Injury Identification

OCTOBER/NOVEMBER 2018

- Identify types of injuries commonly seen in sexual assault
- Increase knowledge of medical-forensic terminology
- Describe injury documentation techniques

Nursing diagnosis –
- Impaired skin integrity related to physical trauma following a sexual assault
- Pain related to physical findings following a sexual assault

Injury Frequency

<p>| TAB 9: Offence type in violence-related injuries treated in hospital emergency departments, by age of patient, 1994 |
|---|---|---|---|---|---|---|---|---|---|</p>
<table>
<thead>
<tr>
<th>Number</th>
<th>Total</th>
<th>Under 10</th>
<th>Under 11</th>
<th>Under 12</th>
<th>Under 13</th>
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<tr>
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<td>Anal penetration</td>
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</table>
Injury Frequency

- 30% of victims of sexual violence go to the hospital
- Non-genital injury - 50 - 91%
- Mean number of injuries 10.8
- Genital injury – 30%
- Wounds provide evidence of the crime
- White women have more documented injury than women of color

Injury Risk Factors

- Current or former intimate partner
- Perpetrator threatened to harm or kill them or someone close to them
- Perpetrator used a weapon during the rape
- Perpetrator used drugs and/or alcohol at the time of the rape

Documentation

- Document in writing, on body diagram and with photographs
- Use directional terms
- Use forensic and medical terminology
- Document size in centimeters and millimeters
- Document shape and color
- Use a standard measurement tool - ABFO L Square ruler
- Document type of injury and mechanisms of injury in quotes
- Document pain and tenderness using pain scale
- At time of assault
- At time of exam
Directional Terms
- Inferior – Superior
- Anterior - Posterior
- Medial - Lateral
- Proximal – Distal

Document Position
- Use clock face to document genital and anal injuries
- Document position patient is in during exam
- Clock remains the same regardless of patient position

Injury Documentation
Head to toe exam documenting injuries, pain and tenderness
Injury Identification

Contusion = Bruise

- Blunt force trauma to capillaries then blood seeps into the surrounding tissue

Bruises

- Bruises may be found in the skin, muscles, and internal organs
- Produced by squeezing or pinching, where the force is applied gradually and then maintained
- Deep bruises may have delayed appearance at the skin surface
- Deep bruises may require as long as 12 or 24 hours to become apparent
- The more superficial the source of bleeding, the sooner the discoloration will be seen on the skin
Bruises

- Location does not necessarily reflect the precise point of injury
- Some areas of the body bruise more easily than others
  - Face bruises more readily than the hands
  - Occur more in loose tissues
  - Less apparent where the skin is supported by fibrous tissue or good muscle tone
  - Occur more in adipose tissue compared to muscle

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Bruises

- Age
  - Infants have loose and delicate skin, and the abundant subcutaneous fat
  - Elderly have degenerative changes in the tissues which support the small blood vessels of the skin and subcutaneous tissues
- Gender
  - Women bruise more easily than men because they have more subcutaneous fat
- Skin color can affect how bruise discoloration is perceived

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Aging Bruises Based on Color

- Bruises change color during the healing process
- The ability to perceive yellow appears to decline as they age
- Studies show a lack of consistency on dating bruises based on color
- The role of the forensic health professional is to remain as objective as possible
- Pre-existing injuries need to be distinguished
Hematoma
- Localized swelling that is filled with blood caused by a break in the wall of a blood vessel
- Hematoma can result from an injury to any type of blood vessel
  - Artery, vein, or small capillary

Tramline Bruising
Pale linear central area lined on either side by linear contusions

Erythema - Redness
Result of injury or irritation causing dilatation of the capillaries
Ecchymosis
- Caused by blood leaking under the skin
- Common and non-specific medical sign
- Petechiae < 3 mm
- Purpura > 3 mm < 1 cm
- Ecchymosis > 1 cm

Injury Caused by Suction
- Negative pressure from force of suction causes the vessels to break
- Area of petechial hemorrhage
- Area of erythema
  - Skin reddened by expanded blood vessels
- Hematomas
  - Accumulation of blood from broken blood vessels

Abrasion
- Friction scraping away epidermis or disruption of epidermis by direct pressure or rubbing
Layered Injury

- Bruise with abrasion layered on top

Blunt Force Injury = Laceration
- A bursting of the skin or other tissues resulting from compression or stretching associated with impact by a blunt object or surface
  - Irregular borders
  - Crushed margins
  - Tissue bridging
  - Nerves, vessels, and other soft tissues extend across gap

Sharp Force Injury = Incised Wound
Sharp Force Injury - Stab Wound

- Puncture wounds that are deeper than they are long
- Caused by a pointed object with a sharp tip
- Direction of force in a perpendicular angle with the skin
- Boat-like shape
- Approximate edges

Sharp Force Injury - Incised wound

- Longer than they are deep
- No tissue bridging
- Knives, razors, box cutters, broken glass, and any other object with a sharp edge or point

Non-suicidal self-injury

- Incised wound
- Document?
Patterned Injury

When an object used as a weapon leaves marks that correspond to the shape of the weapon used.

Patterned Injury

Bite Marks

- The clarity of the bitemark is affected by
  - Location of the body part being bitten
  - Whether the area is curved
  - Degree of flexibility

- Bite marks are usually formed during a highly dynamic process

- Bite marks may not present themselves as regular curved marks, but as a complex wound featuring multiple arches, bruises and abrasions

- Mimics - defibrillator pad marks, the bottom of a glass bottle, heel of a shoe, jewelry and children's toys
Bite marks

- Circular or oval bruise with central sparing
- 2 concave 'bows' (with the concavities facing each other) with gaps at each end and a suction mark in the middle
- U shaped arches
- When the skin is bruised during the biting process, the marks made will distort over time, as the bruising diffuses into surrounding soft tissues

http://www.forensicmed.co.uk/wounds/bitemarks/
Ligature Mark

Defensive Injuries

Pattern of Injury

- Pattern of facial injuries from a fall not an assault
  - Unilateral blunt trauma
  - Predominantly restricted to bony prominences
- Pattern of injuries in various stages of healing
  - IPV
  - Child abuse

http://www.forensicmed.co.uk/wounds/blunt-force-trauma/patterns/
Terminology

- **Bruise = Contusion**: Blunt force injury; usually results in swelling and pain.
- **Ecchymosis**: Not a contusion. It is non-painful patch. Blood has leaked into the skin and is bigger than petechia (<3 mm) and purpura (>3 mm and < 1 cm). Ecchymosis is >1 cm.
- **Laceration/tear**: Blunt force injury; jagged edges and crushed margins.
- **Incision/cut**: Sharp force injury; clean edges; wound is longer than it is deep.
- **Stab/puncture**: Sharp force injury; wound is deeper than it is long; appearance of wound margins shape affected by instrument used and location of injury.
- **Patterned Injury**: Pattern of the instrument used leaves imprint.
- **Pattern of Injury**: Injuries in different stages of healing; may include patterned injury.

References

- [http://koronfelsforensicmedicine.blogspot.com/2013/07/wounds‐bruises‐contusions‐ecchymoses.html](http://koronfelsforensicmedicine.blogspot.com/2013/07/wounds‐bruises‐contusions‐ecchymoses.html)
- [Recognition of Pattern Injuries in Domestic Violence Victims](http://www.well‐being‐how.com/forensic‐sciences/recognition‐of‐pattern‐injuries‐in‐domestic‐violence‐victims/)
- [McGraw‐Hill's Access Medicine Dr Smock's photographs](http://voldabbruy.com/ch11/psy/ex/ch.17.htm)
- [Catherine J Carter‐Snell _ Bald Step article](https://www.researchgate.net/publication/225298479_Injury_documentation_Using_the_BALD_STEP_mnemonic_and_the_RCMP_Sexual_Assault_Kit)

PHYSICAL ABUSE INJURY INDICATORS – CHARTS AND IMAGES

- [MedScape Forensic Autopsy of Sharp Force Injuries](http://emedicine.medscape.com/article/1680082‐overview#a1)
- [Dr. Nipon Poornthanawit](https://www.slideshare.net/mdhum/050‐evaluation‐and‐management‐of‐sexual‐assault‐victims‐new)
- [Aging Bruises Based on Color: A Brief Review Forensic: Healthcare Online 6/2018](https://www.researchgate.net/publication/225298479_Injury_documentation_Using_the_BALD_STEP_mnemonic_and_the_RCMP_Sexual_Assault_Kit)