

Wound

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Outline

- Introduction
- Definition
- Types of wounds
- Healing
- Approach to forensic wound
- Wound investigation sheet

Objectives

- Describe the types of wounds.
- Document the wound in official reports.

Introduction

- Wound is an initial step into forensic medicine world.
- Physical or chemical force producing injuries to tissues.

Introduction

- Force or energy
- Energy transfer
- Tissue injury

Energy Transfer

- Surface area of impact
- Time interval of transfer
- Energy absorbed
- Lever action force
- Plasticity and elasticity
- Inertia
- Hydrostatic force

Definition

- Wound
 - an injury or damage, usually restricted to those caused by physical means with disruption of normal continuity of structures.
 - **บาดแผล**

Definition

- Ulcer
 - Lesion from infection, inflammation, malignancy or necrosis.
 - แผล

Definition

- Patterned wound
 - The size and shape of the wounding object appeared on the wound.

Types of Wounds

- According to types of forces.
- According to types of weapons or sources.
 - Gun
 - Electric current
- According to types of issues.
 - Sexual assault
 - Child abuse
 - Elder negligence

Types of Wounds

- According to intention
 - Self inflicted wound: hesitation, pathetic
 - Defense wound

Wounds from Mechanical Forces

- Blunt force injury
 - Abrasion
 - Contusion
 - Laceration
- Sharp force injury
 - Abrasion
 - Cut
 - Stab

Forces

Blunt force

Sharp force

contusion

laceration

abrasion

cut

stab

Force

epidermis

Abrasion

dermis

laceration

cut or incise/stab

contusion

Abrasion

- Injury to the superficial part of the tissue.
- Injury to the epithelial surface of the tissue.
- Loss or destruction of epithelium.
- Sometimes deep to injure capillary causing bleeding and serosanguineous fluid leakage and drying to form reddish brown scab.

Abrasion

- Friction-scraping, brush, graze, sliding
- Scratch
- Rubbing
- Direct pressure or impact

Scratch

- Linear abrasion

Brush burn

- Sliding abrasion on rough surface of the road.
- Gravel rash.

Patterned Abrasion

- Imprint or stamp of object onto the tissues.

Antemortem or Postmortem

- Antemortem
 - Reddish-brown appearance
- Postmortem
 - Yellow and translucent
 - Parchment like

Healing of Abrasion

- Scab formation
- Epithelialization
- Subepidermal granulation
- Remodelling

Scab

- Deposition of serum, red blood cells and fibrins on the abrasion.
- Infiltration of PMN. (early at 2 h, but usually 4 – 6 h)
- Three separated zones in 12 h
 - Upper of serum, RBC and fibrin
 - Middle of PMN
 - Base of damaged epithelium

Epithelial Regeneration

- Arise in surviving hair follicle and at the edge of the abrasion.
- Epithelial growth appears as early as 30 h.

Subepidermal Granulation

- Occur only after epithelial covering of an abrasion.
- Prominent at 5 – 8 d.
- Prominent perivascular infiltration and chronic inflammatory cells.
- Overlying epithelium becomes progressively hyperplastic with formation of keratin.
(9 – 12 d)

Regression

- Begin at about day 12.
- Remodelling of epithelium, then thinner and even atrophic.
- Prominent collagen fibers.
- Definite basement membrane and decrease vascularity of dermis.

Contusion

- Compression or stretching causing rupture of the blood vessels in the tissue.
- Extravasation of blood into surrounding tissues.
- Occur in any tissues
 - In skin: bruise
 - Hemorrhage
 - Petechial hemorrhage 2 mm

Severity of Contusion

- Force
- Soft, lax and vascular tissues
- Bleeding diatheses

Contusion

- Differentiation from livor mortis
 - Area
 - Cannot be wiped or squeezed
 - Extravasation into surrounding tissues

Patterned Contusion

- Tramline contusion
 - Rod
 - train-track-like line, railway line

- Love mark

Characteristic Contusion

- Battle's sign
- Raccoon's eyes, Panda's eyes, spectacle hematoma

Resolve of Contusion

- Initial dark blue or purple of crimson.
- Violet
- Green
- Dark yellow
- Pale yellow
- Disappear

Resolve of Contusion

- Earliest yellow discoloration in 18 h.
- Earliest hemosiderin in macrophage in 24 h.

Postmortem Contusion

- Can be produced with severe force in early postmortem at the congested vessels.
- Artefact: Prinsloo Gorgon Bleeding in Posterior aspect of esophagus.

Laceration

- Tear or disruption of tissue by stretching, shearing or crushing from blunt force.
- Occur in any tissues
- At the skin, tend to be irregular with abraded contused margins.
- Bridges of tissue running from side to side.

Laceration

- Long and thin object (pipe, pool cue)
 - Linear laceration
- Flat surface object
 - Irregular, ragged or Y-shaped laceration

Chop Wound

- Heavy object with relatively sharp edge
 - Axes, machetes, meat cleavers
- Dull knife
 - Resemble an incised wound
 - Abraded margins
 - Bridging tissue (+/-)

Avulsion

- Force impact oblique to the skin, ripping the skin and soft tissue off the underlying tissue.

Cut

- Cut or incised wound
- More length than depth
- The edge of the wound in the skin is typically sharp, without abrasion or contusion.

Severity

- Sharpness of the tip.
- The consistency of the tissue.
- Direction and amount of force.
- Injured organ.

Stab wounds

- More depth than length.
- Length of the wound in the skin can be equal or greater than the width of the knife.
- Depth of the stab wound can be equal to, less than, or greater than the length of the knife blade.

Stab wounds

- Shape of a stab wound is affected by the shape of the object and Langer's lines of the skin.
- Bilateral pointed end: double-edged weapon.
- One pointed with one squared off (blunted): single-edged weapon.

Stab wounds

- Y- or L-shaped stab wound
 - Twisted weapon while withdrawn
 - Moving stabbed person
- Guard metal piece appearing on the thrust plunge whole blade into the tissue. (hilt in the sword)

Stab wounds

- Broken bottle
 - Clusters of wounds
 - Different sizes, shapes and depths.

Depth, length and width

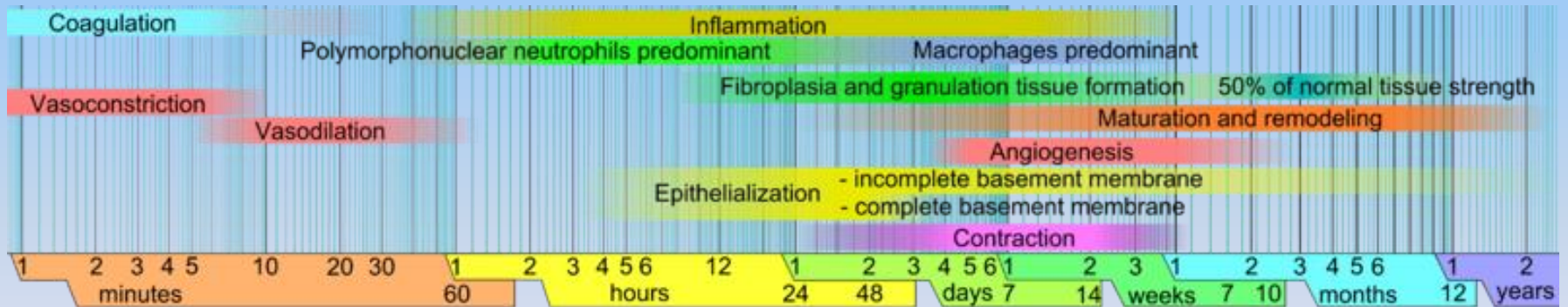
Puncture wound

- Pointed object with small diameter.

Perforated Wound

Healing of Separated Skin

- Continuous and overlapping process.
- Start immediately after injury.



Approach to Forensic Cases

- Normal or abnormal appearances
- Antemortem or postmortem
- When did it occur?
- By which object, cause and mechanism?
- By whom?
- With intention or not?

Antemortem

- Vital reaction
 - Bleed
 - Clot
 - Inflammation
 - Healing
 - Complication
 - Infection
 - embolism

Perimortem

- Difficult to separate whether ante or postmortem.

Sudden Loss of Consciousness?

- ARAS
- 10 – 50 seconds glucose preservation in brain

Sudden Death?

- Death
 - Somatic
 - Cellular death

- Somatic death
 - Heart
 - Lung
 - Brain

Documentation of Wound

Medicolegal Document

- Logo
- Institution
- General information
- Fact
- Opinion

ใบนำส่งผู้บาดเจ็บหรือศพให้ แพทย์ตรวจชั้นสูตร

- Official document
- According to the laws
- By medical professionals
- ผลการตรวจชั้นสูตรบาดแผลหรือศพของแพทย์

Documentation

- Site. Anatomical position.
- Size. Dimensions of wound should be measured.
- Shape. Curved. Linear. Irregular. Straight etc.
- Surrounds. Condition of nearby tissues.
- Colour. Particularly when describing bruises.
- Contents. Note presence of foreign material in or around the wound.
- Borders. Note any characteristics of the edges of the wound.

แนวทางการเขียนใบชั้นสูตร บาดแผล

- <http://www.forensicchula.net>

Reasonable Opinion

- Base on a careful review of all the information available to the doctor.
- When subsequent information leads to an alteration of an original opinion, the doctor may need to revise his original opinion.

Any Questions?

Thank You for Your Attention