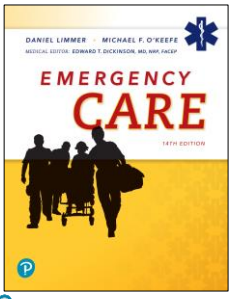
Emergency Care

Fourteenth Edition



Chapter 30

Soft-Tissue Trauma

Topics

Soft Tissues

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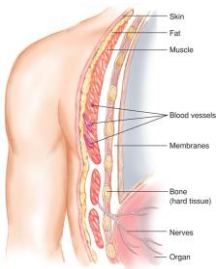
Soft Tissues (1 of 4)

- Skin
- Fatty tissues
- Muscles
- Blood vessels
- Connective tissues
- Membranes
- Glands
- Nerves

Soft Tissues (2 of 4)



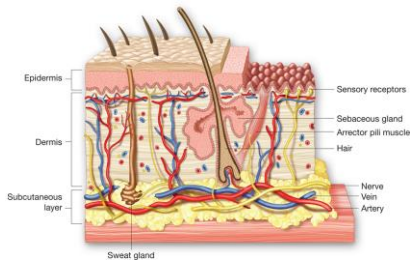
Soft Tissues (3 of 4)

- Major functions of the skin
  - Protection
  - Water balance
  - Temperature regulation
  - Excretion
  - Shock (impact) absorption

Soft Tissues (4 of 4)

- Skin layers
  - Epidermis
  - Dermis
  - Subcutaneous layers
- Wounds often classified as closed or open.

The Skin



For long description, see slide 97: Appendix 1

Closed Wounds

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Closed Wounds (1 of 4)

- Internal injuries with no pathway from the outside to the injured site
- Although skin unbroken, may be extensively crushed tissues beneath
- Range from minor to life-threatening

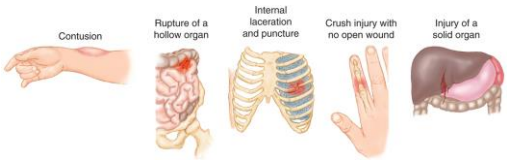
Closed Wounds (2 of 4)

- Contusions
  - Bruise
- Hematomas
  - Similar to contusion
  - More tissue damage
  - Involves larger blood vessels

Closed Wounds (3 of 4)

- Closed crush injuries
  - Force transmitted from exterior to internal structures
  - Crush or rupture internal organs
    - Solid organs bleed severely and cause shock
    - Hollow organs leak into body cavities

Closed Wounds (4 of 4)



Patient Assessment (1 of 3)

- Bruising may be indication of internal injury or internal bleeding.
- Consider mechanism of injury.
- Crush injuries are difficult to identify.

Patient Care (1 of 8)

- Take appropriate Standard Precautions
- Manage airway, breathing, and circulation
- Manage as if there were internal bleeding and shock if there is any possibility of internal injuries

Patient Care (2 of 8)

- Splint extremities that are painful, swollen, or deformed
- Stay alert for vomiting
- Continuously monitor for changes and transport promptly
- Apply cold pack to isolated injuries to manage pain and swelling

Open Wounds

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Types of Open Wounds (1 of 2)

- Abrasions
- Lacerations
- Penetrating trauma and punctures
- Avulsions
- Amputations

Types of Open Wounds (2 of 2)

- Open crush injuries
- Bite wounds
- Blast injuries
- High-pressure-injection injuries

Think About It

- Does an open wound necessitate using more than just gloves as Standard Precautions?
- Can an open injury affect the patient's airway or breathing?

Emergency Care for Open Wounds

- Strict attention to Standard Precautions
  - In addition to wearing gloves, a gown and protective eyewear may be required.

Patient Assessment (2 of 3)

- Primary assessment
  - Airway
  - Breathing
  - Circulation
  - Severe bleeding
- Care for individual wounds

Patient Care (3 of 8)

- Expose wound.
- Clean wound surface.
- Control bleeding.
- For all serious wounds, provide care for shock, including administration of high-concentration oxygen.
- Prevent further contamination.

Patient Care (4 of 8)

- Bandage dressings in place after bleeding is controlled.
- Keep patient lying still.
- Reassure patient.

Treating Specific Types of Open Wounds

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Treating Abrasions and Lacerations

- Reduce wound contamination
- Hold direct pressure to control bleeding
- Always check pulse, motor, and sensory function distal to injury to assure function

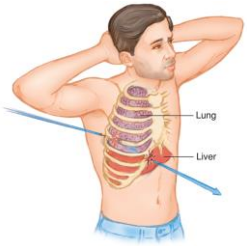
Treating Penetrating Trauma (1 of 2)

- Use caution because objects may be embedded deeper than they appear.
- Check for exit wounds.
  - May require immediate care
- Bullets can fracture bones as they enter.
- Stab wounds are considered serious, especially if in a vital area of body.

Treating Penetrating Trauma (2 of 2)

- Reassure patient.
- Search for exit wound.
- Assess need for basic life support.
- Follow local protocols regarding spinal motion restriction.
- Transport patient.

Treatment: Penetrating Trauma (1 of 2)



Bullets travel in an unpredictable path once they are inside the patient's body, and can therefore cause damage to multiple organs and bones.

Treatment: Penetrating Trauma (2 of 2)

A gunshot wound to the right flank. **© Edward T. Dickinson, MD**

Treating Impaled Objects (1 of 2)

- Do not remove object; may cause severe bleeding.
- Expose wound area.
- Control profuse bleeding by direct pressure.
- Get a description of the object.
- Apply several layers of bulky dressing so dressing surrounds the object on all sides.

Treating Impaled Objects (2 of 2)

- Place bulky dressing on opposite sides of the object.
- Secure dressings in place.
- Care for shock.
- Keep patient at rest.
- Transport the patient carefully and as soon as possible.
- Reassure patient throughout all aspects of care.

Treatment: Impaled Objects (1 of 2)

Stabilize an impaled object with bulky dressings.

Treatment: Impaled Objects (2 of 2)

Bandage the impaled object and surrounding dressings in place.

Object Impaled in the Cheek (1 of 3)

- Object may enter oral cavity, causing airway obstruction.
- If cheek wall is perforated, profuse bleeding into mouth and throat can cause nausea and vomiting.
- External wound care will not stop the flow of blood into the mouth.

Object Impaled in the Cheek (2 of 3)

- Examine wound site, both inside and outside mouth
- If you find the perforation and can see both ends, remove object.
  - If this cannot be easily done, leave object in place.

Treatment: Impaled Object in Cheek

The process of removing an impaled object from the cheek.

Object Impaled in the Cheek (3 of 3)

- Position patient to allow for drainage.
- Monitor patient's airway.
- Dress outside of wound.
- Consider the need for oxygen and care for shock.

Puncture Wound or Object Impaled in the Eye (1 of 2)

- Stabilize the object.
- Apply rigid protection.
- Have another rescuer stabilize dressings and cut while you secure them in place with self-adherent roller bandage or with wrapping of gauze.

Treatment: Puncture Wound or Object Impaled in Eye (1 of 2)

Managing an object impaled in the eye.

Treatment: Puncture Wound or Object Impaled in Eye (2 of 2)

The object is contained and immobilized.

Puncture Wound or Object Impaled in the Eye (2 of 2)

- Dress and bandage uninjured eye.
- Consider need for oxygen and care for shock.
- Reassure patient and provide emotional support.

Treating Avulsions

- Clean wound surface.
- Fold skin back into normal position.
- Control bleeding and dress with bulky dressings.
- If avulsed parts are completely torn away, save in sterile dressing and keep moist with sterile saline.

Treating Amputations (1 of 3)

- Take steps to control hemorrhage immediately.
- Apply direct pressure to control bleeding; use tourniquet only if all other methods fail.

Treating Amputations (2 of 3)

Care for an amputated part. The amputated digit sits on sterile gauze, awaiting reimplantation at the trauma center. **© Edward T. Dickinson, MD**

Treating Amputations (3 of 3)

- Wrap amputation site in sterile dressing, and secure dressing with self-adhesive gauze bandage.
- Then wrap or bag amputated part in plastic bag; keep it cool by cold pack.
- Do not immerse amputated part directly in water or saline.

Treating Genital Injuries

- Control bleeding.
- Preserve avulsed parts.
- Consider whether injury suggests another, possibly more serious, injury.
- Display calm, professional manner.
- Dress and bandage wound.
- Consider possibility of sexual assault.

Burns

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Burns

- May involve more than just skin-level structures
- If respiratory structures are affected, swelling may occur, causing life-threatening obstruction.
- Do not let burn distract from spinal damage or fractures.

Patient Assessment (3 of 3)

- Classifying burns
  - Agent and source
  - Depth
  - Severity

Classifying Burns by Agent and Source

- Agent could be chemicals or electricity
- Report the agent and, when practical, the source of the agent.
  - Never assume the agent or source of the burn.
  - Always gather information from your observations of the scene, bystanders' reports, and the patient interview.

Assessment: Burns

For long description, see slide 98: Appendix 2

Burns are classified by depth.

Classifying Burns by Depth (1 of 2)

- Superficial burn (1st degree)
  - Involves only epidermis
  - Reddening with minor swelling
- Partial thickness burn (2nd degree)
  - Epidermis burned through, dermis damaged
  - Deep, intense pain
  - Noticeable reddening
  - Blisters and mottling

Superficial Burn

A superficial burn. **© Edward T. Dickinson, MD**

Partial Thickness Burn (1 of 2)

Partial thickness burns. © **Edward T. Dickinson, MD**

Partial Thickness Burn (2 of 2)

Partial thickness burn. © **Edward T. Dickinson, MD**

Classifying Burns by Depth (2 of 2)

- Full thickness burn (3rd degree)
  - All layers of skin burned
  - Blackened areas or dry and white patches

Full Thickness Burn

A full thickness burn. © **Edward T. Dickinson, MD**

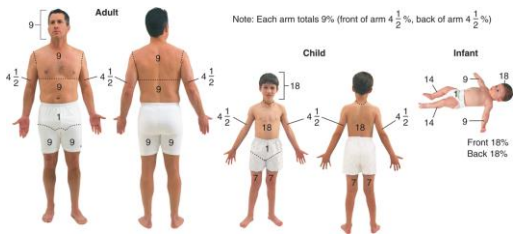
Determining the Severity of Burns (1 of 3)

- Consider the following factors:
  - Agent or source of the burn
  - Body regions burned
  - Depth of the burn
  - Extent of the burn
  - Age of the patient
  - Other illnesses and injuries

Determining the Severity of Burns (2 of 3)

- Rule of Nines
  - Helps estimate extent of burn area
  - Adult body is divided into 11 main areas
  - Each represents 9 percent of body surface

Burns: Severity



For long description, see slide 99: Appendix 3

Rule of nines.

Determining the Severity of Burns (3 of 3)

- Rule of palm
  - Helps estimate extent of burn area
  - Palm and fingers equal about 1 percent of body surface area
  - Easier to apply to smaller or localized burns

Classifying Burns by Severity

- Must be classified to determine:
  - Order and type of care
  - Priority for transport
  - Maximum information to provide to the emergency department.

Pediatric Note

- Infants and children have a much greater relationship of body surface area to total body size, resulting in greater fluid and heat loss from burned skin.

Treating Specific Types of Burns (1 of 4)

- Patient care for thermal burns
  - Stop burning process and cool burned area.
  - Ensure open airway and assess breathing.
  - Look for signs of airway injury.
  - Complete primary assessment.
  - Treat for shock.

Treating Specific Types of Burns (2 of 4)

- Evaluate burns by depth, extent, and severity.
- Do not clear debris.
- Remove clothing and jewelry.
- Wrap with dry sterile dressing.
- For burns to hand or feet, remove patient's rings or jewelry and separate fingers or toes with sterile gauze pads.

Treating Specific Types of Burns (3 of 4)

- Patient care for chemical burns
  - Wash away chemical with copious amounts of flowing water.
  - If dry chemical, remove contaminated clothing, then flush with water.

Treating Specific Types of Burns (4 of 4)

- Patient care for chemical burns
  - Apply sterile dressings.
  - Treat for shock.
  - Transport.

Radiation Burns (1 of 2)

- Exposure to high levels of radiation can harm the human body both immediately and in a delayed fashion.
- Great number of sources of radiation
  - Difficult to detect without specific monitoring equipment

Radiation Burns (2 of 2)

- Extremely harmful
  - Do not approach a radiological injury without protective equipment and specialized training.
  - See patient with a radiological burn only after they have been decontaminated.
- Most will present like thermal injuries.

Electrical Injuries

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Electrical Injuries

- Severe damage through body along path of electrical current
- Entry and exit burns are possible.
- Respiratory/cardiac arrest are possible.
- Bones may fracture from violent muscle contractions.

Patient Care (5 of 8)

- Provide airway and breathing care.
- Provide basic cardiac life support; be ready to defibrillate.
- Care for shock and administer high-concentration oxygen.

Patient Care (6 of 8)

- Care for spinal and head injuries as well as extremity fractures.
- Evaluate burn sites.
- Cool burning areas and smoldering clothing the same you would for a flame burn.
- Apply sterile dressings.
- Transport as soon as possible.

Dressing and Bandaging

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Dressing and Bandaging (1 of 4)

- Dressing
  - Any material applied to wound to control bleeding and prevent contamination
- Bandage
  - Any material used to hold dressing in place

Dressing and Bandaging (2 of 4)

Dressings cover wounds.

Dressing and Bandaging (3 of 4)

- Universal dressing
  - Available for profuse bleeding, large wound
- Pressure dressing
  - Used to control bleeding
- Occlusive dressing
  - Used to form an airtight seal
  - Wounds to the abdomen, large neck veins, open wounds to chest

Dressing and Bandaging (4 of 4)

Bandages hold dressings in place.

Patient Care (7 of 8)

- Dressing open wounds
  - Take Standard Precautions.
  - Expose wound.
  - Use sterile or very clean materials.
  - Cover entire wound.
  - Control bleeding by direct pressure and/or hemostatic agents or dressings to stop or slow bleeding.
  - Do not remove dressings.

Patient Care (8 of 8)

- Bandaging open wounds
  - Do not bandage too tightly or too loosely.
  - Do not leave loose ends.
  - Do not cover tips of fingers or toes.
    - Must observe distal skin color changes
  - Cover all edges of dressings.

Bandaging Open Wounds (1 of 2)

To apply a self-adhering roller bandage, secure it with several overlapping wraps.

Bandaging Open Wounds (2 of 2)

To apply a self-adhering roller bandage, keep it snug.

Chapter Review

Chapter Review (1 of 5)

- Soft-tissue injuries may be closed (internal, with no pathway to the outside) or open (an injury in which the skin is interrupted, exposing the tissues below).
- Closed injuries include contusions (bruises), hematomas, crush injuries, and blast injuries. Open wounds include abrasions, lacerations, punctures, avulsions, amputations, crush injuries, and blast injuries.
- For open wounds, expose the wound, control bleeding, and prevent further contamination.

Chapter Review (2 of 5)

- For both open and closed injuries, take appropriate Standard Precautions; note the mechanism of injury; protect the patient's airway and breathing; consider the need for oxygen by nonrebreather mask; treat for shock; and transport.

Chapter Review (3 of 5)

- Burn severity is determined by considering the source of the burn, body regions burned, depth of the burn (superficial, partial thickness, or full thickness), extent of the burn (by rule of nines or rule of palm), age of the patient (children under 5 and adults over 55 react most severely), and other patient illnesses or injuries.

Chapter Review (4 of 5)

- Care for burns includes stopping the burning process (using water for a thermal burn, brushing away dry chemicals), covering a thermal burn with a dry sterile dressing, flushing a chemical burn with sterile water, protecting the airway, administering oxygen as appropriate, treating for shock, and transporting the patient to a medical facility.

Chapter Review (5 of 5)

- For treatment of electrical injuries, be sure that you and the patient are in a safe zone away from possible contact with electrical sources. Protect airway, breathing, and circulation. Be prepared to care for respiratory or cardiac arrest. Treat for shock, care for burns, and transport the patient.

Remember (1 of 2)

- The soft tissue of the body is made up of skin, fatty tissues, muscles, blood vessels, connective tissues, membranes, glands, and nerves.
- The skin provides protection, water balance, temperature regulation, excretion, and shock absorption.
- **Open** or **closed** in reference to a soft-tissue injury is dictated by whether or not the skin is still intact.
- Closed injuries must be evaluated with consideration to underlying anatomy and mechanism of injury.

Remember (2 of 2)

- Open injuries typically are easier to visualize, but they often can mask underlying injuries.
- Burns involve immediate destruction of tissue but also can have a long-term effect, both physically and emotionally.
- Safety must be a key concern when treating a patient with a burn or an electrical injury.
- The goal of dressing and bandaging wounds is to control bleeding and to prevent infection.

Questions to Consider (1 of 2)

- Does the patient have a patent airway and is breathing adequate?
- If the wound is penetrating, is there an exit wound?
- What is the best way to immobilize an impaled object?

Questions to Consider (2 of 2)

- Is there respiratory involvement with the burn?
- Have we irrigated the chemical burn sufficiently?
- Does the electrical burn have an exit wound?
- Is the bandage securely fastened to hold the dressing?

Critical Thinking (1 of 2)

- A 21-year-old male lacerated his anterior elbow when he fell through a window. There is a lot of blood around the patient. Bystanders have applied numerous towels and washcloths over the wound (at least 3 inches thick).

Critical Thinking (2 of 2)

- There are so many dressings on the wound that you can't tell if it is still bleeding. The patient is alert, but pale and anxious. The radial pulse on his uninjured arm is weak and rapid. How much assessment of the wound should you do and how do you do it without making things worse?

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Appendix 1

From the top to the inner layers, the skin surface comprises the epidermis, dermis, and subcutaneous layers. Underlying tissues and organs comprise sensory receptors, sebaceous glands, arrector pili muscles, hair, sweat glands, nerves, veins, and arteries.

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Appendix 2

Superficial burns are associated with skin reddening and involve only the outermost layer of skin, known as the epidermis. Partial thickness burns are associated with blisters and involve both the epidermal and dermal layers of the skin. In full thickness burns, all layers of the skin are damaged including the underlying tissues. Full thickness burns are associated with black or brown charring.

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Appendix 3 (1 of 2)

The rules are as follows for an adult.

- The anterior or posterior surface of the head represents 9 percent.
- The anterior or posterior surface of the upper torso or upper back represents 9 percent.
- The anterior or posterior surface of the abdomen and upper trunk or lower back and buttocks represents 9 percent.
- The anterior or posterior surface of each leg represents 9 percent.
- The anterior or posterior surface of each arm represents 4 and one half percent.
- The genitalia represents 1 percent.

The rules are as follows for a child.

- The anterior or posterior surface of the head represents 18 percent.
- The anterior or posterior surface of the torso and upper trunk or back and buttocks represents 18 percent.
- The anterior or posterior surface of each leg represents 7 percent.
- The anterior or posterior surface of each arm represents 4 and one half percent.
- The genitalia represents 1 percent.

Appendix 3 (2 of 2)

The rules are as follows for an infant.

- The anterior or posterior surface of the head represents 18 percent.
- The anterior or posterior surface of the torso and upper trunk or back and buttocks represents 18 percent.
- The anterior or posterior surface of each leg represents 14 percent.
- The anterior or posterior surface of each arm represents 9 percent.
- The genitalia represents 1 percent.

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