

Injury Identification

MARCH 2020



- 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

Table 9. Offense type in violence-related injuries treated in hospital emergency departments, by age of patient, 1994

	Total	Child (under age 12)	Teen (age 12-19)	Adult (age 20 or older)
Percent				
Total	100.0%	100.0%	100.0%	100.0%
Rape/sexual assault	4.6	29.2	4.5	2.8
Robbery	1.6	.1	.7	2.0
Assault	93.9	70.7	94.8	95.3
Fight/altercation	29.4	9.4	33.2	29.6
Assault	64.5	61.3	61.6	65.7

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”

Journal of Forensic and Legal Medicine, August 2019

Understanding rates of genital-anal injury: Role of skin color and skin biomechanics

- Women with lighter skin tones **may** have skin that is more easily injured than women with darker tones.
- External genital injuries may be more easily identified in women with light as compared to dark skin
- Women with decreased viscoelasticity may be more easily injured

These findings support the need to develop forensic procedures that are effective in people across the range of skin colors and to interpret forensic findings considering the innate properties of the skin.

Journal of Forensic Nursing 2009; 5(4): 191–2009

Health disparities in the forensic sexual assault examination related to skin color

Based on the results of this study, women with light skin have significantly more external anogenital injuries than women with dark skin, and that difference is likely explained by problems with anogenital injury detection on dark skin.

American Journal of Emergency Medicine
October 2008 26(8) 857-866

Forensic sexual assault examination and genital injury: is skin color a source of health disparity?

Our reported injury prevalence (55% overall) falls within estimates of the reported injury prevalence after consensual sexual intercourse. Some investigators have previously found an injury prevalence as high as 61% to 73% after consensual intercourse.

From a criminal justice perspective, the importance of the proof of injury prevalence is relevant for 2 primary reasons.

- First, during the last 10 years, the annual National Crime Victimization Survey repeatedly has reported that black women have higher rape/sexual assault rates compared to white women.
- Second, national victimization surveys, including the National Crime Victimization Survey, reported that a reason for a substantial proportion of women not reporting their sexual victimization to the police is the "lack of proof" that an incident happened.

Proceedings of the National Academy of Sciences of the USA April 2016

Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites

- 25% Of residents thought that blacks have thicker skin
- 14% thought blacks nerve endings were less sensitive than whites
- 17% thought black peoples blood coagulates more quickly than whites

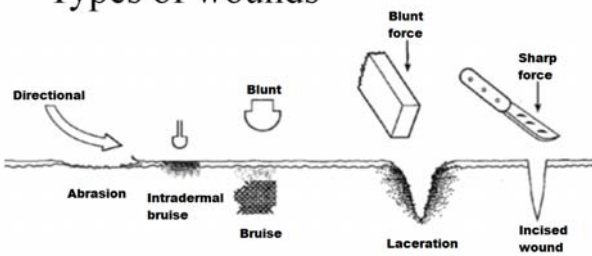
BMI

But more than that, science has repeatedly demonstrated that a measure built by and for white people is even less accurate for people of color — and may even lead to misdiagnosis and mistreatment. According to studies published by the Endocrine Society, the BMI overestimates fitness and health risks for Black people. Meanwhile, according to the World Health Organization, the BMI underestimates health risks for Asian communities, which may contribute to underdiagnosis of certain conditions. And, despite the purported universality of the BMI, it papers over significant sex-based differences in the relationship between body fat and the BMI. That is, because so much of the research behind the BMI was conducted on those assigned male at birth, those assigned female may be at greater health risk if their diagnosis hinges on a measurement that was never designed for them.

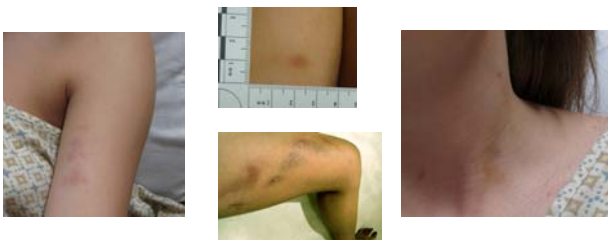
Injury Risk Factors

- 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

Types of wounds



Bruise (Contusion)



- 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 (12-24 hours)
- 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 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



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

Aging Bruises Based on Color

- Bruises change color during the healing process
- Our ability to perceive the color yellow appears to decline as we age
- Studies show a lack of consistency among raters on dating bruises based on color
- The role of the forensic health professional is to remain as objective as possible

Can One Accurately Date a Bruise?

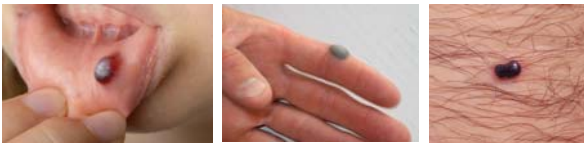
[Aging Bruising Based on Color: A Brief Review](#)
 This digital download provides a fuller examination of the research related to the clinical assessment of bruises. Forensic Healthcare Online Store



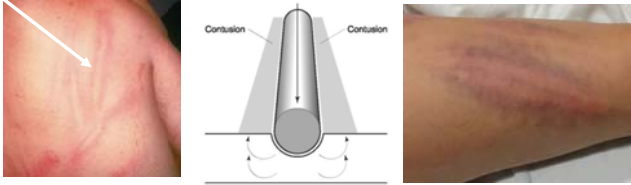
Medically reviewed by [Judith Marcin, M.D.](#) on August 10, 2018 — Written by [Jenna Fletcher](#)

Hematoma

- Localized swelling filled with blood caused by a break in the wall of blood vessel
- Hematoma can result from an injury to any type of blood vessel
 - Artery, vein, or small capillary

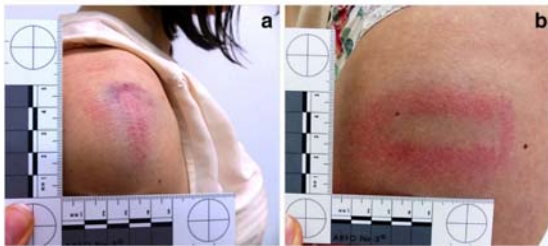


Tramline Bruising



Pale linear central area lined on either side by linear contusions

Tramline Bruises



Right upper arm and left hip

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

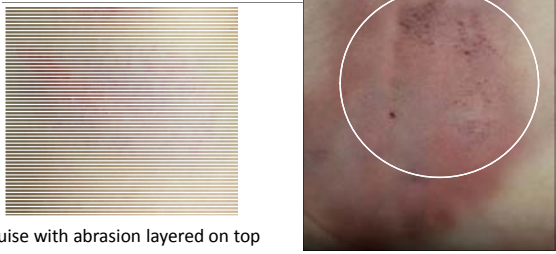


Abrasion



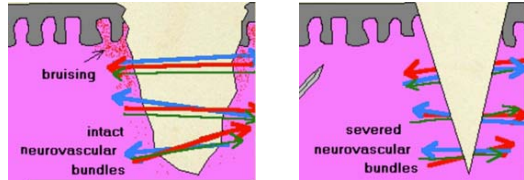
Friction scraping away epidermis or disruption of epidermis by direct pressure or rubbing

Layered Injury



Bruise with abrasion layered on top


Blunt Force Injury = Laceration



Sharp Force Injury = Incised Wound

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 - 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



Courtesy of William S. Smock, MD.

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

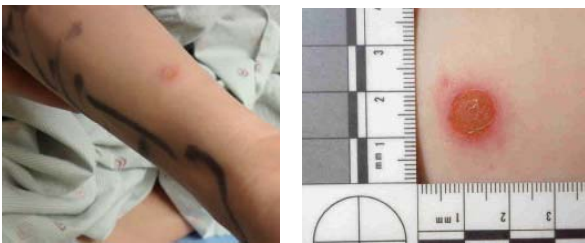
When an object used as a weapon leaves marks that correspond to the shape of the weapon used



Patterned Injury



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



Bite marks



Documentation

- **Bite mark**
 - 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

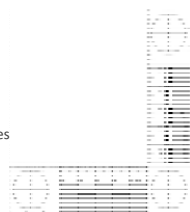
- Pattern of facial injuries from a fall not an assault
 - Unilateral blunt trauma
 - Predominantly restricted to bony prominences
- Pattern of injuries in various stages of healing
 - IPV
 - Child abuse



<http://www.forensicmed.co.uk/Wounds/blunt-force-trauma/patterns/>

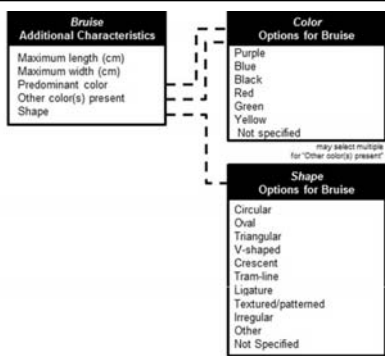
Documentation

- 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



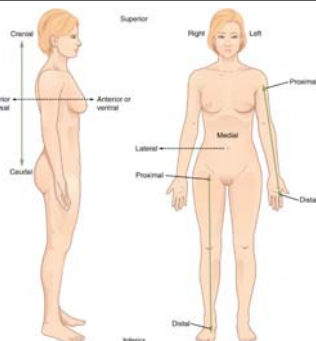
Terminology

- **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



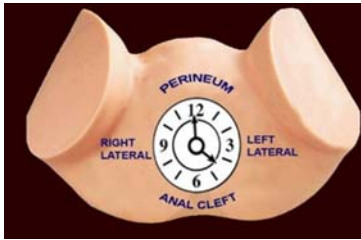
Directional Terms

- 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

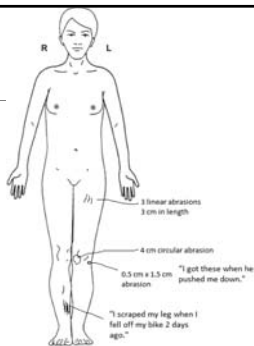


Injury Documentation



Head to toe exam documenting injuries, pain and tenderness

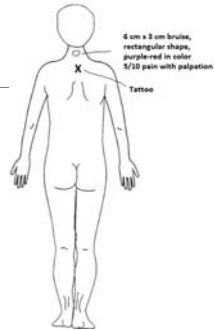
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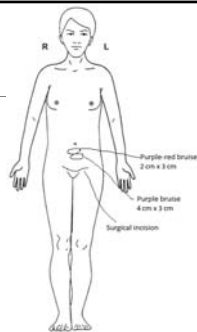
Injury Documentation



Dimensions - width first and length second



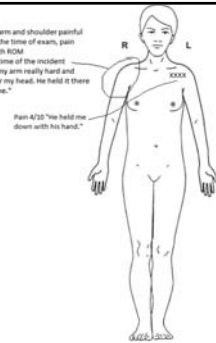
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Injury Documentation



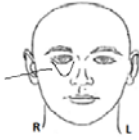
Right upper arm and shoulder painful
Pain 12/10 at the time of exam, pain increases with ROM
Pain 8/10 at time of the incident — "he yanked my arm really hard and pulled it over my head. He held it there for a long time."



Injury Documentation



Hematoma extending from medial lower eyelid to lateral lower eyelid and down to cheek
 Dark purple in color, swollen
 Pain 8/10 at time of incident
 Pain 6/10 at time of exam
 Patient has no visual changes
 Evaluated by ED physician
 "He punched me with his closed fist"



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