

Assessment and Emergency Care of Orthopaedic Injuries

Scene Size-up

Scene Safety	Ensure scene safety and safe access to the patient. Be aware of potential violence and the possibility of a crime scene. Follow standard precautions, putting on a minimum of gloves and eye protection. Scenes with multiple patients may require you to carry additional pairs of gloves in the event of tears. Determine the number of patients. Assess the need for additional resources such as utility services, fire department, ALS, or additional ambulances. The mechanism of injury may suggest the injury extent and type; consider the possibility that the patient may have internal bleeding.
Mechanism of Injury (MOI)/ Nature of Illness (NOI)	Determine the MOI. Observe the scene, and look for indicators that will assist you with this. The nature of the problem may not be readily apparent until more information is gathered. Falls, assaults, and motor vehicle crashes are common mechanisms in skeletal trauma. Be alert for primary and secondary injuries. Consider spinal immobilization in any trauma patient with a significant MOI.

Primary Assessment

Form a General Impression	Identify and manage immediate threats to life. Determine the priority of care based on the MOI. If the patient has a poor general impression, call for ALS assistance. A rapid scan of the patient will help you to identify and manage life threats. Keep alert for signs of shock. Assess the patient's level of consciousness using the AVPU scale. If the patient is able to communicate, obtain the chief complaint and type of injury that occurred. Do not let a nonlethal orthopaedic injury distract you from the ABCs.
Airway and Breathing	Ensure the airway is open, clear, and self-maintained. Unresponsive patients will need the airway opened and maintained using a modified jaw-thrust maneuver if a spinal injury is suspected. A patient with an altered level of consciousness may need emergency airway management; consider inserting a properly sized oropharyngeal or nasopharyngeal airway. Evaluate the patient's ventilatory status for rate and depth of breathing, respiratory effort, and tidal volume. Patients breathing at a rate of less than 12 breaths/min or more than 20 breaths/min may have inadequate breathing that requires assistance. Orthopaedic injuries are not common causes of breathing problems; if a breathing problem exists assess the patient for other injuries. Continuously monitor the patient's oxygen saturation levels and for additional signs of hypoxia. Administer high-flow oxygen at 15 L/min, providing ventilatory support as needed.
Circulation	Observe skin color, temperature, and condition. Assess capillary refill time; if greater than 2 seconds, treat aggressively for shock. Open fractures may cause bone ends to protrude through the skin; therefore, look for life-threatening bleeding and treat accordingly. If you are not able to control bleeding in an extremity with a pressure dressing, apply a tourniquet. Fractures may cause internal bleeding leading to shock. Be alert for signs and symptoms. Evaluate the distal pulse rate, quality (strength), and rhythm. Tachycardia may be an early indicator of shock.
Transport Decision	If the patient has an airway or breathing problem, signs and symptoms of bleeding, or other life threats, manage them immediately and consider rapid transport, performing the secondary assessment en route to the hospital. Do not delay transport to perform a lengthy assessment or splint simple long-bone fractures. Pelvic and femoral fractures are indicators of severe external forces. Patients suspected of having pelvic, femoral, or bilateral fractures of any long bone should be packaged using a backboard and transported without delay. Simple fractures should be splinted to limit pain and blood vessel and nerve damage.

NOTE: The order of the steps in this section differs depending on whether the patient is conscious or unconscious. The following order is for a conscious patient. For an unconscious patient, perform a primary assessment, perform a full-body scan, obtain vital signs, and obtain the past medical history from a family member, bystander, or emergency medical identification device.

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History Taking

Investigate Chief Complaint

Investigate the chief complaint, and gather a history once you have identified and treated life threats. Identify associated symptoms and pertinent negatives. Ask SAMPLE questions, focusing on the events surrounding the incident and the mechanism of injury. SAMPLE can also be obtained from family, bystanders, and medical alert tags if the patient is not able to provide the information. Ask OPQRST questions when the MOI is unclear to help understand the injury better.

Secondary Assessment

Physical Examinations

If the patient is unconscious or multiple systems are affected, perform a full-body scan beginning with the head, using DCAP-BTLS to identify hidden and potentially life-threatening injuries. Assessment should be rapid if the patient has a poor general impression. Focus the assessment on an isolated injury once all the systems have been examined. Significant trauma requires a full-body scan. Look for swelling, deformities, asymmetry (compare the injured extremity with the opposite uninjured extremity), and contusions while palpating for tenderness. Look for shortening, rotation, and angulation of the limb. If no external signs of injury are present, and the patient is not reporting pain, you might ask the patient to move each extremity carefully to assess motor and neurologic status. Perform a focused examination when the patient has non-significant trauma. Assess the injured area, including the distal and proximal joints. Check for perfusion, motor, and sensory function. Look for the 6 Ps during your musculoskeletal assessment (pain, paralysis, paresthesias, pulselessness, pallor, and pressure).

Vital Signs

Obtain baseline vital signs. Vital signs should include blood pressure by auscultation, pulse rate and quality, respiration rate and quality, pupils, and skin assessment for perfusion. Note the patient's level of consciousness. Use pulse oximetry, if available, to assess the patient's perfusion status. Tachycardia or hypotension may indicate hypoperfusion. Reassess the patient's vital signs every 5 minutes to observe trends.

Reassessment

Interventions

If spinal injury is suspected, stabilize and immobilize the spine as needed. Ensure an open airway, using an oropharyngeal or nasopharyngeal airway if necessary. Provide oxygen via a nonbreathing mask or bag-mask device as required, and manage any life-threatening injuries. Control external bleeding and treat for shock. In patients with non-life-threatening injuries, splint the affected area in a position that allows for good circulation distal to the injury. Reassess the chief complaint, primary assessment, vital signs, and any interventions already performed. Vital signs should be obtained every 5 minutes and results compared with those obtained earlier. Place the patient in a position of comfort unless shock is suspected, then place the patient supine and treat accordingly. Continuously observe and reassess the patient during transport so worsening conditions can be managed.

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Communication and Documentation

Contact medical control/receiving hospital with a radio report including notification of an orthopaedic emergency so appropriate staff and equipment will be ready when you arrive. Include a thorough description of the MOI and position in which the patient was found. Include treatments performed and patient's response. Let hospital staff know if there are open fractures and if circulation is compromised. Be sure to document the patient's chief complaint, physical findings, history, and any changes in patient status and the time. Document the scene observations on your arrival. If abuse is suspected, notify the hospital staff of your suspicions and complete any mandatory report forms. Follow local treatment protocols.

NOTE: Although the following steps are widely accepted, be sure to consult and follow your local protocols. Take appropriate standard precautions when treating all patients.

Orthopaedic Injuries

General Management of Orthopaedic Injuries

Managing life threats to the patient's ABCs is the primary concern with any traumatic emergency. The MOI that caused the injury may also have caused a spinal injury or other fracture, and these must be managed at the appropriate time following local protocol. Remove any jewelry the patient is wearing on injured extremities. Choose the correct type and size splint for the injury. Splints for long-bone fractures should be long enough to stabilize the injured bone and the joint above and below the injury. If swelling is present, a cold pack can be applied to the injured area. In all of the following specific injuries, perform the following:

1. Ensure scene safety.
2. Determine the MOI.
3. Consider the need for spinal stabilization.
4. Open, clear, and maintain the patient's airway.
5. Ensure adequate ventilation.
6. Administer high-concentration oxygen via a nonrebreathing mask or bag-mask device as appropriate.
7. Control bleeding, and treat for shock. Cover open wounds with a dry, sterile dressing and apply pressure to control bleeding.
8. Apply a splint, and elevate the extremity about 6" (slightly above the level of the heart).
9. Apply cold packs if there is swelling, but do not place them directly on the skin.
10. Position the patient for transport, and transport to the appropriate treatment facility.

Fractures, Dislocations, Sprains, and Strains

Field management for fractures, dislocations, sprains, and strains is essentially the same: Prevent further injury, reduce the risk of infection, minimize pain, and reduce the risk of long-term disability. Because it can be difficult to differentiate between the different types of orthopaedic injuries, it is necessary to provide the same emergency care to all, which includes control of bleeding, followed by splinting. Long-bone injuries can be immobilized with a padded board splint, an air splint, or other similar device. Isolated femoral fractures should be managed using a traction splint. If a pelvic injury is suspected, a pelvic binder should be applied. Clavicle and shoulder injuries can be immobilized using a sling and swathe.

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Orthopaedic Injuries

Compartment Syndrome

If you suspect compartment syndrome (pain out of proportion to the injury, pallor, decreased sensation, decreased power), splint the affected limb, keep it at or above the level of the heart, and transport immediately. Surgical intervention is required to manage this injury.

Amputation

Ensure that bleeding is controlled at the stump using a tourniquet, if necessary and if protocols allow. Manage life threats first; do not focus only on trying to save an amputated part. If life threats are under control and if the amputation is complete, you may wrap the part in a sterile dressing and place it in a plastic bag. You should then place the bag containing the amputated part on top of ice. Do not pack the amputated part in ice. A frozen part is useless to a surgeon. Transport the amputated part with the patient, but do not delay transport of a seriously injured patient to do so.