Precourse online self-assessment: knowledge questions

Basic Principles of Fracture Management

Information for course chairs and faculty

The online precourse self-assessment for the AOTrauma Course—Basic Principles of Fracture Management consists of two parts:

- Demographic questions
- Self-assessment questions, including motivation to learn and multiple-choice test questions

This document contains the multiple-choice test questions from the online precourse self-assessment for the Basic Principles of Fracture Management Course.

*Information for course chairs and faculty only (please do not distribute to course participants)*
The callus formation shown in these images is an example of which of the following?

a. Absolute stability and indirect healing
b. Absolute stability and direct healing
c. Relative stability and direct healing
d. Relative stability and indirect healing
Question 2

A 21-year-old male motorcyclist sustained this closed injury in a motorcycle crash.

When the soft tissues have recovered enough for surgery, which of the following methods is recommended for **definitive stabilization**?

a. Interfragmentary lag screw
b. Interfragmentary lag screws and neutralization plate
c. Interfragmentary lag screws and buttress plate
d. Bridge plating
Competency 02: Plan treatment (assessment, imaging, classification, decision making)

Question 1

A 37-year-old male was hit by a car bumper; he sustained this open tibial fracture.

Which of the following statements is most accurate when classifying this injury?

a. It is a Gustilo Anderson Type IIIB injury
b. It is a Gustilo Anderson Type IIIA injury
c. It is impossible to classify this injury with the information provided
d. It is an AO Classification IO 3 MT2 NV1 injury

Question 2

A 52-year-old male was involved in a motorcycle accident.

How would you proceed?

a. Prepare an illustrated step-by-step plan, with list of instruments and implants
b. Temporary splinting
c. Use a locking distal femoral plate
d. Use position screws for the intraarticular portion of the fracture and splinting
Competency 03: Apply reduction techniques with attention to soft tissues

Question 1
What is the most important surgical goal for the diaphyseal fracture shown in this x-ray?

a. Anatomical fracture fragment reduction
b. Interfragmentary compression of fragments and neutralization plate
c. Restoration of anatomical and mechanical axes
d. To achieve relative fracture stability

Question 2
The image shows a fresh knee injury.

What are the best next steps in evaluating and treating this injury?

a. CT scan, then knee-spanning external fixator
b. CT scan, then knee immobilizer
c. Knee immobilizer, then CT scan
d. Knee-spanning external fixator, then CT scan
Competency 04: Apply implants appropriately using different techniques

**Question 1**

Which of the following statements best describes the treatment of the ulnar fracture (B) in this x-ray?

- a. It probably has been reduced indirectly
- b. It should heal without callus formation
- c. It has been stabilized with a bridging technique
- d. It has been stabilized with anatomic reduction and relative stability

**Question 2**

Absolute stability is best achieved for this fracture with which of the following techniques?

- a. Medial and lateral plates
- b. Lag screws and buttress plate(s)
- c. Circular ring fixator
- d. Anatomical plate with locking head screws
Competency 05: Assess & treat diaphyseal fractures

Question 1
What is the function of the plate in these x-rays?

a. Compression plate
b. Buttress plate
c. Neutralization plate
d. Bridge plate

Question 2
Which of the following statements best describes the function of reamed intramedullary nailing for a simple diaphyseal fracture?

a. It provides relative stability
b. It promotes direct bone healing
c. It is rarely associated with indirect bone healing
d. It preserves the intramedullary blood supply
Question 1

What is the best reduction technique for this fracture?

a) articular = direct; metaphyseal = direct
b) articular = indirect; metaphyseal = direct
c) articular = indirect; metaphyseal = indirect
c) articular = direct; metaphyseal = indirect

Question 2

Which of the following fractures are best treated with absolute stability?

a) Split tibial plateau fracture (41–B1)
b) Diaphyseal femoral fracture (32–C3)
c) Tibial shaft fracture (42–C1), spiral
d) Multifragmentary fracture of the humeral shaft (12–C3)
Competency 07: Strategies to assess/treat open fractures & soft-tissue injuries

Question 1

A 32-year-old male with no general medical problems sustained an isolated injury in a motorcycle accident.

Which of the following emergency treatment measures is most important in preventing infection?

- a. Getting the patient to the OR within 6 hours
- b. Good surgical debridement
- c. Moderate pressure wound irrigation
- d. Skeletal stabilization using an external fixator

Question 2

A 33-year-old man sustains an open fracture of the proximal left tibia after being hit by a car. The wound is 10 cm long, and the emergency medical technician states that the patient was found on the ground with the leg soaked from heavy rain.

Based on the appearance and mechanism of injury, the patient most likely what type of fracture?

- a. Type I Gustilo open fracture
- b. Type III Gustilo open fracture
- c. Tscherne grade I open fracture
- d. Tscherne grade II open fracture
### Competency 08: Manage the polytrauma patient

#### Question 1

A 42-year-old woman sustained a severe closed head injury (Glasgow Coma Scale score 8), a traumatic pneumothorax on the right side, a closed fracture of the left femoral shaft, and an open fracture of the left forearm in a motor vehicle accident. She is admitted to the intensive care unit (ICU) upon arrival.

The femoral shaft fracture should be managed with:

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<tbody>
<tr>
<td>a</td>
<td>Immediate unreamed IM nailing</td>
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<td>b</td>
<td>Skeletal traction in the ICU</td>
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<tr>
<td>c</td>
<td>Temporary external fixation</td>
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<tr>
<td>d</td>
<td>Open reduction and internal fixation with a locking compression plate</td>
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</tbody>
</table>

#### Question 2

A 50-year-old man involved in head-on collision in which he was not wearing a seat belt is brought to the emergency department unconscious and with multiple extremity injuries. The AP, lateral, and open mouth cervical spine x-rays are normal.

What is the most appropriate next step?

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<tbody>
<tr>
<td>a</td>
<td>Order CT of the cervical spine</td>
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<td>b</td>
<td>Consider the cervical spine cleared</td>
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<td>c</td>
<td>Discontinue log rolling the patient</td>
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<tr>
<td>d</td>
<td>Order flexion-extension x-rays of the cervical spine</td>
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Question 1

After initial examination in the emergency department and application of a pelvic binder, the patient undergoes an exploratory laparotomy. After a splenectomy is performed and a moderately sized lower retroperitoneal hematoma (not expanding) is discovered, the patient remains hypotensive.

Further pelvic stability should be provided by which of the following techniques?

a. Use of a four-hole reconstruction plate across the symphysis
b. Use of two 7.3-mm cannulated screws across the right sacroiliac joint and external fixation
c. Open reduction and plate fixation of the right sacroiliac joint
d. Application of an external fixation device

Question 2

A 65-year-old woman was struck by an automobile while crossing the street. Vital signs in the emergency department were:

- Temperature 35 C, Heart rate 120, Blood pressure 95/50.

The patient was intubated upon arrival due to respiratory distress.

- Lateral C-spine x-ray was normal.
- Chest x-ray was abnormal on the right side, showing several broken ribs and a small hemopneumothorax.
- The patient’s pelvic x-ray is shown in the image.

In addition to IV fluids and a right chest tube, what is the next step in the management of this patient?

a. Application of pelvic binder
b. Angiography
c. External fixation of the pelvis
d. Check for other sources of bleeding
**Competency 10: Recognize & manage risk factors and complications**

**Question 1**

If this closed injury is treated with **immediate** internal fixation, what complication is most likely to occur?

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<tbody>
<tr>
<td>a</td>
<td>Meta-diaphyseal nonunion</td>
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<td>b</td>
<td>Compartment syndrome</td>
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<td>c</td>
<td>Wound breakdown</td>
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<td>d</td>
<td>Posttraumatic arthritis</td>
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A 38-year-old male sustained the illustrated closed leg injury in an automobile crash.
- A splint was applied.
- 2 hours later, he had slight leg pain.
- The calf was swollen, and there was tenderness over the fracture.
- Pain did not increase with passive dorsiflexion or plantar flexion of the toes.

What is the **next step** in care of this patient?

- a  Urgent four-compartment fasciotomies
- b  Continued observation and serial physical exams
- c  Measure compartment pressure
- d  Application of a well-padded long-leg cast
Competency 11: Recognize & treat bone union disorders

Question 1
This x-ray demonstrates a closed fracture treated 26 weeks previously with closed, static-locked intramedullary nailing.

The current appearance of the fracture is **most likely** the result of which of the following factors?

- a  Excessive motion at the fracture site
- b  Excessive stripping of the fracture site
- c  Inhibition of osteoblast activity by lack of strain
- d  Early use of nonsteroidal antiinflammatory drugs

Question 2
In the presence of infection, hardware should be removed in which situation?

- a  All cases where hardware is present
- b  When hardware is not providing stability
- c  When gram positive organisms are present
- d  When hardware is made of stainless steel
Competency 12: Recognize & manage special fracture circumstances

Question 1

The image shows an 80-year-old female's humerus with an established nonunion 6 months after original injury.

What is the best choice for stabilization of this injury?

- **a**  Intramedullary rod fixation
- **b**  Functional bracing and bone stimulation
- **c**  Locked compression plating and bone grafting
- **d**  Bridge plating with locked screws

Question 2

A comatose 40-year-old female who is in the intensive care unit with a closed mid-shaft tibial fracture has a tensely swollen calf.

• Compartment pressures are 43 mm Hg laterally, 52 mm Hg anteriorly, 34 mm Hg in the superficial posterior, and 30 mm Hg in the deep posterior compartments.
• The patient’s diastolic blood pressure is 65 mm Hg.

What is the next step in treatment?

- **a**  Perform a four-compartment fasciotomy
- **b**  Reassess compartment pressure after 2 hours
- **c**  Elevate the leg and observe for reduction of the swelling
- **d**  Perform a fasciotomy to decompress the anterior and lateral compartments