but students may find some of the following connections:
   - Girls could play more sports, different sports
   - Girls could play longer, higher levels of competition—throughout college; more professional female athletes
   - More encouragement for girls to play sports

Worksheet 2

1. All kinds of “overuse” (vs. “traumatic”) injuries that affect soft tissue and bones including:
   - ACL/knee injuries—particularly in girls and young women
   - Tendonitis
   - Stress fractures
   - Torn ligaments
   - Bursitis

2. Answers will vary but may include some of the reasons listed below. During discussion, you might share some of your experiences with sports and examples of differences.
   - Youth and adolescent bodies are still growing—bones and growth areas close to the joints are still forming/weak points.
   - More kids are playing a single sport year-round; because of this, the muscles and bones used for that one sport are overused/can’t rest, and other muscles don’t get worked (specialization vs. cross-training).
   - Increasingly competitive culture of youth sports
   - Play-through-pain attitudes
   - Youth try to imitate techniques of adult athletes but don’t have adult bodies or training.
   - Poorly fitting or wrong equipment
   - Increased popularity of extreme sports among youth

3. A growth plate is the area of growing tissue at each end of the long bones in children and adolescents. They are replaced by solid bone as we mature (complete sometime during adolescence) and, until then, are the weakest part of our skeletons.
4. Lack of understanding of female anatomy, physiology, and development (e.g., the effects of puberty on a girl's body, higher fat-to-lean ratio). Many coaches don't understand differences between girls' and boys' physiology/training approaches—poor technique.

- Improper technique, lack of injury prevention programs and training approaches
- Title IX gave girls important advances in sports but this has also meant girls start earlier, train harder, etc., in order to be competitive and take advantage of opportunities.

5. Encourage cross-training, multiple sports, no year-round play
- Better injury prevention programs; e.g., teaching kids how to decelerate correctly (no sudden stops and changes in direction) or training girls how to run and land differently from how they would naturally given their anatomy
- Strength training; building muscles to support better technique and/or overall strength
- Strictly enforcing pitch counts (baseball) and other participation rules
- Using youth-sized equipment (Note: You might also discuss which sports do this and which don't; e.g., basketball and soccer do, but so far baseball doesn't, although there have been pushes to use baseballs that are 1 oz. lighter for youth.)
- Better training for coaches; mandatory certification