

Comprehensive Classification System for Visible Intentional and Unintentional Acute Injuries

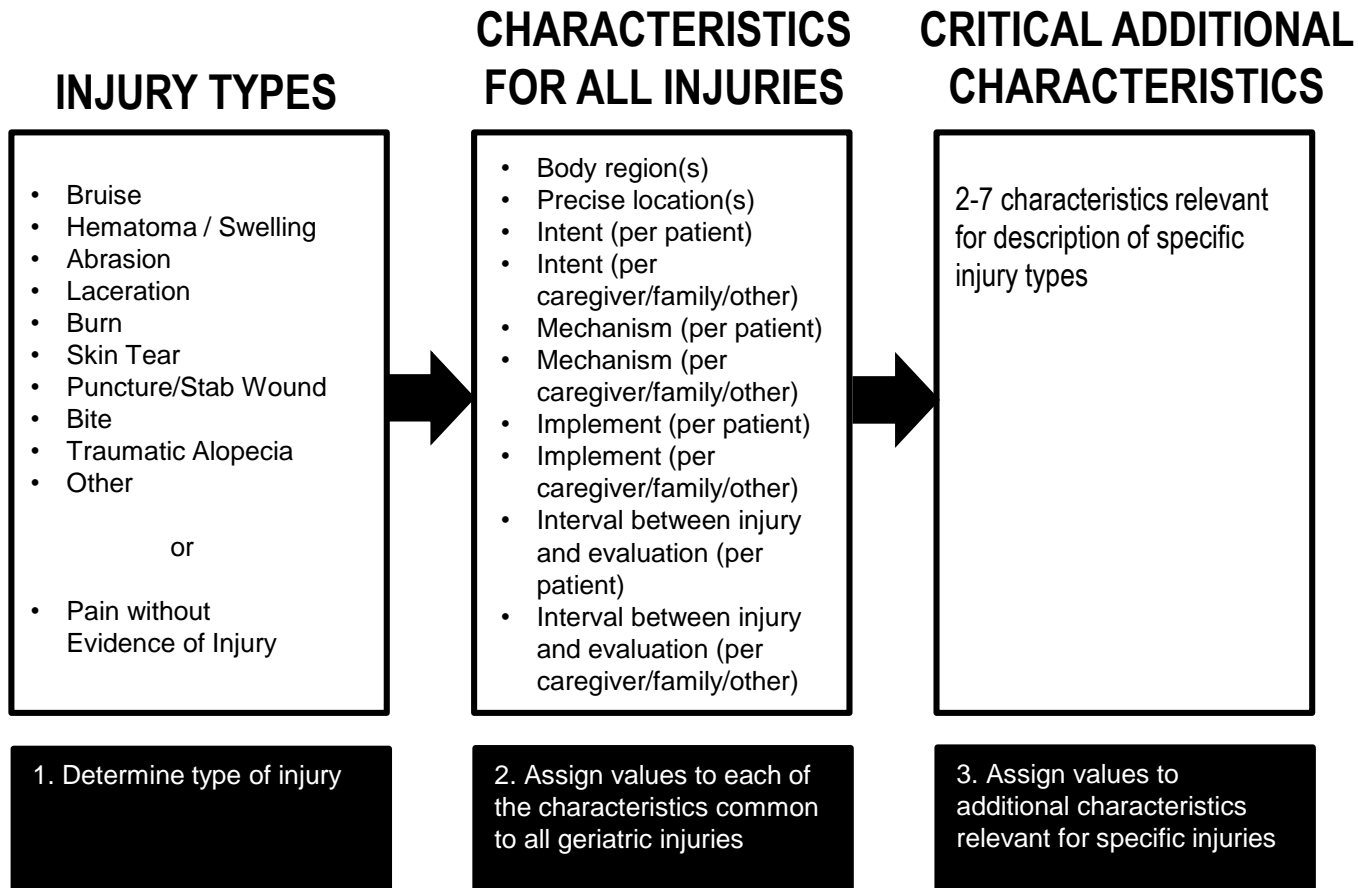
Taxonomy for Research and Practice

Developed by: Tony Rosen, Christopher Reisig, Veronica LoFaso, Elizabeth M. Bloemen, Sunday Clark,
Thomas J. McCarthy, Estomih P. Mtui, Neal E. Flomenbaum, Mark S. Lachs

TABLE OF CONTENTS

Overview of 3-Step Classification Process.....	3
Characteristics for All Injuries - details for Body Regions and Precise Locations.....	4
Skull / Brain.....	4
Maxillofacial / Dental / Neck.....	4
Thorax (Chest) / Abdomen / Back.....	4
Pelvis / Gluteal Region.....	4
Upper Extremity.....	5
Lower Extremity.....	5
Characteristics for All Injuries – details for Intent, Mechanism, Implement, Time Interval.....	6
Critical Additional Characteristics for Specific Injury Types.....	7
Bruise.....	7
Soft Tissue Swelling.....	8
Abrasion.....	9
Laceration.....	10
Burn.....	11
Skin Tear.....	12
Puncture / Stab Wound.....	13
Bite.....	14
Traumatic Alopecia.....	15
Complete Reference List.....	16

OVERVIEW OF 3-STEP CLASSIFICATION PROCESS



CHARACTERISTICS FOR ALL INJURIES (details for Body Regions and Precise Locations)

Body regions

Skull/Brain
 Maxillofacial/Dental/Neck
 Thorax (Chest)/Abdomen/Back
 Pelvis/Gluteal Region
 Upper Extremities
 Lower Extremities

may select multiple

Thorax (Chest)/Abdomen/Back Precise Locations

Left Supraclavicular
 Right Supraclavicular
 Left Clavicular
 Right Clavicular
 Left Pectoral / Anterior Thorax
 Right Pectoral / Anterior Thorax
 Sternal
 Left Breast
 Left Areola
 Left Nipple
 Right Breast
 Right Areola
 Right Nipple
 Left Axilla
 Right Axilla
 Chest / Anterior Thorax - Unspecified
 Left Lateral Thorax / Infra-Axillary Region
 Right Lateral Thorax / Infra-Axillary Region
 Left Upper Quadrant
 Right Upper Quadrant
 Left Lower Quadrant
 Right Lower Quadrant
 Periumbilical
 Left Inguinal
 Right Inguinal
 Abdomen - Unspecified
 Left Scapular Region
 Right Scapular Region
 Thoracic Spine
 Left Paraspinal Thoracic
 Right Paraspinal Thoracic
 Thoracic Back - Unspecified
 Lumbar Spine
 Left Paraspinal Lumbar
 Right Paraspinal Lumbar
 Left Lumbar Back
 Right Lumbar Back
 Lumbar Back – Unspecified
 Back - Unspecified
 Not specified

may select multiple

Skull/Brain Precise Locations

Left Temporal Region
 Right Temporal Region
 Left Mastoid Process
 Right Mastoid Process
 Left Parietal Region
 Midline Skullcap
 Right Parietal Region
 Left Occipital Region
 Right Occipital Region
 Mid Occipital Region
 Not Specified

may select multiple

Pelvis/Gluteal Region Precise Locations

Pubic symphysis
 Vulvar
 Vaginal
 Penile
 Scrotal
 Anorectal
 Sacral
 Coccygeal
 Left Hip
 Right Hip
 Left Gluteal
 Right Gluteal
 Not specified

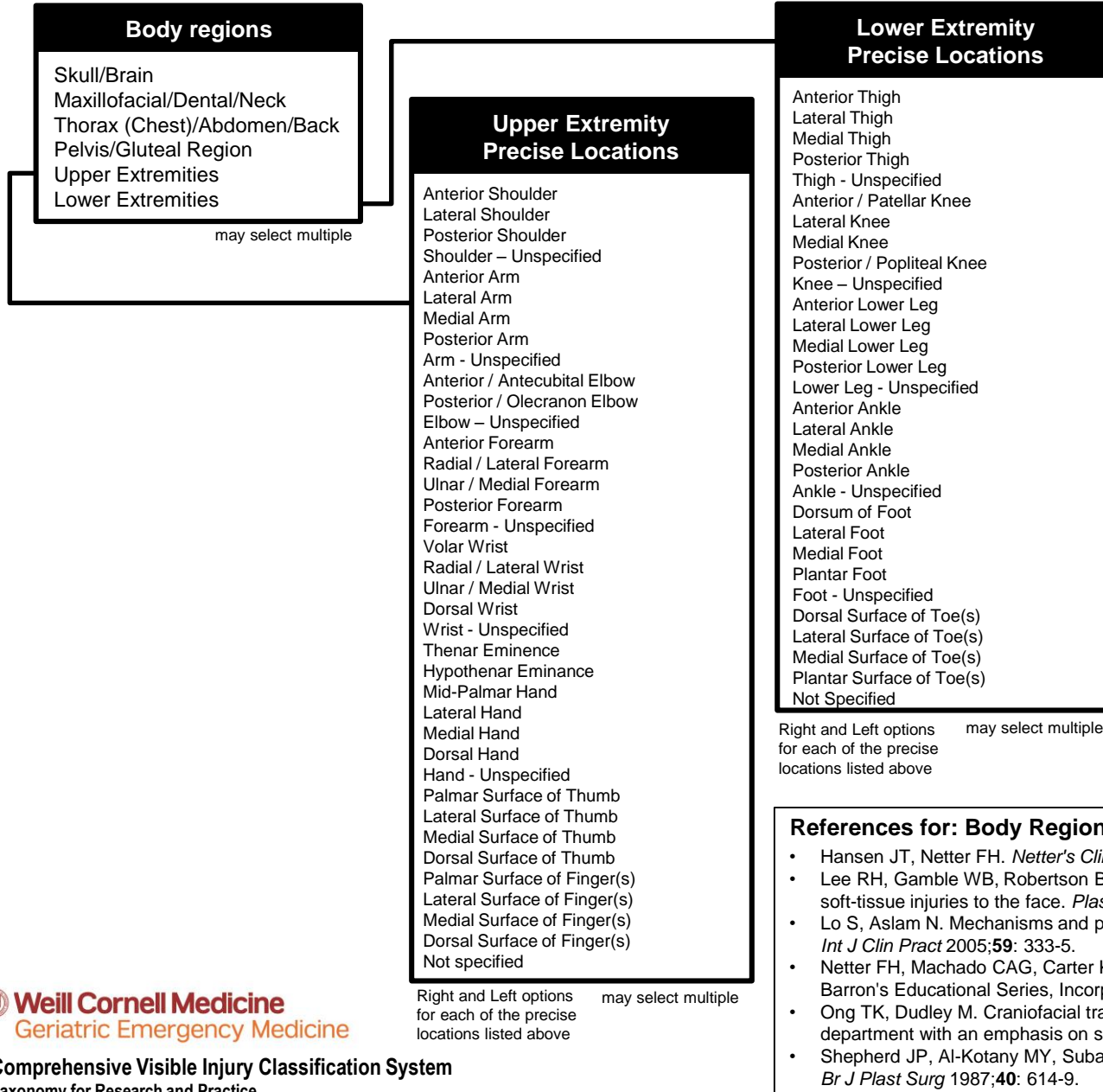
may select multiple

Maxillofacial/Dental/Neck Precise Locations

Left Frontal Region / Forehead
 Right Frontal Region / Forehead
 Mid Frontal Region / Forehead
 Forehead - Unspecified
 Left Supra-orbit
 Left Infra-orbit
 Left Medial Orbit
 Left Lateral Orbit
 Left Globe / Eye
 Left Orbit - Unspecified
 Right Supra-orbit
 Right Infra-orbit
 Right Medial Orbit
 Right Lateral Orbit
 Right Globe / Eye
 Right Orbit - Unspecified
 Left Nasal
 Right Nasal
 Nasal Bridge / Septum
 Nose - Unspecified
 Left External Ear
 Right External Ear
 Left Zygoma / Cheekbone
 Right Zygoma / Cheekbone
 Left External Buccal
 Right External Buccal
 Left Mandible
 Right Mandible
 Supra Peri-oral
 Left Upper Lip
 Right Upper Lip
 Middle Upper Lip
 Left Lower Lip
 Right Lower Lip
 Middle Lower Lip
 Infra Peri-oral
 Peri-oral / Lips - Unspecified
 Left Mental / Chin
 Right Mental / Chin
 Mid Mental / Chin
 Mental / Chin - Unspecified
 Anterior Neck
 Left Lateral Neck
 Right Lateral Neck
 Cervical Spine / Midline Posterior Neck
 Neck - Unspecified
 Not specified

may select multiple

CHARACTERISTICS FOR ALL INJURIES (details for Body Regions and Precise Locations, ctd)



CHARACTERISTICS FOR ALL INJURIES (details for Intents, Mechanisms, Implements, Time Interval)

Intents

Intentional injury / assault
 Unintentional Injury
 Intentional self-harm
 Legal intervention
 Unknown

may select multiple

Mechanisms

Blunt assault with hand/fist
 Blunt assault with foot/knee
 Blunt assault with other body part
 Blunt assault with object
 Push/shove, fall during altercation
 Strangulation/suffocation
 Grab/twist/pinch
 Bite (human)
 Penetrating assault with object
 Using body weight / sitting on victim
 Pulling hair
 Rape / sexual assault
 Fall from standing / sitting
 Fall from height
 Motor vehicle collision - occupant
 Pedestrian struck by motor vehicle
 Bicyclist struck by motor vehicle
 Poisoning
 Fire/Burn
 Suffocation
 Drowning
 Bite / sting by animal
 Jump from height
 Other
 Unknown

may select multiple

Implements

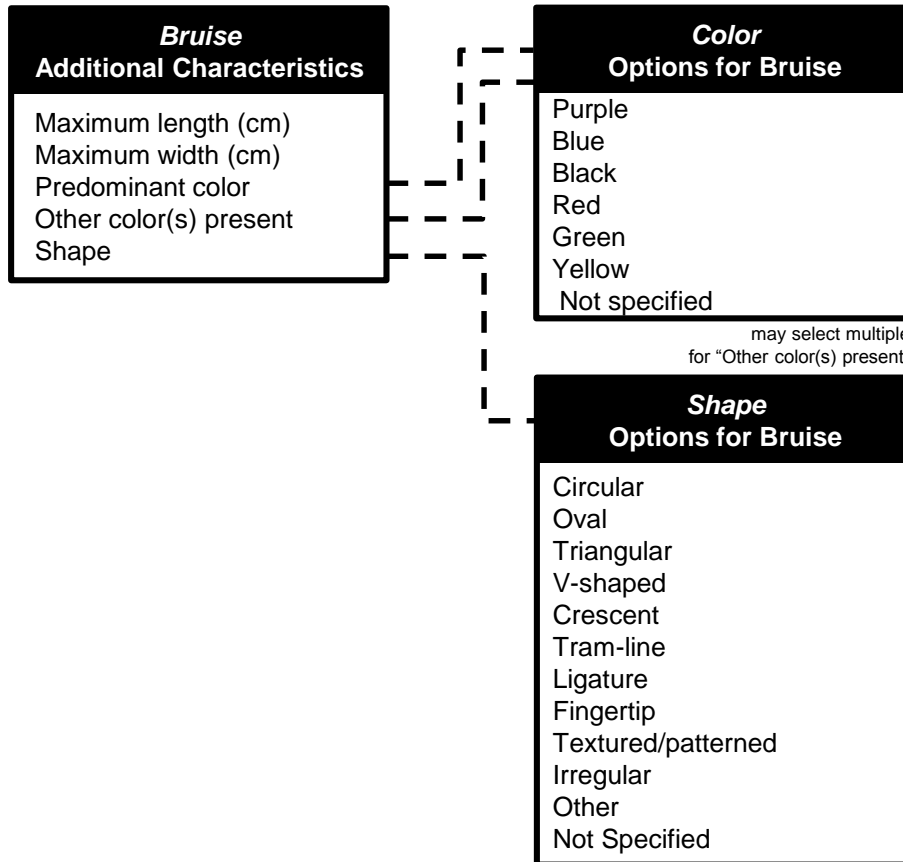
Closed fist
 Open hand
 Feet
 Knees
 Other body part
 Body weight
 Handgun
 Rifle
 Knife
 Piece of furniture
 Cane
 Baseball bat
 Bottle
 Telephone
 Kitchen utensils
 Broomstick
 Rope
 Other household object
 Other object
 Unknown

may select multiple

Time Interval between Injury and Evaluation

<1 Day
 1 Day
 2 Days
 3 Days
 4 Days
 5 Days
 6 Days
 7-14 Days
 15-29 Days
 1-2 Months
 3-6 Months
 7-12 Months
 >1 Year
 Unknown

CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES



References for: Bruises

- Carpenter RF. The prevalence and distribution of bruising in babies. *Arch Dis Child* 1999;**80**: 363-6.
- Dunstan FD, Guildea ZE, Kontos K, Kemp AM, Sibert JR. A scoring system for bruise patterns: a tool for identifying abuse. *Arch Dis Child* 2002;**86**: 330-3.
- Kaczor K, Pierce MC, Makoroff K, Corey TS. Bruising and physical child abuse. *Clin Pediatr Emerg Med.* 2006;**7**(3):153-60.
- Lecomte MM, Holmes T, Kay DP, Simons JL, Vintiner SK. The use of photographs to record variation in bruising response in humans. *Forensic Sci Int* 2013;**231**: 213-8.
- Madea B. *Handbook of Forensic Medicine.* 1st ed. Chichester: Wiley Blackwell; 2014.
- Maguire S, Mann M. Systematic reviews of bruising in relation to child abuse-what have we learnt: an overview of review updates. *Evid Based Child Health* 2013;**8**: 255-63.
- Maguire S, Mann MK, Sibert J, Kemp A. Are there patterns of bruising in childhood which are diagnostic or suggestive of abuse? A systematic review. *Arch Dis Child* 2005;**90**: 182-6.
- Payne-James J, McGover C, Jones R, Karch SB, Manlove J. *Simpson's Forensic Medicine.* 13th ed. London: Hodder Arnold; 2011.
- Mosqueda L, Burnight K, Liao S. The life cycle of bruises in older adults. *J Am Geriatr Soc* 2005;**53**: 1339-43.
- Wiglesworth A, Austin R, Corona M, et al. Bruising as a marker of physical elder abuse. *J Am Geriatr Soc* 2009;**57**: 1191-6.

Definitions for selected Bruise: Shapes

- **Tram-line:** pattern characterized by parallel linear bruises with regions of sparing between them -- created when a relatively light object impacts the skin surface rapidly
- **Ligature:** mark usually encircling the neck in a horizontal plane often overlying the larynx or upper trachea – may also appear surrounding wrists or ankles
- **Fingertip:** bruises from a continually or forcefully applied grip are often relatively round and may coincide with 2 to 4 fingertips -- thumb bruise may also be noted on the opposite side

CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES

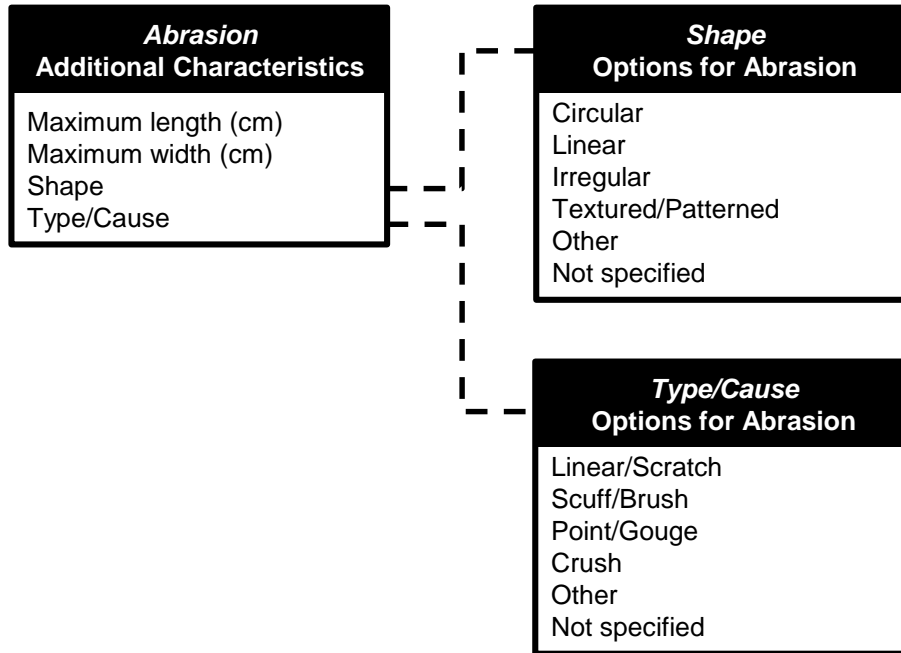
Soft Tissue Swelling **Additional Characteristics**

Maximum length (cm)
Maximum width (cm)

References for: Soft Tissue Swelling

- Kellogg ND, American Academy of Pediatrics Committee on Child Abuse and Neglect. Evaluation of suspected child physical abuse. *Pediatrics* 2007;119: 1232-41.
- Payne-James J, McGover C, Jones R, Karch SB, Manlove J. *Simpson's Forensic Medicine*. 13th ed. London: Hodder Arnold; 2011.
- Sheridan DJ, Nash KR. Acute injury patterns of intimate partner violence victims. *Trauma Violence Abuse* 2007;8: 281-9.

CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES



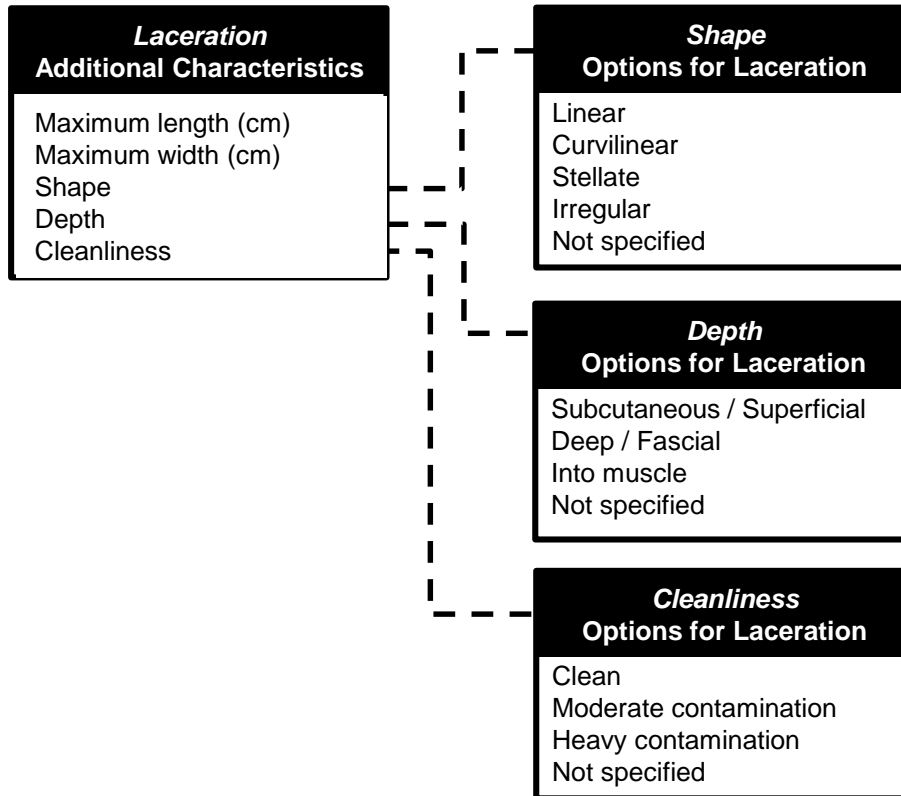
References for: Abrasions

- DiMaio VJM, DiMaio DJ. *Forensic Pathology*. 2nd ed. Boca Raton, FL: CRC Press; 2001.
- Madea B. *Handbook of Forensic Medicine*. 1st ed. Chichester: Wiley Blackwell; 2014.
- Payne-James J, McGover C, Jones R, Karch SB, Manlove J. *Simpson's Forensic Medicine*. 13th ed. London: Hodder Arnold; 2011.
- Reddy K, Lowenstein EJ. Forensics in dermatology: part I. *J Am Acad Dermatol* 2011;**64**: 801-8.
- Saukko PJ, Knight B. *Knight's Forensic Pathology*. 4th ed. Boca Raton, FL: CRC Press; 2015.

Definitions for selected Abrasion: Types/Causes

- **Scuff/Brush**: lateral rubbing action scrapes off the superficial layers of the skin
- **Crush**: injuring object may be reflected by the shape of the skin injury, so that the patterned abrasion can be regarded as an imprint of the causative object, often depicting edges or protruding parts

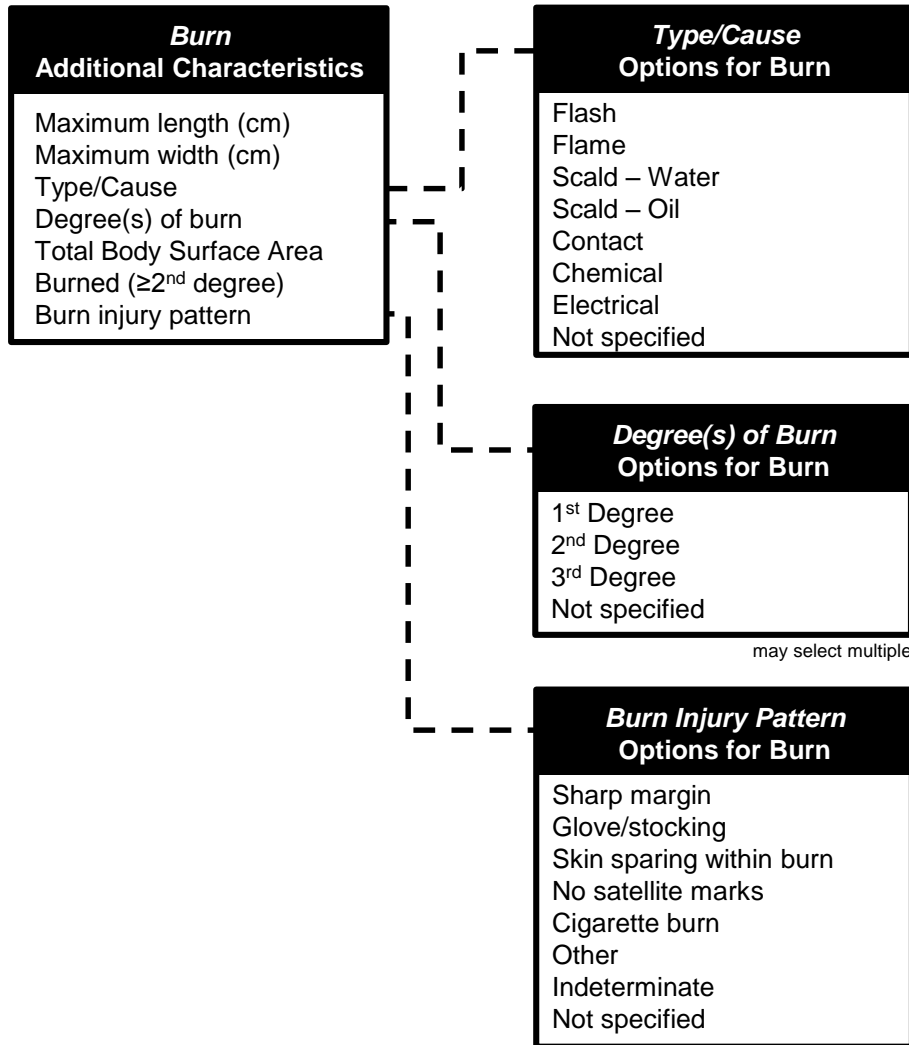
CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES



References for: Lacerations

- DiMaio VJM, DiMaio DJ. *Forensic Pathology*. 2nd ed. Boca Raton, FL: CRC Press; 2001.
- Lee RH, Gamble WB, Robertson B, Manson PN. The MCFONTZL classification system for soft-tissue injuries to the face. *Plast Reconstr Surg* 1999;**103**: 1150-7.
- Lo S, Aslam N. Mechanisms and pattern of facial lacerations in the Accident Department. *Int J Clin Pract* 2005;**59**: 333-5.
- Madea B. *Handbook of Forensic Medicine*. 1st ed. Chichester: Wiley Blackwell; 2014.
- Payne-James J, McGover C, Jones R, Karch SB, Manlove J. *Simpson's Forensic Medicine*. 13th ed. London: Hodder Arnold; 2011.
- Saukko PJ, Knight B. *Knight's Forensic Pathology*. 4th ed. Boca Raton, FL: CRC Press; 2015.

CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES



References for: Burns

- DiMaio VJM, DiMaio DJ. *Forensic Pathology*. 2nd ed. Boca Raton, FL: CRC Press; 2001.
- Greenbaum AR, Donne J, Wilson D, Dunn KW. Intentional burn injury: an evidence-based, clinical and forensic review. *Burns* 2004;**30**: 628-42.
- Greenbaum AR, Horton JB, Williams CJ, Shah M, Dunn KW. Burn injuries inflicted on children or the elderly: a framework for clinical and forensic assessment. *Plast Reconstr Surg* 2006;**118**: 46e-58e.
- Madea B. *Handbook of Forensic Medicine*. 1st ed. Chichester: Wiley Blackwell; 2014.
- Payne-James J, McGover C, Jones R, Karch SB, Manlove J. *Simpson's Forensic Medicine*. 13th ed. London: Hodder Arnold; 2011
- Reddy K, Lowenstein EJ. Forensics in dermatology: part II. *J Am Acad Dermatol*. 2011;**64**(5):811-24.
- Saukko PJ, Knight B. *Knight's Forensic Pathology*. 4th ed. Boca Raton, FL: CRC Press; 2015.

Definitions for selected Burn: Types/Causes

- **Flash**: caused by the sudden ignition or explosion of gases, petrochemicals or fine particulate material
- **Flame**: actual contact of body and flame, with scorching of the skin progressing to charring
- **Contact**: physical contact between the body and a hot object

Definitions for selected Burn: Injury Patterns

- **Glove/stocking**: burn on hands and/or feet with sharp line of demarcation giving the appearance of gloves or stockings occurring when feet or hands are held in the water
- **Skin sparing within burn**: presence of spared areas within areas of burn and sharp demarcations between burned and un-burned skin (such as in joint flexion surfaces)
- **Cigarette burn**: characteristically appear as circular lesions 8mm to 10mm in diameter with a central crater surrounded by a rolled margin

CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES

Skin Tear
Additional Characteristics

Maximum length (cm)
 Maximum width (cm)
 Flap tissue loss
 Flap color

Flap Tissue Loss
Options for Skin Tear

No skin loss
 Partial flap loss
 Total flap loss
 Not specified

This is the ISTAP Skin Tear Classification System from:
 LeBlanc K, Baranoski S, Christensen D, et al. International Skin Tear Advisory Panel: a tool kit to aid in the prevention, assessment, and treatment of skin tears using a Simplified Classification System. *Adv Skin Wound Care* 2013;26:459-76.

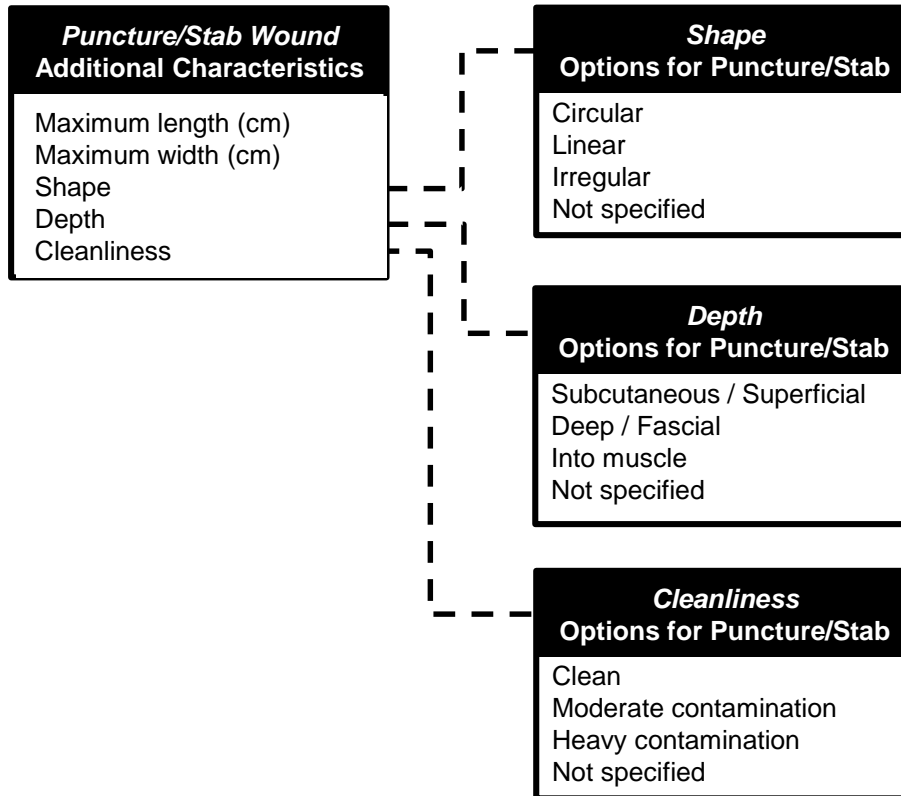
Flap Color
Options for Skin Tear

Pale, dusky, or darkened
 Not pale, dusky, or darkened
 Not specified

References for: Skin Tears

- Carville K LG, Newall N, Haslehurst P, Michael R, Santamaria N, Roberts P. STAR: A consensus for skin tear classification. *Prim Intent* 2007;15: 18-28.
- LeBlanc K, Baranoski S, Christensen D, Langemo D, Sammon MA, Edwards K, et al. International Skin Tear Advisory Panel: a tool kit to aid in the prevention, assessment, and treatment of skin tears using a Simplified Classification System. *Adv Skin Wound Care* 2013;26: 459-76.
- LeBlanc K, Baranoski S, Holloway S, Langemo D. Validation of a new classification system for skin tears. *Adv Skin Wound Care* 2013;26: 263-5.
- Payne RL, Martin ML. The epidemiology and management of skin tears in older adults. *Ostomy Wound Manage* 1990;26: 26-37.
- Payne RL, Martin ML. Defining and classifying skin tears: need for a common language. *Ostomy Wound Manage* 1993;39: 16-20, 2-4, 6.

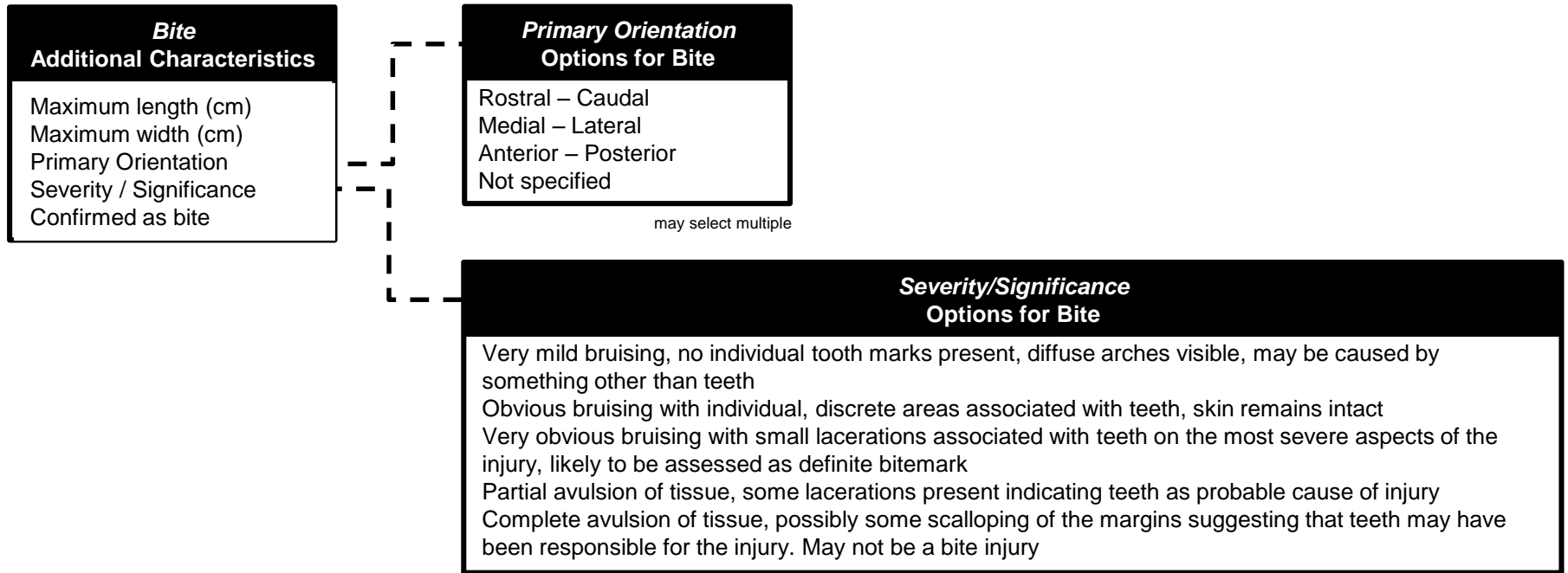
CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES



References for: Puncture/Stab Wounds

- DiMaio VJM, DiMaio DJ. *Forensic Pathology*. 2nd ed. Boca Raton, FL: CRC Press; 2001.
- Madea B. *Handbook of Forensic Medicine*. 1st ed. Chichester: Wiley Blackwell; 2014.
- Payne-James J, McGover C, Jones R, Karch SB, Manlove J. *Simpson's Forensic Medicine*. 13th ed. London: Hodder Arnold; 2011.
- Saukko PJ, Knight B. *Knight's Forensic Pathology*. 4th ed. Boca Raton, FL: CRC Press; 2015.

CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES



This is the Bitemark Severity and Significance Scale from:
 Pretty IA. Development and validation of a human bitemark severity and significance scale. *J Forensic Sci* 2007;52:687-91.

References for: Bites

- Pretty IA. Development and validation of a human bitemark severity and significance scale. *J Forensic Sci* 2007;52: 687-91.
- Pretty IA, Sweet D. A paradigm shift in the analysis of bitemarks. *Forensic Sci Int* 2010;201: 38-44.
- Sweet D, Pretty IA. A look at forensic dentistry--Part 2: teeth as weapons of violence--identification of bitemark perpetrators. *Br Dent J* 2001;190: 415-8.

CRITICAL ADDITIONAL CHARACTERISTICS FOR SPECIFIC INJURY TYPES

Traumatic Alopecia **Additional Characteristics**

Maximum length (cm)
Maximum width (cm)
Sharp delineation between
injury patch and hair
Hair breakage
Associated with
hemorrhage or
hematoma

References for: Traumatic Alopecia

- Collins KA. Elder maltreatment: a review. *Arch Pathol Lab Med* 2006;**130**: 1290-6.
- Palmer M, Brodell RT, Mostow EN. Elder abuse: dermatologic clues and critical solutions. *J Am Acad Dermatol* 2013;**68**: e37-42
- Sheridan DJ, Nash KR. Acute injury patterns of intimate partner violence victims. *Trauma Violence Abuse* 2007;**8**: 281-9.
- Whiting DA. Traumatic alopecia. *Int J Dermatol* 1999;**38 Suppl 1**: 34-44.

COMPLETE REFERENCE LIST

- Carpenter RF. The prevalence and distribution of bruising in babies. *Arch Dis Child* 1999;**80**: 363-6.
- Carville K LG, Newall N, Haslehurst P, Michael R, Santamaria N, Roberts P. STAR: A consensus for skin tear classification. *Prim Intent* 2007;**15**: 18-28.
- Collins KA. Elder maltreatment: a review. *Arch Pathol Lab Med* 2006;**130**: 1290-6.
- DiMaio VJM, DiMaio DJ. *Forensic Pathology*. 2nd ed. Boca Raton, FL: CRC Press; 2001.
- Dunstan FD, Guildea ZE, Kontos K, Kemp AM, Sibert JR. A scoring system for bruise patterns: a tool for identifying abuse. *Arch Dis Child* 2002;**86**: 330-3.
- Greenbaum AR, Donne J, Wilson D, Dunn KW. Intentional burn injury: an evidence-based, clinical and forensic review. *Burns* 2004;**30**: 628-42.
- Greenbaum AR, Horton JB, Williams CJ, Shah M, Dunn KW. Burn injuries inflicted on children or the elderly: a framework for clinical and forensic assessment. *Plast Reconstr Surg* 2006;**118**: 46e-58e.
- Hansen JT, Netter FH. *Netter's Clinical Anatomy*. Philadelphia: Saunders/Elsevier; 2010.
- Kaczor K, Pierce MC, Makoroff K, Corey TS. Bruising and physical child abuse. *Clin Pediatr Emerg Med*. 2006;**7**(3):153-60.
- Kellogg ND, American Academy of Pediatrics Committee on Child Abuse and Neglect. Evaluation of suspected child physical abuse. *Pediatrics* 2007;**119**: 1232-41.
- LeBlanc K, Baranoski S, Christensen D, Langemo D, Sammon MA, Edwards K, et al. International Skin Tear Advisory Panel: a tool kit to aid in the prevention, assessment, and treatment of skin tears using a Simplified Classification System. *Adv Skin Wound Care* 2013;**26**: 459-76.
- LeBlanc K, Baranoski S, Holloway S, Langemo D. Validation of a new classification system for skin tears. *Adv Skin Wound Care* 2013;**26**: 263-5.
- Lecomte MM, Holmes T, Kay DP, Simons JL, Vintiner SK. The use of photographs to record variation in bruising response in humans. *Forensic Sci Int* 2013;**231**: 213-8.
- Lee RH, Gamble WB, Robertson B, Manson PN. The MCFONTZL classification system for soft-tissue injuries to the face. *Plast Reconstr Surg* 1999;**103**: 1150-7.
- Lo S, Aslam N. Mechanisms and pattern of facial lacerations in the Accident Department. *Int J Clin Pract* 2005;**59**: 333-5.
- Madea B. *Handbook of Forensic Medicine*. 1st ed. Chichester: Wiley Blackwell; 2014.
- Maguire S, Mann M. Systematic reviews of bruising in relation to child abuse-what have we learnt: an overview of review updates. *Evid Based Child Health* 2013;**8**: 255-63.
- Maguire S, Mann MK, Sibert J, Kemp A. Are there patterns of bruising in childhood which are diagnostic or suggestive of abuse? A systematic review. *Arch Dis Child* 2005;**90**: 182-6.
- Mosqueda L, Burnight K, Liao S. The life cycle of bruises in older adults. *J Am Geriatr Soc* 2005;**53**: 1339-43.
- Netter FH, Machado CAG, Carter K. *Netter's Atlas of the Human Body*. Hauppauge, NY: Barron's Educational Series, Incorporated; 2005.
- Ong TK, Dudley M. Craniofacial trauma presenting at an adult accident and emergency department with an emphasis on soft tissue injuries. *Injury* 1999;**30**: 357-63.
- Palmer M, Brodell RT, Mostow EN. Elder abuse: dermatologic clues and critical solutions. *J Am Acad Dermatol* 2013;**68**: e37-42.
- Payne RL, Martin ML. Defining and classifying skin tears: need for a common language. *Ostomy Wound Manage* 1993;**39**: 16-20, 2-4, 6.
- Payne RL, Martin ML. The epidemiology and management of skin tears in older adults. *Ostomy Wound Manage* 1990;**26**: 26-37.
- Payne-James J, McGover C, Jones R, Karch SB, Manlove J. *Simpson's Forensic Medicine*. 13th ed. London: Hodder Arnold; 2011.
- Pretty IA, Sweet D. A paradigm shift in the analysis of bite marks. *Forensic Sci Int* 2010;**201**: 38-44.
- Pretty IA. Development and validation of a human bite mark severity and significance scale. *J Forensic Sci* 2007;**52**: 687-91.
- Reddy K, Lowenstein EJ. Forensics in dermatology: part I. *J Am Acad Dermatol* 2011;**64**: 801-8.
- Reddy K, Lowenstein EJ. Forensics in dermatology: part II. *J Am Acad Dermatol*. 2011;**64**(5):811-24.
- Saukko PJ, Knight B. *Knight's Forensic Pathology*. 4th ed. Boca Raton: CRC Press; 2015.
- Shepherd JP, Al-Kotany MY, Subadan C, Scully C. Assault and facial soft tissue injuries. *Br J Plast Surg* 1987;**40**: 614-9.
- Sheridan DJ, Nash KR. Acute injury patterns of intimate partner violence victims. *Trauma Violence Abuse* 2007;**8**: 281-9.
- Sweet D, Pretty IA. A look at forensic dentistry--Part 2: teeth as weapons of violence--identification of bite mark perpetrators. *Br Dent J* 2001;**190**: 415-8.
- Whiting DA. Traumatic alopecia. *Int J Dermatol* 1999;**38 Suppl 1**: 34-44.
- Wiglesworth A, Austin R, Corona M, et al. Bruising as a marker of physical elder abuse. *J Am Geriatr Soc* 2009;**57**: 1191-6.