Burn

Electrical burn

- **electrical burn** is a skin **burn** that happens when electricity comes in contact with the body.
- it can travel through your body.
- When this happens, the electricity can damage tissues and organs.
- This damage can be mild or severe – and it can even cause death.

Important Factors in electrical burn

1. Voltage (Tension): The muscle contraction increased with increasing the volte
2. Amperage (Intensity)
3. Resistance of the Body Tissues (like the skin and the vascular system)
4. Area of Contact of the Body (smaller area has more resistance than the larger area)
5. Duration of Contact (The longer the contact, the greater will be the damage.)

Causes of death

- VENTRICULAR FIBRILLATION
- SPASM OF THE RESPIRATORY MUSCLES
- PARALYSIS OF THE RESPIRATORY CENTRE
- Trauma

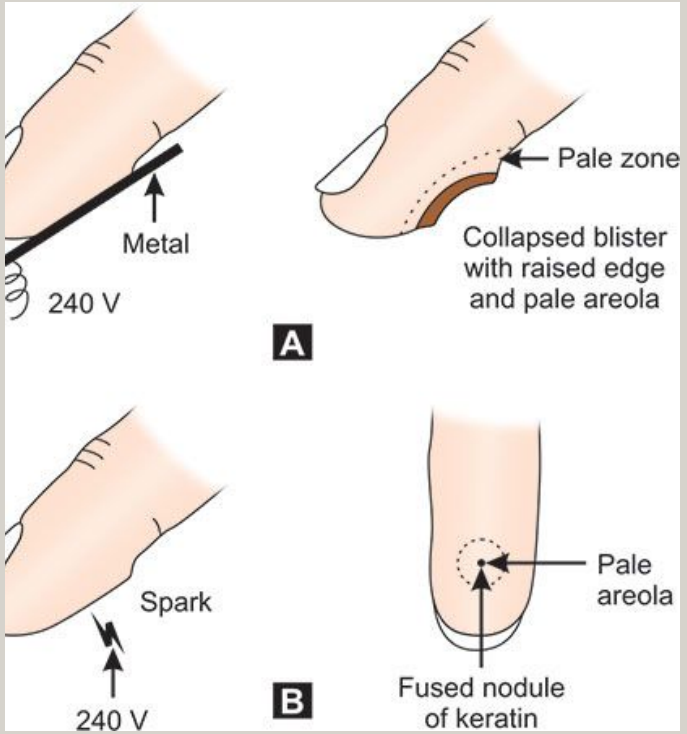
- fatal electrocution can occur with no visible skin mark, and the doctor may have to reach the diagnosis by exclusion of all the other possible causes and by attending to the circumstances of death.
- Gross damage is usually observed in the high-tension currents, and prolonged contact with the low or medium currents can also lead to gross damage.

FINDINGS IN DEATHS DUE TO LOW- OR MEDIUM-TENSION CURRENTS:

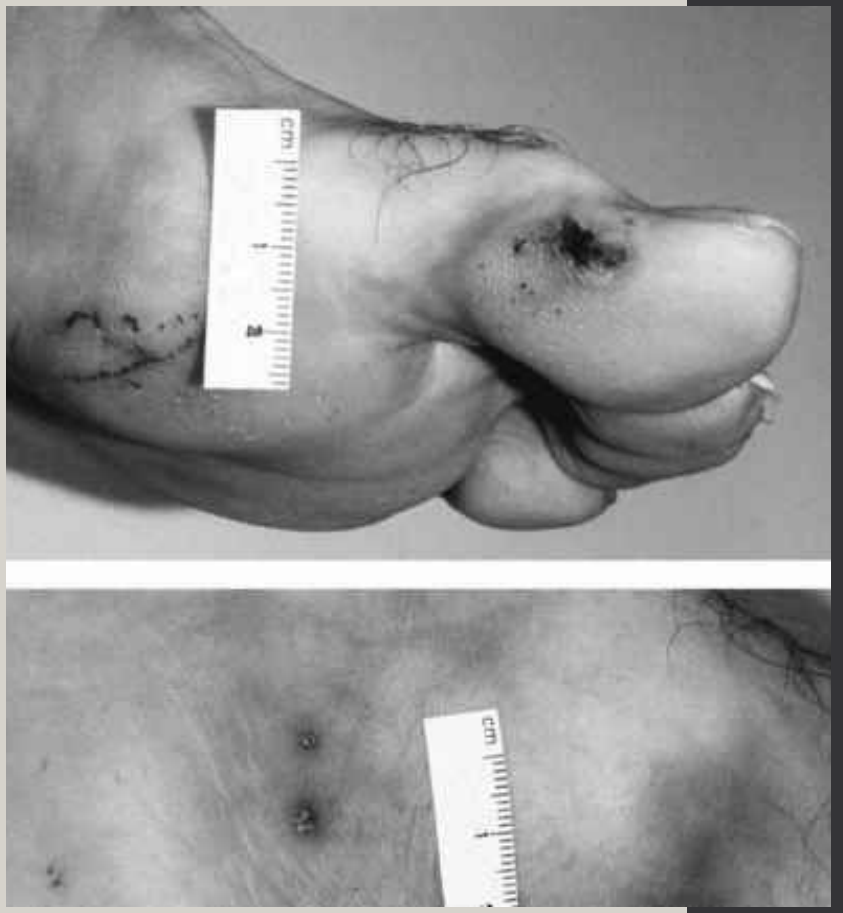
- **Joule burn (endogenous)** :
- The point where the current enters the body
- round to oval, pale ,shallow craters, with elevated and rolled margin
- The crater floor is lined by pale flattened skin and the adjacent skin will be hypermic

- **Flash / spark burn** :

- If the contact of the skin with the conductor is good, the passage of current heats up the tissue fluid and the skin offering resistance gets split and blister may be raised. The shape and size of the mark may correspond to the shape and size of the source of the current in such cases
- If the contact is not good or is less firm, the current jumps the gap between the source and the skin in the form of a spark and causes the outer skin keratin to melt over a small area. On cooling, the keratin gets condensed into a hard brownish nodule and this is termed as the so-called spark lesion



- **Exit marks:**
- Variable in appearance
- There may be more disruption of tissues.
- Often as splits with raised ridges , or lacerations.
- Burns and perforations of the clothing or shoes may be seen over the site of exit.



FINDINGS IN DEATHS DUE TO HIGH-TENSION CURRENTS

- **Arc current**:
- As body approaches high voltage line , an electrical arch may pass through it in relation to the voltage.
- Effects are same as flame burn (charring)

Crocodile skin:

- large areas of the skin.
- Multiple sparks burns
- Punched out lesions
- resembling lightning burns.

Autopsy findings : Heart

- Wavy appearance and fragmintial of myocardial fibers
- Contraction bands within the fibers (especially of 'bark like' appearance) often seen in the superficial myocardium after resuscitation that induces electrical defibrillation

Autopsy findings : internal

- Skeletal muscle: Zenker's degeneration (is a severe glassy or waxy hyaline **degeneration** or necrosis of skeletal muscles)
- Current pearls : small balls of molten metal derived from electrode, carried deep in tissue
- Bones: heat generated by current melts Ca phosphate (Round dense Foci on X-ray) bone pearls , wax dripping, bone necrosis

Filigree burns

- It's appear within few mins to one hour of Lightning injury
- It's seen as a patterned area of erythema
- It's gradually fades within 24 h
- The erythematous marks are not burns, indicate path taken by current

Manner of death

- Suicidal: rare
- Homicidal : extremely rare
- Accidental: most common
- Judicial

Suicidal

- The victim usually winds wire round the wrists or other parts of the body, makes their connection with the wall socket and switches it on

Judicial

By electrical chair

Accidents

- Leading course of work-related traumatic death: construction, transportation , public utilities , manufacturing,and agriculture

Accident

- Defective tools or electrical devices
- Improper preventive measures

- Postmortem blisters contain mostly gas or may contain little fluid.
- They do not show any antemortem reaction in and around them
- The base is dry, hard and yellow

Trait	Dry heat	Moist heat
Cause	Flame, heated solid substance or radiant heat	Steam or any liquid at or near boiling point
Clothing	Burnt and may be adherent to the body	Usually wet but not burnt
Discolouration	Skin roasted, charred etc.	Skin bleached
Site	At and above the site of flame	At and below the site of contact
Skin	Dry, shrivelled, charred	Sodden and bleached
Vesication	At the circumference of burnt area	Most marked over burnt area
Red line	Present	Present
Singeing	Present	Absent
Charring	Present	Absent
Trickled marks (splashing)	Absent	Present
Ulceration	Absent (unless infected)	Absent (unless infected)
Scarring	Thick and causes disfigurement	Thin and causes less disfigurement

Thank you