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Burns

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Learning objectives

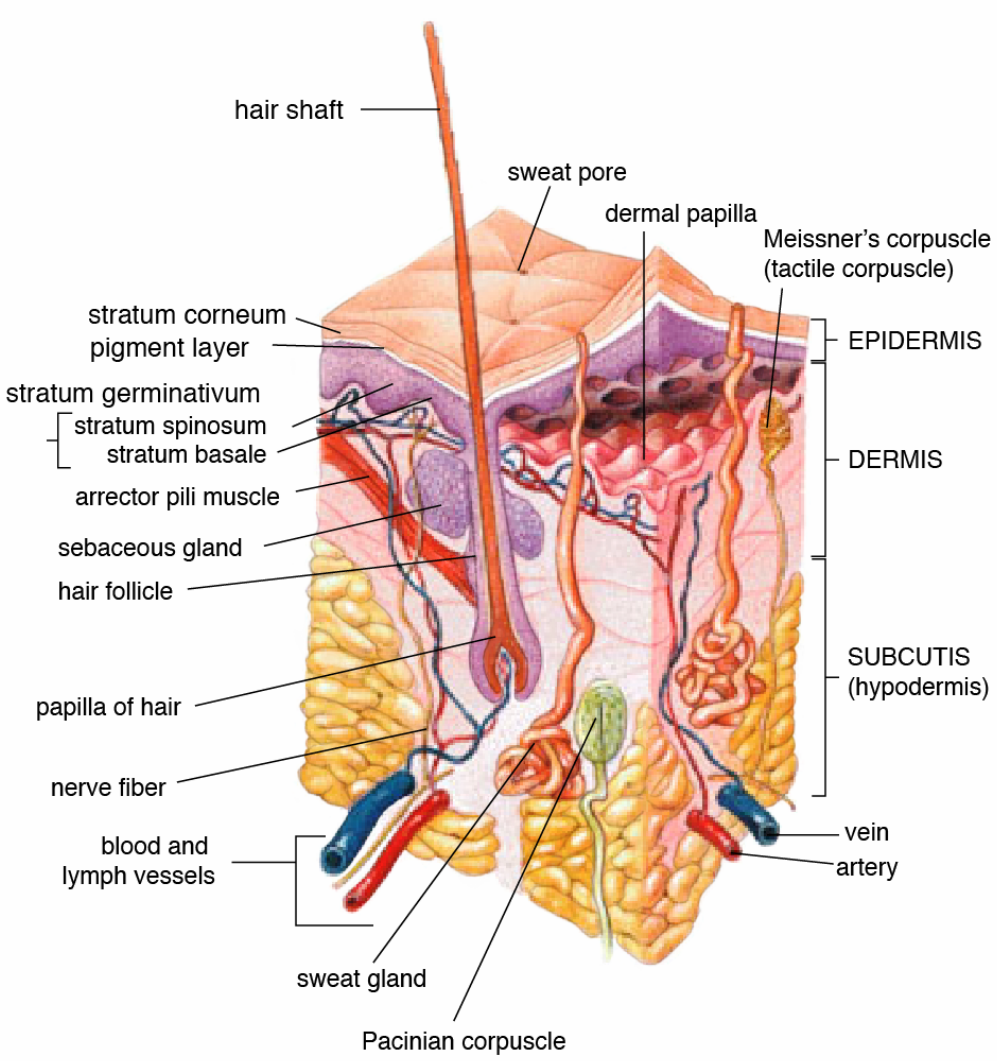
- Students will become familiar with various degrees of burns.
- Students will learn the procedure for first aid for burns.
- Students will learn how to assess the severity and extent of burns.

Definition

- Burn (lat. Combustio) = tissue damage caused by direct or indirect exposure to heat
- Skin, or deeper structures, are destroyed

- The tolerable contact temperature is 43.5 °C.
- Skin damage occurs at a temperature of 55 °C. The decisive factor is the duration of the heat exposure

Skin structure



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Pathophysiology

- Thermal burns
  - contact with heated objects, such as boiling water, steam, hot cooking oil, fire and hot objects

Destruction of capillaries →
→ release of vasoactive substances →
→ generalized dysfunction of capillaries→
→ plasma leakage into the interstitium, edema, hemoconcentration →
→ hypovolemic-distribution shock →
→ activation of the sympathetic nervous system →
→ acute systemic inflammatory response syndrome →
→ extreme loss of heat, fluids

Pathophysiology

- Inhalation of toxic substances
  - Rapid development of airway swelling
  - Intoxication of toxic substances (CO, CO_2, etc.)

Pathophysiology

- Chemical burns (corrosions)
  - Acids cause dry coagulation necrosis
  - Alkalis cause wet necrosis

Types of burns

- DEPTH
  - **Superficial:** preservation of follicles, sebaceous glands, capillaries and nerve endings
  - **Deep:** loss of skin in all layers (possibly including subcutaneous tissue, muscle and bone), pale base means necrosis or ischemia

- DEGREES
  - 1st) redness, edema
  - 2nd a) superficial; blister
  - 2nd b) deep
  - 3rd) necrosis; full thickness
  - 4th) charring

Degrees

1st degree

- Redness, swelling: only epidermis is affected, increased sensitivity of the skin, painfull, spontaneous healing without scars

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Degrees

- 2nd a) Superficial: damaged epidermis and superficial part of dermis, blisters, spontaneous healing in 2-3 weeks by reepithelialization

- 2nd b) Deep: damaged reticular dermis, pale base, incipient necrosis, difficult healing-contractures, risk of infections

Degrees

3rd degree

- Necrosis: irreversible damage of the full thickness of dermis, including nerve endings, a skin graft is needed for healing

Degrees

4th degree

- Charring: damage of the whole skin, subcutaneous tissue, including muscle fascia, muscles, bones, etc. Reccurent debridements of necrotic tissue are necessary, usually followed by numerous plastic reconstructions

First aid

- Take care of your own safety
- Immediately get the person away from the heat, electrical, chemical source
- Transport to a safe place (excluding smoke, fumes,…)
- Follow SSS ABC, start CPR if the person is not breathing

First aid

- Gently remove loose clothing, shoes (do not remove anything that's stuck to the skin!)
- Remove any metal thing (watches, rings,…) which is near the burnt area of the skin

- Prevention of heat loss (foil, blanket)
- Call 112
- Nothing to eat

First aid

- Burns: Cool burns with clean cold water for a long time (up to 20 minutes), up to a maximum of 5% of the body surface; especially the face, neck and hands

CAVE: rapid development of hypothermia (especially in children)
Cover with a sterile sheet

- Corrosion: Rinse with plenty of water, always remove contaminated clothing

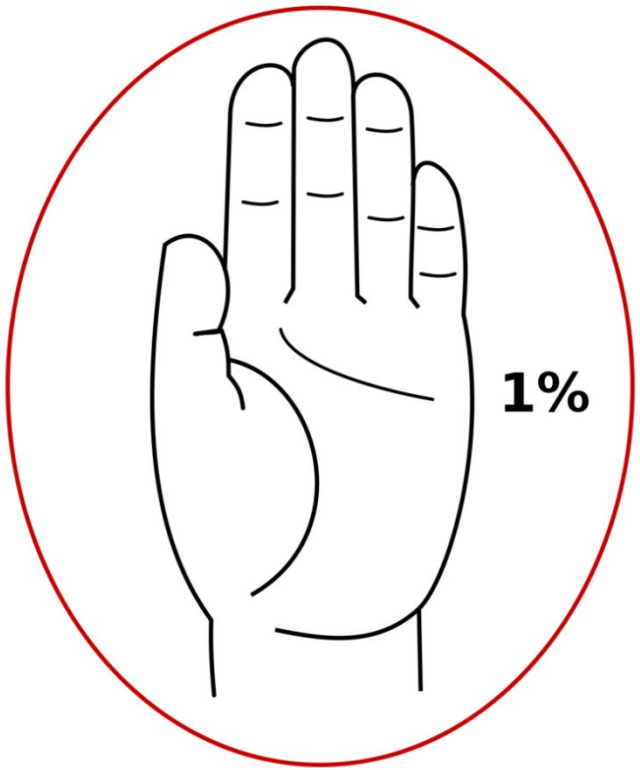
Cover with a sterile sheet
Never induce vomiting!

The most common mistakes

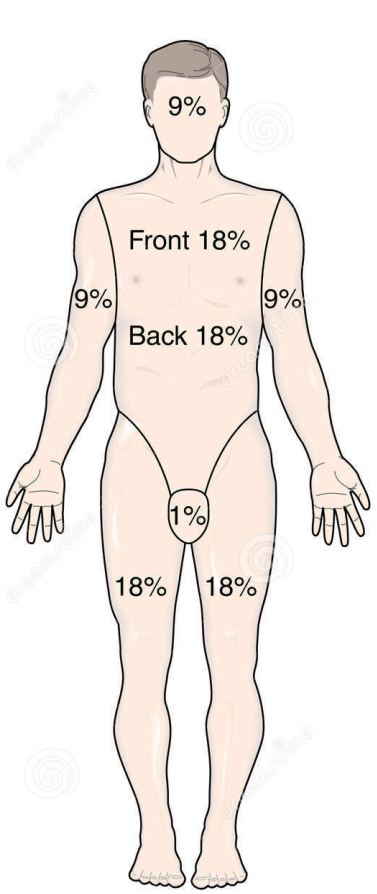
- Cooling of the torso and large areas
- Cooling with ice
- Application of ointments and various lubrications on injured surfaces
- To give a drink or meal to a patient

Extent of burns

- RULE OF PALM (patient´s)



- RULE OF NINES



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Serious localizations

- Burns on the face, neck, hands, feet and genitals
- Circumferential burn
- Inhalation trauma

Severity

- Mechanism of injury (polytrauma, electrical burn of high voltage)
- Extent and depth of burns
- Age
  - children up to 2 years……2^{nd} - 5% TBSA
  - children 3 - 10 years …… 2^{nd} - 10% TBSA
  - children 11-15 years …….... 2^{nd} - 15% TBSA
  - adults ……..... 2^{nd} - 20% TBSA, 3^{rd} 5% TBSA
  - seniors over 70 years ……2^{nd} - 10% TBSA
- Location
- Inhalation trauma
- Anamnesis of patient

Transport

- Major thermal trauma → Burn Centers
- Moderate thermal trauma → regional hospital

Learning outcomes

- Student knows how to provide first aid to the burnt person.
- Student is able to estimate the severity and extent of burns
- Student is able to list situations where medical treatment of burns is necessary.

Sources

- https://www.nhsinform.scot/illnesses-and-conditions/injuries/skin-injuries/burns-and-scalds

- Pictures:
  - http://www.popaleniny.cz/ambulantni
  - https://en.wikipedia.org/wiki/Integumentary_system#/media/File:Skin.png

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