

ABRASION AND ITS FORENSIC IMPORTANCE

KUHS MBBS - Forensic Medicine & Toxicology | Study-Friendly Exam Notes

High-yield core: Abrasion is a superficial blunt force injury that helps determine site of impact, direction of force, age of injury, causative object, crime scene connection, manner of assault and identity of assailant.

1. Definition of Abrasion

Abrasion is a mechanical injury characterized by destruction or removal of the superficial epithelial layer of skin, usually involving the epidermis and papillary dermis, caused by friction against a rough surface.

It is also called gravel rash when caused by rubbing against a rough surface.

2. Classification of Abrasions

Abrasions are classified into four main types:



3. Types of Abrasions

Type	Mechanism	Features	Forensic Importance / Examples
Scratch / Linear Abrasion	Sharp or pointed object passing across the skin. Examples: fingernails, pin, thorn.	Long, narrow and linear. Superficial epithelium is torn and collected at one end. Clean area is seen at the beginning. Epithelial tags are present at the tail end.	Epithelial tags indicate direction of force. Crescentic fingernail abrasions may be seen in throttling, child abuse and sexual assault.
Graze Abrasion	Horizontal or tangential friction between the skin and a hard rough surface.	Most common type of abrasion. Shows uneven, longitudinal, parallel lines. Epidermis is heaped up at the opposite end of movement. Dirt, gravel, glass or sand may be embedded.	Indicates direction of force or dragging. Common in road traffic accidents. Variants include brush burns and friction burns.
Pressure Abrasion	Also called crushing / friction abrasion. Caused by direct impact or linear pressure of a rough object over the skin.	Superficial cuticle is crushed. Often associated with bruising underneath.	Common example is ligature mark in hanging and strangulation.
Imprint / Patterned Abrasion	Force applied perpendicularly to the skin for a short duration.	Cuticle is crushed at the point of impact. Abrasion bears the pattern or imprint of the offending object. When dried, it becomes brownish and parchment-like, making the pattern clearer.	Helps identify the causative object or weapon. Examples: tyre tread marks, radiator grill marks, bicycle chain marks, teeth bite marks and ligature pattern.

4. Age Estimation of Abrasions

Age	Appearance
Fresh to 12-24 hours	Bright red, raw, oozing serum and blood
12-24 hours	Exudate dries to form reddish scab
2-3 days	Reddish-brown scab
4-5 days	Brown / dark brown scab

Age	Appearance
5-7 days	Brownish-black scab, starts falling from margins
7-12 days	Scab dries, shrinks and falls off, leaving depigmented area
More than 12 days	Epithelium becomes thin and gradually regains normal appearance

Important: Abrasions usually heal completely without permanent scar.

5. Medico-legal Significance of Abrasions

Aspect	Forensic Importance
Site of Impact	Abrasions occur exactly at the site of contact and help identify the point where force was applied.
Direction of Force	Epithelial tags and heaping of epidermis indicate direction of force or dragging.
Identification of Weapon / Object	Patterned abrasions help identify the causative object, such as tyre, radiator grill, bite mark, ligature or bicycle chain.
Age of Injury	Scab colour and healing changes help estimate time since injury. This may support or contradict the history of assault.
Crime Scene Correlation	Dirt, dust, grease, sand, gravel or glass embedded in abrasions may connect the victim to the scene of crime.
Identification of Assailant	Tissue, blood or epithelial cells under fingernails may be used for DNA analysis . Bite mark abrasions may help identify the assailant.
Legal Nature of Injury	Abrasions are generally simple injuries . Abrasion over the cornea may cause permanent corneal opacity and visual impairment, amounting to grievous hurt under Section 320 IPC / Section 116 BNS .

Nature and Manner of Offence - Distribution Helps in Crime Reconstruction

- **Crescentic nail marks on neck** - throttling.
- **Abrasions around mouth and nose** - smothering.
- **Abrasions over breasts, genitals, inner thighs and around anus** - sexual assault.
- **Abrasions over hands and forearms** - defence injuries / struggle.

Conclusion

Abrasion is a superficial blunt force injury, but it has great forensic value. It helps determine the site and direction of force, age of injury, causative object, crime scene connection, manner of assault and identity of assailant.