

A photograph of a baseball player in a white pinstriped uniform sliding into a base. The player is wearing a red helmet and a brown glove. The background is a blurred green field.

Concepts of Athletic Training

**FIFTH
EDITION**

***Ronald P. Pfeiffer
Brent C. Mangus***

Chapter 1

The Concept of Sports Injury

Sports Participation

In the United States, 6.7 million public high school children are involved in sports activities annually.



© Ilene MacDonald/Alamy Images

Title IX Education Assistance Act of 1972



© Shawn Pecor/Shutterstock, Inc.

- Since its passing, female sports participation increased by 700%.
- Research indicates injuries are sports specific, NOT gender specific.

General Injury Data

According to a Pennsylvania study, rates of athletic injuries among of high school students were:

- Football – 46.7%
- Boys' basketball – 10%
- Wrestling – 9.68%
- Girls basketball – 7.5%



© Photos.com

General Injury Data (continued)

In a two-year study of a community sports program, children participating in soccer had the highest rate of injury, followed by baseball, football, and softball.

Contusions were the most common injury.

Definition of Sports Injury

- There is no universally acceptable definition.
- The majority of today's definitions use "time lost" criteria as the major determinant.

NCAA Definition of Sports Injury

Sports Injury:

- Occurs as a result of participation in organized intercollegiate practice or game.
- Requires medical attention by a team athletic trainer or physician.
- Results in restriction of athlete's participation for one or more days after the injury.

Acute Injuries

Acute Injury – “characterized by rapid onset, resulting from a traumatic event”

- Acute injuries typically involve significant trauma followed by pain, swelling, and loss of function.

Critical Force – “magnitude of a single force for which the anatomical structure of interest is damaged”

Chronic Injuries

Chronic Injury – “characterized by a slow, insidious onset, implying a gradual development of structural damage”

- Chronic injuries develop over time and are often associated with repetitive, cyclic activities, such as running.
- These injuries are commonly called “overuse injuries.” Common sites include the Achilles tendon, patellar tendon, and the rotator cuff.

Overuse Injuries

- Overuse injuries may be caused by:
 1. ***Intrinsic Factors*** – immature cartilage, lack of flexibility, lack of proper conditioning, psychological factors.
 2. ***Extrinsic Factors*** – excessive training, lack of adequate recovery, incorrect technique, playing on uneven or hard surfaces

Types of Tissues

Soft Tissues

Muscles

Fascia

Tendons

Joint capsules

Ligaments

Blood vessels

Nerves

Skeletal Tissue

Any bony
structure in the
body

Catastrophic Injury

Catastrophic Injuries:

- Involve damage to the brain and/or spinal cord.
- Can be life threatening or cause permanent damage.
- Can occur as a direct or indirect result of sports participation.

Injury Classifications

Sprains are injuries to ligaments.

- First-degree: mild pain with little/no swelling
- Second-degree: ligament damage, pain, moderate swelling, and dysfunction
- Third-degree: complete tear of ligament(s), pain, swelling, dysfunction leading to a loss of stability

Injury Classifications

Strains are injuries to tendons, muscles, or musculotendinous junctions.

First-degree strain: mild with little/no swelling, pain noticeable with use

- Second-degree strain: more extensive soft-tissue damage, pain, and moderate loss of function
- Third-degree strain: complete rupture, significant swelling, loss of function, and possible defect in muscle

Injury Classifications

Contusions are commonly referred to as “bruises.”

- Result from direct blows to the body surface, causing a compression of the underlying tissue
- Contusions are associated with pain, stiffness, swelling, ecchymosis, and hematoma
- May result in **myositis ossificans** – a bonelike formation within the muscle tissue

Skeletal Tissue Injuries

Fractures are breaks or cracks in a bone.

Types of Fractures

- Closed
- Open
- Stress
- Salter-Harris

Dislocations

Dislocation – “displacement of contiguous surfaces or bones comprising a joint”

Subluxation: partial displacement

Luxation: complete displacement

All dislocations should be diagnosed and treated by a physician.

Injury Recognition

Coach's role:

- Coaches are most often the first to arrive at the scene of an injury.
- Treat all possible injuries as such until proven otherwise.
- Recognize and determine if the injury requires medical referral.

Schools or sponsoring agencies should make every effort to hire a BOC-Certified Athletic Trainer.

Epidemiology of Sports Injuries

- Epidemiology – “study of the distribution of diseases, injuries, or other health states in human populations for the purpose of identifying and implementing measures to prevent their development and spread”
- Scientific sports injury research is a relatively recent trend.

Epidemiology of Sports Injuries

Sports injury epidemiology involves determining risk factors that may play a causative role in the injury.

- Hypotheses are developed to test for statistical relationships between risk factors and injury.

Classification of Sports

American Academy of Pediatrics has developed categories of sports based on risk of injury.

- Contact/collision
- Limited contact/impact
- Non-contact

Extent of Injuries: Tackle Football

- 25.5 injuries for every 100 players with the highest rate of injury occurring during games.
- Game injury rates were double the rates seen in practice.
- Hip, thigh, and leg regions injured most often.
- 2.4% of injuries required surgery, and of those 59.4% involved the knee.

Extent of Injuries: Tackle Football

- Contusions, strains, sprains, and fractures are common injuries.
- Offensive players have higher risk than defensive players.
- Older players have higher risk than younger ones.
- Spinal cord and brain injuries are a major concern.

Extent of Injuries: Basketball

- Ankle sprains are the most common injury in both sexes.
- Girls have higher risk of knee injuries than boys and are more likely to require surgery.
- The rate of ACL injury during games was 3 times higher for women than men.



© Photodisc

Extent of Injuries: Baseball

In 2004, over 450,000 high school boys participated.

Nearly 12% sustained injuries.

- Forearm/wrist/hand or shoulder/arm were often injured.

Of these injuries, most were strains or sprains.



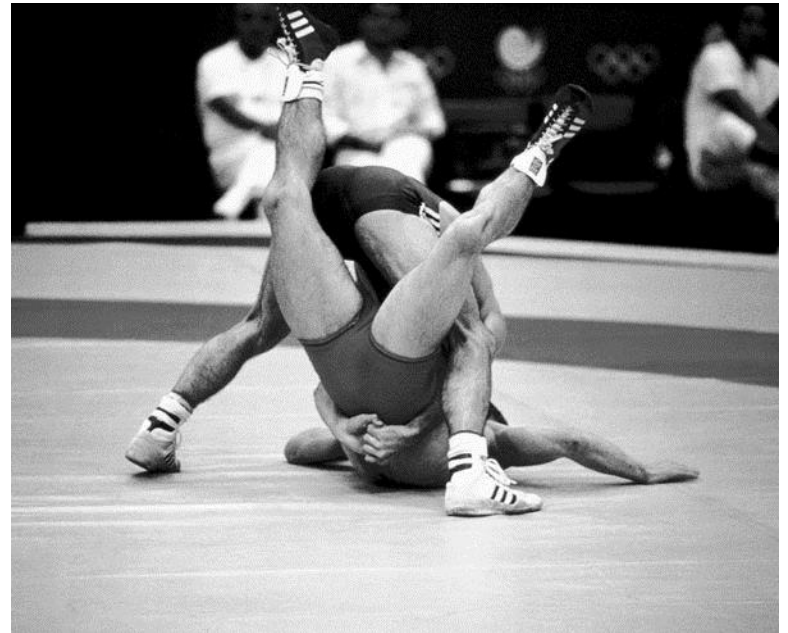
© Peter Weber/Shutterstock, Inc.

Extent of Injuries: Baseball

- Children between the ages 5 and 14 have increased vulnerability to chest impact injuries from balls.
- **Little League Elbow** – Chronic elbow injuries are a concern for adolescent pitchers.
 - Sidearm pitching presents the greatest risk for elbow problems.

Extent of Injuries: Wrestling

- In 2004, there were over 240,000 high school participants.
 - About 27% sustained injuries.
- Collisions with opponents and mats, and takedown and escape maneuvers resulted in various injuries.



© Digital Vision/Getty Images

Extent of Injuries: Wrestling

- Shoulder/arm, knee, and forearm/wrist/hand were injured most often.
 - Most of these injuries were strains & sprains.
- Friction burns, skin infections, weight management, and “cauliflower ear” are also common issues.

Extent of Injuries: Volleyball

- During 2004, nearly 400,000 high school girls participated.
- Nearly 15% suffered injury, mostly sprains.
- Ankle/foot region is most often injured.

Extent of Injuries: Soccer

In the United States, there are 14 million participants under 18 years of age.

During the 2002 season almost:

- 340,000 high school boys participated.
- 300,000 high school girls participated.

Extent of Injuries: Soccer (cont.)

- Contusions are the most common injury.
- The majority of injuries are in the lower extremity – accounting for about 60% of total injuries.
- Female athletes have a higher ratio of knee, specifically ACL, injuries than male athletes.
- Research has shown that the majority of head injuries result from collisions not intentional heading.
- Improperly constructed, movable soccer goals have been involved in a number of severe injuries and deaths.