

# CHAPTER 3

## ASSESSMENT CATEGORIES



Application



Communication



Knowledge and Understanding



Thinking

# Out of Harm's Way: Sports Injuries

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## 1

**BIOMECHANICAL PRINCIPLES OF INJURY** (Textbook pages 64–65)**1 Key Terms and Definitions**

Define the key terms below in your own words.

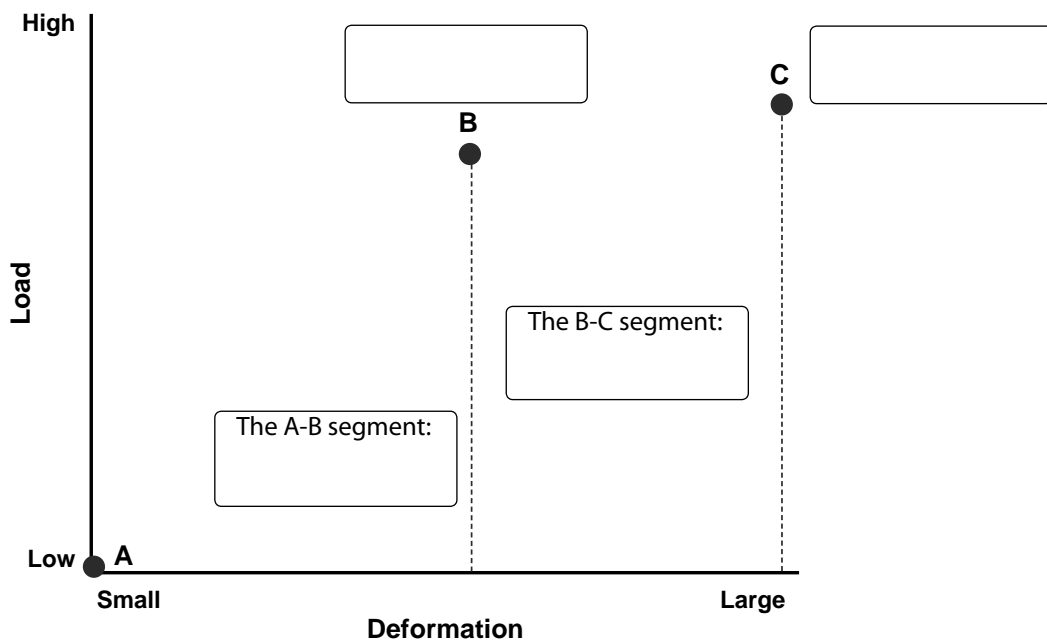
Key Term	Definition
bending	
compression	
deformation	
elastic region	
load	
plastic region	
positive training effect	
shear	
stress	
tension	



torsion	
ultimate failure	
yield-level point	

**2 The Load–Deformation Curve**

Draw a typical load–deformation curve of a bone in the figure below, and fill in the empty boxes with the appropriate descriptive terms that correctly describe what is occurring in the graph. Then in your own words describe what this graph means.




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**3 Forces to Be Reckoned With**

Name the type of physical stress or force acting on the structure in each of the diagrams below. Then provide at least one example of an injury or body part that is affected by this type of physical stress.

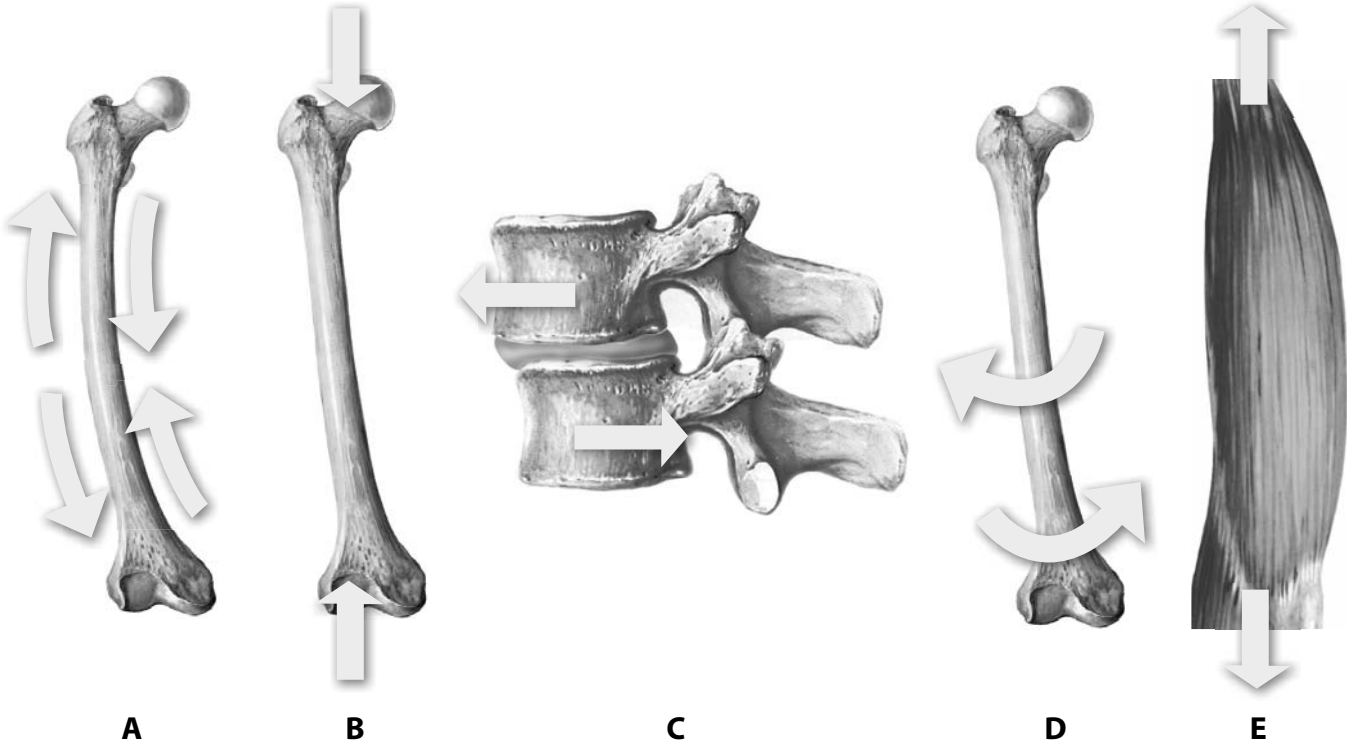


Diagram	Force Acting on the Tissue	Example
A		
B		
C		
D		
E		



**2**

**INJURY TREATMENT AND REHABILITATION** (Textbook pages 65–68)



**1 Key Terms and Definitions**



Define the key terms below in your own words.

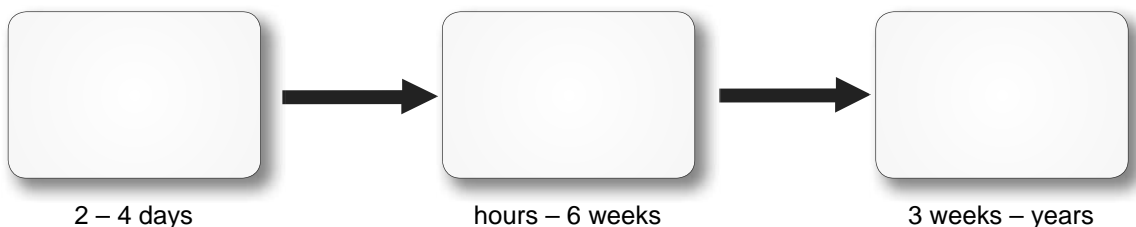
Key Term	Definition
cryotherapy	
fibroblastic repair phase	
inflammatory response phase	
maturation–remodeling phase	
PRICE	
rehabilitation	
treatment	



**2 Pain, Pain, Go Away**



Identify the three phases of the healing process.



## 3


**TYPES OF INJURIES** (Textbook pages 68–84)**1 Key Terms and Definitions**

Define the key terms below in your own words.


Key Term	Definition
anterior cruciate tear	
avulsion fracture	
bursitis	
complete dislocation	
compound fracture	
concussion	
contusion	
lateral ankle sprain	
lateral epicondylitis	
medial epicondylitis	



partial dislocation	
patellar tendonitis	
proprioception	
shin splints	
shoulder impingement	
simple fracture	
sprain	
strain	
stress fracture	
subluxation	
tendonitis	


**2 Making the Grade**

 Complete the following table on strains and sprains.

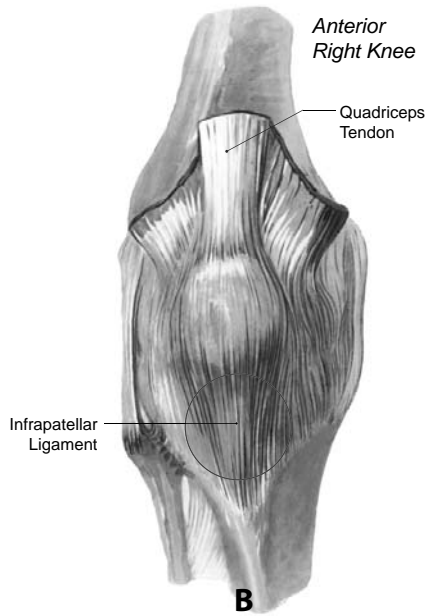
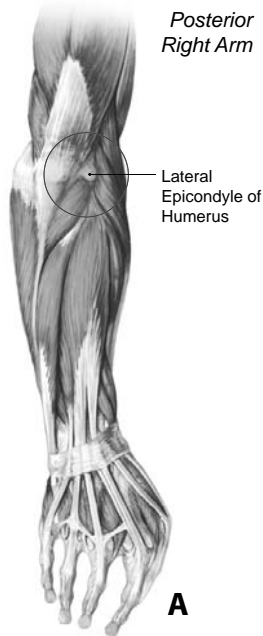
Symptoms	Sprain or strain?	1st, 2nd, or 3rd degree?	Surgery required?
Several muscle fibers have been torn. There is decreased range of motion and moderate loss of function.			
Ligament is torn. There is no pain during isometric and passive movements.			
A few muscle fibers have been stretched or torn. There is minor weakness and swelling.			
Ligament is moderately stretched. There is decreased range of motion and a moderate loss of function.			


**3 Identify the Injury**

 For the diagrams on the next page, indicate what injury is being illustrated based on the site of the injury. Then give another name that is used to describe the same injury.

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_



**4 Mechanism Match**

Match each sport injury listed below on the left with the mechanism of injury that best describes it on the right.

Sport Injury	Answer	Mechanism of Injury
Shoulder separation	_____	A) Repetitive pitching motion
Concussion	_____	B) Sudden cutting movements
Medial epicondylitis	_____	C) Fall on an outstretched arm
Lateral epicondylitis	_____	D) Being hit from behind headfirst into the boards
Shoulder impingement	_____	E) Improper backhand form in tennis
ACL tear	_____	F) Repetitive overhead activities
Contusion	_____	G) Knee-on-thigh contact





## 5

## CHECK YOUR UNDERSTANDING

**Multiple Choice**

- Which of the following statements about the load–deformation curve is **false**:
  - The A-B segment of the curve represents the elastic region of the tissue structure.
  - The B-C segment of the curve represents the strength of the material in terms of stored energy.
  - Loads occurring in the elastic region do not cause permanent damage.
  - Permanent deformation will occur if the load exceeds a certain point.
  - None of the above.

**Answer:** \_\_\_\_\_

- Which of the following statements about the fibroblastic repair phase is **true**:
  - It is the third phase of healing.
  - It may last as long as three weeks.
  - It begins around 24 hours after injury.
  - It leads to scar formation.
  - Both B and D.

**Answer:** \_\_\_\_\_

- Abnormal bone formation resulting from a severe contusion to a soft tissue is called:
  - a charleyhorse
  - jumper's knee
  - myositis ossificans
  - a subluxation
  - a bone spur

**Answer:** \_\_\_\_\_

- Which of the following statements about dislocation of the shoulder is **true**:
  - It most commonly occurs when the head of the humerus slips posteriorly.
  - A common mechanism of injury is falling backward and landing on a flexed arm.
  - It can result in injury to the brachial plexus.
  - It is an example of an overuse injury.
  - None of the above.

**Answer:** \_\_\_\_\_

- Which of the following is **not** an overuse injury:
  - shoulder impingement
  - tendonitis
  - stress fracture

- bursitis
- none of the above

**Answer:** \_\_\_\_\_**Fill in the Blanks**

Fill in the blanks for the following statements using words from the **word bank** below. Place the corresponding letter from the word bank in the blank spaces provided.

- In the \_\_\_\_\_ region of the load–deformation curve, a tissue returns to its original shape after a load is removed.
- When a compression force crushes tissue, a \_\_\_\_\_ results.
- When a ligament or the joint capsule is stretched or torn, the injury is called a \_\_\_\_\_.
- \_\_\_\_\_ fractures occur when a tendon or ligament pulls a small chip of bone away from the rest of the bone.
- Tiny fluid-filled sacs that lubricate and cushion pressure points between your bones and tendons are called \_\_\_\_\_.

**Word Bank**

- |              |                |            |
|--------------|----------------|------------|
| a. avulsion  | e. contusion   | i. plastic |
| b. bursae    | f. dislocation | j. sprain  |
| c. cartilage | g. elastic     | k. strain  |
| d. compound  | h. fracture    | l. stress  |

**True or False**

Indicate whether each statement is **true (T)** or **false (F)**. If the statement is false, provide the correct answer.

- When training loads are at or near a tissue's ultimate yield point, cells may divide to make new cells or to make proteins.

**Answer:** \_\_\_\_\_



2. Regular use of certain medications to decrease pain and inflammation may be helpful and appropriate.

**Answer:** \_\_\_\_\_

4. Neurosurgeons and other brain experts state that minor concussions sometimes occur.

**Answer:** \_\_\_\_\_

3. Another common term for a complete dislocation is subluxation.

**Answer:** \_\_\_\_\_

5. Not cooling down after a workout can lead to muscle atrophy.

**Answer:** \_\_\_\_\_



**Think and Link**



1. Explain what PRICE is and how you would use it in the treatment of any soft tissue injury presented in this chapter.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Distinguish between four different types of fractures, and provide an example of an action or activity that may result in each type of fracture.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_



**Injury Scenarios**

Read both of the following scenarios, and answer the questions pertaining to each scenario.

**Scenario 1**

Ralph was practicing on one side of the gymnasium with the soccer team. He was working on his slide tackling drills. At the same time, Mike was on the other side of the gym playing floor hockey with his friends. The floor hockey ball was shot on the soccer side of the gym, and Mike ran to retrieve it. As Ralph was running to perform his slide tackle, Mike stepped into Ralph's path. They collided – SMACK. Just before the collision, Ralph tried to plant his foot, which made his left knee buckle and sharply twist medially. Ralph heard a "POP" sound from his left knee. He fell to the ground, grabbing his knee and screaming something not very nice to Mike. Ralph did not cry. In fact, he did not even feel that much pain. He just noticed that his left knee was very unstable and medially loose or wobbly. Ralph was very upset because he had his regional final soccer game the next day. Answer the following questions about Ralph's injury.

**A)** Was this injury caused to a ligament or a tendon, and what was the name of the ligament or tendon injured?

\_\_\_\_\_  
\_\_\_\_\_

**B)** What degree of strain or sprain is this injury? Why?

\_\_\_\_\_  
\_\_\_\_\_

**C)** What are the signs and symptoms of this injury, and why did Ralph not really feel any pain in the area?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**D)** Does Ralph require surgery? What is the recovery time for this type of injury?

\_\_\_\_\_  
\_\_\_\_\_

**E)** When Ralph and Mike collided, Ralph's knee smashed into Mike's thigh, giving Mike a deep thigh contusion (a "charleyhorse"). Explain what a contusion is, and outline how Mike should treat this injury.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**Scenario 2**

Lou was walking up the stairs to the second floor after class when he noticed Josellyn, the prettiest girl in the school, coming down the stairs toward him. Josellyn gave him a big smile as she passed, and Lou turned to say hello. As he did so, he missed a step, fell, and hit his head; he was knocked out for a few seconds. Mr. Anthony, a teacher who was walking beside Lou, realized that he could be seriously hurt and could have a concussion, so he sent another student for the school nurse, who did in fact determine that Lou had suffered a concussion.

**A)** In a thorough paragraph, describe exactly what a concussion is, and differentiate between a first and second degree concussion.

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**B)** What are some of the signs and symptoms of postconcussion syndrome, and what is the only effective remedy for Lou?

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**C)** Is Lou more prone to concussions now that he has suffered a concussion? Explain?

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**D)** Martina and David, who saw Lou fall, told their friends that Lou suffered a minor concussion because he wasn't bleeding and was not unconscious for an extended period of time. Are Martina and David accurate in their diagnosis? If so, how does a minor concussion differ from a major concussion?

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**E)** As Lou unsuccessfully tried to break his fall, he also partially dislocated his shoulder. The proper term used to describe a partially dislocated shoulder is \_\_\_\_\_. At the hospital, the doctor successfully relocated the head of the humerus back into the shoulder joint. The name of that shoulder joint is the \_\_\_\_\_.