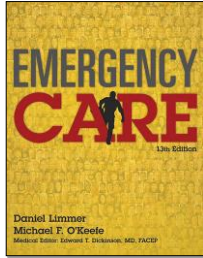


Emergency Care

THIRTEENTH EDITION



CHAPTER 26

Soft-Tissue Trauma

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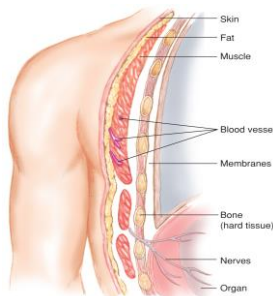
Function of the Skin

- Protection from environmental contact
- Water balance
- Temperature regulation (dilation/constriction)
- Excretion (salts, CO₂, water)
- Shock (impact) absorption

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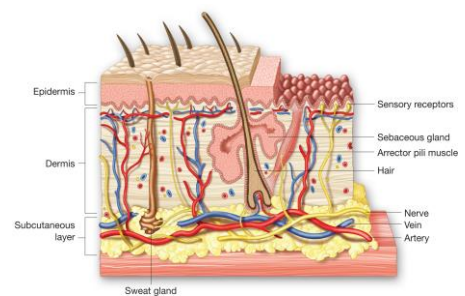
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Soft Tissues



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Layers of the Skin



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Integumentary Anatomy Video



Click on the screenshot to view a video on the subject of skin layers and wounds.

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Closed Wounds

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Closed Wounds

- 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
- Consider MOI

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Closed Wounds

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



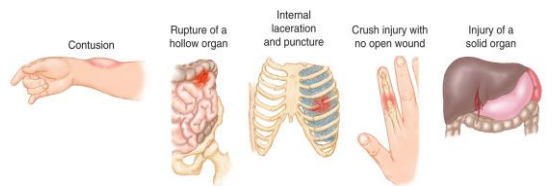
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Closed Wounds

- Closed crush injuries
 - Excessive force crushing or rupturing internal (generally solid) organs
- Blast injuries
 - Can include open and close wound types
 - Potential for massive internal damage is higher than with direct-force trauma.

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Closed Wounds



Closed wounds.

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Patient Care

- PPE
- Manage ABC's (be alert for vomiting)
- Always assume internal injuries
- Splint extremities that are painful, swollen, or deformed
- Apply cold pack to isolated injuries to manage pain and swelling
- Continuously monitor for changes and transport

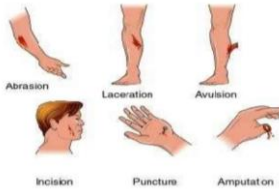
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Open Wounds

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Types of Open Wounds

open wounds



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

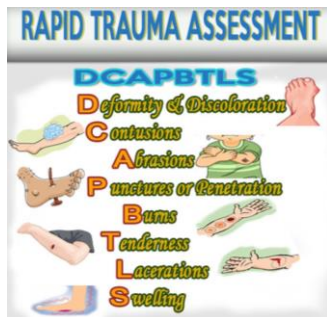
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Think About It

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

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Acronym for Injuries – DCAP BTLS



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Patient Care

- PPE
- ABC's (oxygen and control bleeding)
- Expose wound
- Clean surface of wound
- Prevent further contamination
- Bandage dressings in place after bleeding is controlled
- Keep patient lying still
- Reassure patient

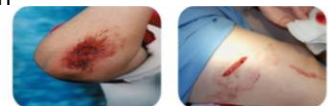
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Treating Specific Types of Open Wounds

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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



ABRASION

LACERATION

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Treating Penetrating Trauma

- Use caution as 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 if in a vital area of body.

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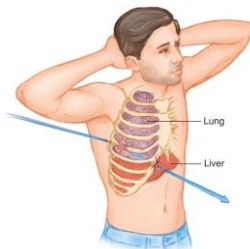
Treating Penetrating Trauma

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



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Treatment: Penetrating Trauma



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

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Treating Impaled Objects

- Do not remove object; may cause severe bleeding.
- Expose wound area
- Control bleeding by direct pressure
- Apply several layers of bulky dressing
- Secure dressings in place



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Treating Impaled Objects

- Care for shock.
- Keep patient at rest.
- Provide rapid transport.
- Reassure patient



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Treatment: Impaled Objects



Bandage the impaled object and surrounding dressings in place.

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Treatment: Impaled Object in Cheek



The process of removing an impaled object from the cheek.

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Object Impaled in the Cheek

- Take care that object does not 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.

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Object Impaled in the Cheek

- 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.

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Object Impaled in the Cheek

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

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Puncture Wound or Object Impaled in the Eye

- Stabilize the object.
- Apply rigid protection.
- Secure with self-adherent roller bandage or with wrapping of gauze.



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Treatment: Puncture Wound or Object Impaled in Eye



Managing an object impaled in the eye.

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Puncture Wound or Object Impaled in the Eye

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

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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.



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Treating Amputations

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



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Treating Amputations

- Wrap amputated part 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.

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Treating Genital Injuries

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

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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.

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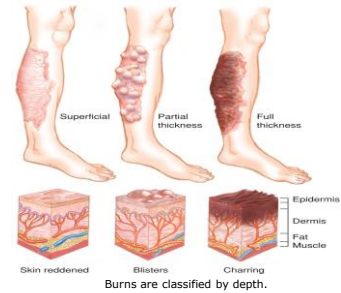
Classification of Burns

Thickness	Degree	Depth	Characteristics
Superficial	First	Epidermis	Pain, redness, mild swelling
Superficial Partial	Second	Dermis: Papillary region	Pain, blisters, splotchy skin, severe swelling
Deep Partial	Third	Dermis: Reticular region	White, leathery, relatively painless
Full		Hypodermis (subcutaneous tissue)	Charred, insensate, eschar formation

1. Agent and source (i.e. chemical, electrical)
2. Depth (1st-4th)
3. Severity (location, age, rule of nines)

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Assessment: Burn Depth



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Superficial Burn (1st degree)



- Involves only epidermis
- Reddening with minor swelling

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Partial Thickness Burn (2nd degree)



- Epidermis burned through, dermis damaged
- Deep, intense pain
- Noticeable reddening
- Blisters and mottling

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Partial Thickness Burn



Partial thickness burns. © Edward T. Dickinson, MD

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Full Thickness Burn (3rd degree)



- All layers of skin burned
- Blackened areas surrounded by dry and white patches

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Determining the Severity of Burns

- 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

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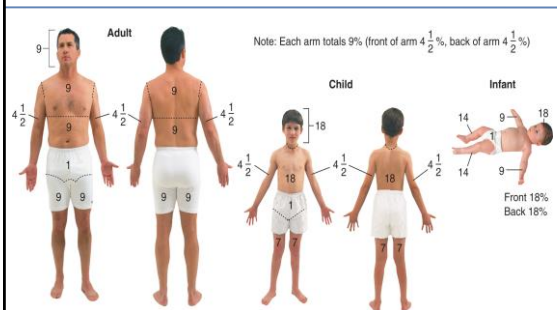
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Determining the Severity of Burns

- Rule of Nines
 - Helps estimate extent of burn area
 - Adult body is divided into 11 main areas
 - Each represents 9 percent of body surface
- Rule of Palm
 - Patient palm equal to 1%

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Rule of Nines



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Classifying Burns by Severity

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

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What is Critical?

- Classified by thickness, percent, and complicating factors
 - Burns of the respiratory tract
 - Partial or full-thickness involving the face, hands, feet, or genitalia
 - Full thickness burns > 10%
 - Partial thickness burns > 30%
 - Burns complicated by musculoskeletal injuries
 - Circumferential burns

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Special Notes

- A moderate burn in a young adult can be fatal to a geriatric adult.
- 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.
 - Full thickness burn of any extent and partial thickness burn of more than 20% is critical in children < 5 years old

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Treating Specific Types of Burns

- 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.

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Treating Specific Types of Burns

- Patient care for thermal burns (cont)
 - 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.

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Treatment: Chemical Burns



For a chemical burn, brush away dry powders.

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Treatment: Chemical Burns



Then flood the area with water.

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Treatment: Chemical Burns

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

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Treatment: Burns to the Eye

- Patient care for chemical burns in eye
 - Flood the eye with water (hold eye open)
 - Flow of water - from the medial (nasal) corner of the eye to the lateral corner



- Wash for at least 20 minutes
- Cover both eyes with moistened pads
- Wash again if burning or irritation occurs

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Radiological Burns

- 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



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Radiological Burns

- 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.

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Electrical Injuries

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Electrical Injuries

- Severe damage through body by disrupting nerve pathways
- Entry and exit burns are possible.
- Respiratory/cardiac arrest are possible.
- Bones may fracture from violent muscle contractions.



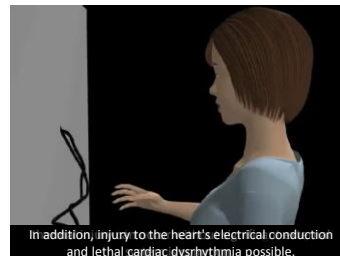
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Patient Care

- Maintain ABC's
- Consider shock, administer oxygen
- Prepare for basic cardiac life support
- Consider spinal or extremity fractures
- Evaluate burn sites – apply sterile dressing
- Cool burning areas and smoldering clothing – same as thermal burn
- Transport as soon as possible.

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Electrical Injuries Animation



In addition, injury to the heart's electrical conduction and lethal cardiac dysrhythmia possible.

Click on the screenshot to view an animation about injuries caused by electricity.

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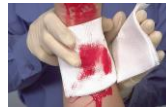
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Dressing and Bandaging

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Dressing and Bandaging

- Dressing
 - Material applied to wound to control bleeding and prevent contamination



- Bandage
 - Material used to hold dressing in place

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Dressing and Bandaging

- 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



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Patient Care

- Dressing open wounds
 - Take PPE 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.

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Patient Care

- 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.

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Bandaging Open Wounds



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

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Bandaging Open Wounds



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

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Chapter Review

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Chapter Review

- 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).
- For open wounds, expose the wound, control bleeding, and prevent further contamination.

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Chapter Review

- Closed injuries include:
 - Contusions (bruises), hematomas, crush injuries, and blast injuries.
- Open wounds include:
 - Abrasions, lacerations, punctures, avulsions, amputations, crush injuries, and blast injuries.

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Chapter Review

- Take PPE precautions
- Note mechanism of injury
- Protect the patient's airway
- Consider need for oxygen
- Treat for shock
- Immediate transport

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Chapter Review

Burn severity is determined by:

- Source of the burn,
- Body regions burned,
- Depth of the burn (superficial, partial thickness, and full thickness),
- Extent of the burn (by rule of nines or rule of palm),
- Age of the patient and other patient illnesses or injuries.

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Chapter Review

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,
- Monitor ABC's, treat for shock, immediate transport

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Chapter Review

For treatment of electrical injuries:

- Consider your safe zone
- Protect airway, breathing, and circulation.
- Be prepared to care for respiratory or cardiac arrest.
- Treat for shock, care for burns, and transport.

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Remember

- The soft tissue of the body is made up of skin, fatty tissues, muscles, blood vessels, fibrous tissues, membranes, glands, and nerves.
- The skin provides protection, water balance, temperature regulation, excretion, and shock absorption.

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Remember

- 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.

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Remember

- 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.

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Questions to Consider

- 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?

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Questions to Consider

- 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?

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Critical Thinking

- 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).

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Critical Thinking

- 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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