TRAINING INSTITUTE on STRANGULATION PREVENTION
www.strangulationtraininginstitute.com

a program of ALLIANCE for HOPE INTERNATIONAL

Webinar: What Paramedics Need To Know About Strangulation

November 23, 2015
10:00am-11:30am

Course Description:

Strangulation is not always fatal, however, it does produce medical signs and symptoms for survivors, and the non-fatal assaults are very typical of domestic violence. Paramedics are often times the first responders on the scene of a domestic violence call. Thus, it is imperative that paramedics receive training to assist them in recognizing the signs and symptoms of strangulation that are often times minimized or overlooked. Many prosecutors are using paramedics' reports to aid them in seeking the maximum punishments for the perpetrators. This webinar aims to train paramedics to recognize the signs and symptoms of fatal and non-fatal strangulation cases and document the injuries in a way that can be helpful to prosecutors. The webinar will be hosted by Gael Strack, CEO/Co-Founder of the Training Institute on Strangulation Prevention, a project of Alliance for Hope International.

Presentation materials and recording are available at
www.strangulationtraininginstitute.com

WHAT PARAMEDICS NEED TO KNOW ABOUT STRANGULATION

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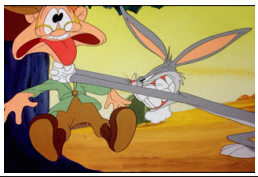
No Financial Disclosures

Strangulation Definition

- Strangulation is a form of **asphyxia** characterized by closure of the **blood vessels** and/or **air passages** of the neck as a result of **external pressure on the neck**



TYPES

- Manual
  - use of hand or forearm or other body part
- Ligature
  - Use of a device (cord, string, rope, belt, etc)
- Carotid restraint

Not choking….

- Choking is asphyxia due to internal obstruction of the airway.
- Food, objects, etc.
- Often used interchangeably, BUT be precise and correct in your charting.

New Concept

- The term strangulation often implies death from the act. Many more survive.
- Need a term to describe that victim was strangled and they lived:
  - **Non-fatal strangulation**
  - Attempted strangulation (not as correct)
    - There was no attempt, person was strangled, just did not die.
  - Near strangulation (not as correct)

Importance of Strangulation

- Can lead to serious injury and even death
- Often accompanies domestic violence assaults and sexual assaults
- Probably underreported
- Effective method of…

POWER and CONTROL

Strangulation & Sexual Assault

- At least 50% of all DV cases include sexual assault.
- At least 25% of all DV cases include strangulation.
- At least 25% of all sexual assault cases include strangulation.
- It's difficult for victims to talk about sexual assault and it's difficult for professionals to ask.

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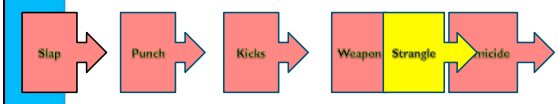
Continuum of Violence



Strangulation?

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- **Victims of prior non-fatal strangulation are 7x more likely of becoming a homicide victim.**
  - (Glass, et al, 2008).

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1995 San Diego Study

- 90% had DV history
- 50% of cases, children were present
- 99% of suspects were men
- Multiple signs and symptoms, most minor, unable to photograph or to seek medical attention
- Choked was most commonly misspelled word (chocked, chockled, shoked, cocked)

The Journal of Emergency Medicine, Vol. 35, No. 3, pp. 329–335, 2008

0736-4679/08 $ see front matter

ELSEVIER

doi:10.1016/j.jemermed.2007.02.065

Violence: Recognition, Management and Prevention

NON-FATAL STRANGULATION IS AN IMPORTANT RISK FACTOR FOR HOMICIDE OF WOMEN

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*School of Nursing, Johns Hopkins University, Baltimore, Maryland, †School of Nursing, University of Virginia, Charlottesville, Virginia, ‡Illinois Criminal Justice Information Authority, Chicago, Illinois, §School of Nursing, Oregon Health and Science University, Portland, Oregon, and ‖Health After Trauma Project, Creekside Communications, Half Moon Bay, California

Reprint Address: Nancy Glass, PHD, MPH, RN, School of Nursing, Johns Hopkins University, 525 N. Wolfe Street, Room 439, Baltimore, MD 21205

☐ **Abstract—The purpose of this study was to examine non-fatal strangulation by an intimate partner as a risk factor for major assault, or attempted or completed homicide of women. A case control design was used to describe non-fatal strangulation among complete homicides and attempted homicides (n = 506) and abused controls (n = 427). Interviews of proxy respondents and survivors of attempted**

☐ **Keywords—intimate partner violence; strangulation; risk of homicide**

INTRODUCTION

The 1993 National Mortality Followback Survey of

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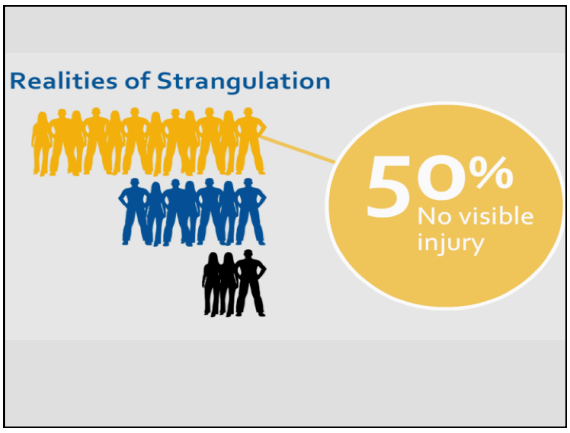
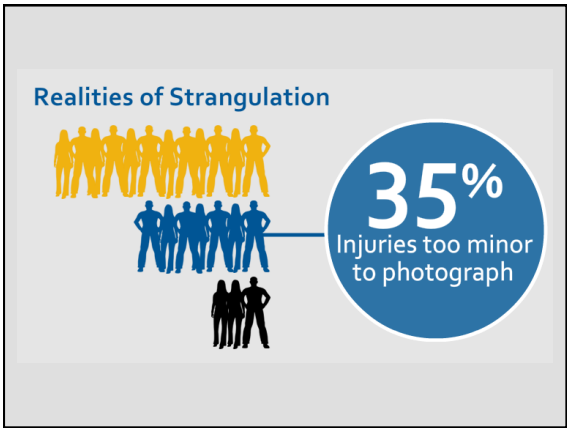
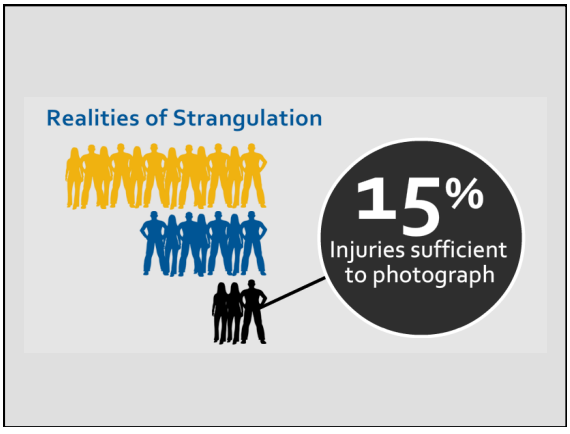

Realities of Strangulation
50%
No visible injury


Realities of Strangulation
35%
Injuries too minor to photograph

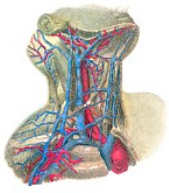

Realities of Strangulation
15%
Injuries sufficient to photograph

Realities of Strangulation

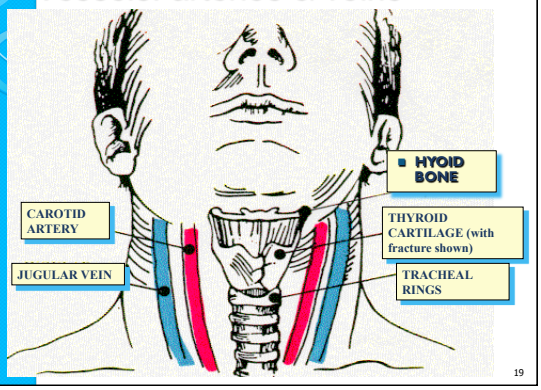
WHAT HAPPENS DURING STRANGULATION?

Pathophysiology

- Final common pathway is lack of oxygen
- Cardiac arrhythmia from carotid sinus pressure
- Jugular vein occlusion
- Carotid artery occlusion
- Tracheal occlusion/injury (not common)



Vessels: arteries & veins



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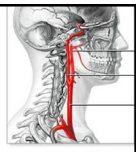
Pathophysiology



- Carotid Artery Compression
  - Compromised blood flow to brain
  - Frontal force (~11lb) compress artery against bones of neck
  - Bleeding and internal artery damage (intimal tears or dissection)
  - Thrombosis/embolization
  - Single carotid artery blocked/compressed→ neuro symptoms on opposite side of body
  - Both carotid arteries blocked/compressed→ unconsciousness

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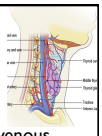
Pathophysiology



- Jugular Vein Compression
  - Compromise blood return from the brain (venous outflow obstruction)
  - 4.4 pounds of pressure on jugular causes backflow of blood (stagnant hypoxia)
  - 15-30 seconds of compression causes altered consciousness
  - Common clinical findings
    - Tiny surface blood vessels rupture from increased pressure
    - Petechiae (face, mucous membranes, brain)
    - Subconjunctival hemorrhage

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Vessel Occlusion

- **Carotid artery occlusion**
  - Anterior neck
  - 11 pounds of pressure for 10 seconds
- **Jugular vein occlusion**
  - Lateral neck
  - 4.4 pounds of pressure for 10 seconds

UNCONSCIOUSNESS

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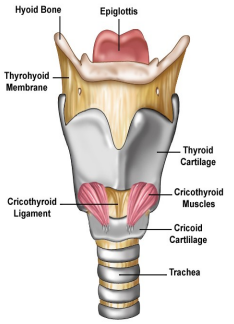
Pathophysiology

- Damage to the larynx or hyoid bone
  - Hemorrhage
  - Edema
  - Bruising/Contusion
    - 22 pounds of pressure
  - Occlusion
    - 33 pounds of pressure
  - Fracture
    - 35-46 pounds of pressure



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Examples of Applied Pressure

- Handgun trigger pull: 6 psi
- Opening of soda can: 20 psi
- Adult male hand shake: 80-100 psi
- Maximum adult male hand shake: 160-180 psi

- Source: Dr. Bill Smock, Louisville Metro Police Department

Continuum

- STRANGLE
- 10 secs
- UNCONSCIOUSNESS
- 4 mins
- BRAIN DEATH

Lethal Progression

- 10 seconds – pass out
- 20 seconds – should bounce back on own
- 30 seconds – need to revive if they don't bounce back
- 50 to 100 seconds – point of no return
- Consequences will depend on location of oxygen deprivation in the brain, length of unconsciousness, age, intoxication, etc.
- 4 minutes (or less) – brain death

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Neurologic Insult to Brain

ACUTE ARREST OF CEREBRAL CIRCULATION IN MAN

LIEUTENANT RALPH ROSSEN (MC), U.S.N.R.*
HERMAN KABAT, M.D., PH.D.
BETHESDA, MD.
AND
JOHN P. ANDERSON
RED WING, MINN.

Archives of Neurology and Psychiatry, 1944 Vol. 50, 5
Thank you Dr. Smock

Brain Death

4

Minutes …

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SIGNS AND SYMPTOMS

Symptoms

- ENT
  - Voice changes (50%)
  - Sore throat
  - Dysphagia
- MSK
  - Neck/jaw pain
- PULMONARY
  - SOB
  - cough
- NEURO
  - Headache
  - Blurred Vision/Vision changes
  - Tinnitus
  - Unconsciousness
  - Seizure
  - Confusion
  - Emotional lability
  - Incontinence
  - Vomiting
  - Stroke like symptoms
  - Pupil changes

"Survey Results of Women Who Have Been Strangled While in an Abusive Relationship" Dr. Wilbur

- **Medical symptoms experienced by victims**
  - Difficulty breathing: 85%
  - Scratches on neck: 44%
  - Dysphagia: 44%
  - Voice change: 45%
  - Loss of consciousness: 17%
  - **Ptosis: 20%**
  - **Facial palsy: 10%**
  - **L or R sided weakness: 18%**
  - Memory deficit: 31%
  - Suicidal ideation: 31%

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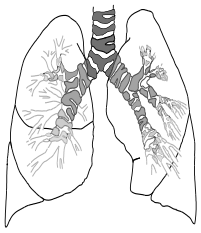
Symptoms of Lung Injury

- Breathing Changes
  - Due to laryngeal fracture or swelling
  - Difficult to breathe (dyspnea)
  - Inability to breathe (apnea)
  - May appear mild but may kill within 36 hours



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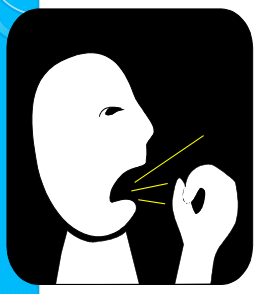
Symptoms of Laryngeal Injury



- Voice changes
  - 50% of victims
  - Nerve injury (recurrent laryngeal nerve)
  - Hoarseness (dysphonia)
    - May be permanent
  - Loss of voice (aphonia)

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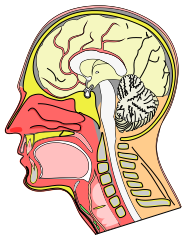
Symptoms of Laryngeal Injury

- Swallowing Changes
  - Due to larynx injury
  - Difficult to swallow (dysphagia)
  - Painful to swallow (odynophagia)



Symptoms of (asphyxia or hypoxia)

- Behavioral Changes
  - Early: Restlessness and violence
    - Hostile toward officers at the scene
    - "She woke up fighting"
  - Long term:
    - Psychosis
    - Amnesia
    - Changes in personality
    - Progressive dementia

Symptoms of (asphyxia or hypoxia)

- Evidence of brain Injury from strangulation will include problems with:
  - Memory
  - Concentration
  - Sleep
  - Headaches
  - Depression and
  - Anxiety

Signs

- Thorough physical exam
- Pay attention to areas of contact
- Special tips covered in forensic section

Signs

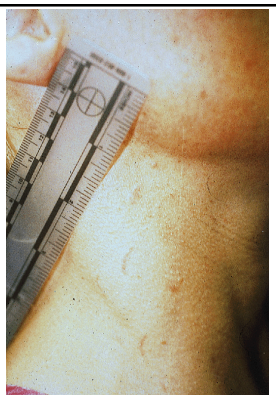
- FACE
  - Petechiae
  - Subconjunctival hemorrhage
- PULMONARY
  - Rales
  - Dyspnea
  - Hemoptysis
  - (Pulmonary edema, pneumonia, aspiration pneumonitis)
- NECK
  - Swelling
  - Tenderness
  - Bruises
  - Abrasions
  - Ligature mark

SIGNS

- NEURO
  - Motor weakness
  - Horner's syndrome
  - Pupil changes
  - Seizure
  - Altered LOC
- ENT
  - Hoarseness
  - Pain
  - Drooling
- GENERAL
  - Anxious
  - Labile
  - Wet pants

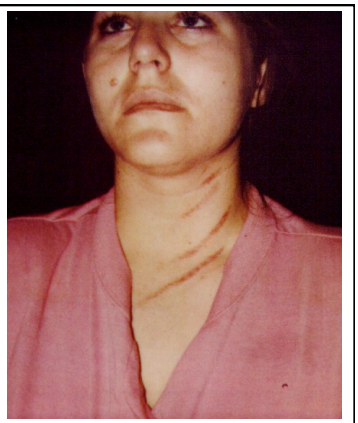
SKIN SIGNS

Impression marks

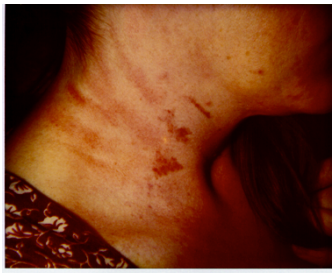


Courtesy of San Diego District Attorney's Office, DDA Dan Goldstein

Scrapes



Red marks (erythema) - often 3.



This victim was strangled repeatedly with two hands. Can you see the fingermarks & bruising?

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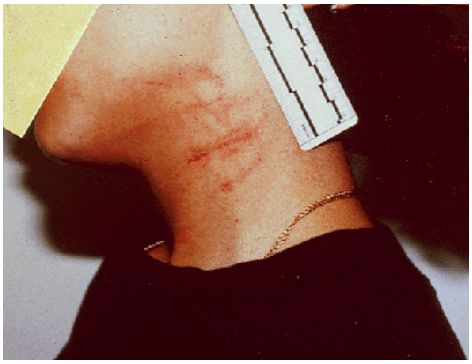

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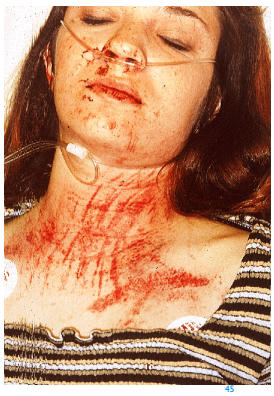
Claw marks



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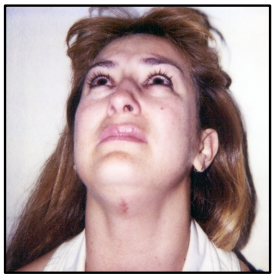

Abrasions: Under chin – due to instinctual chin lowering

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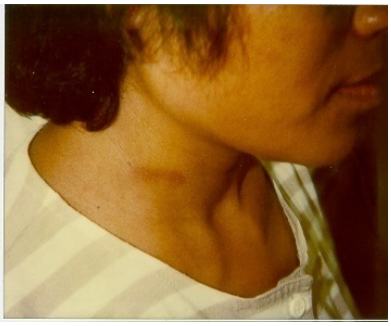

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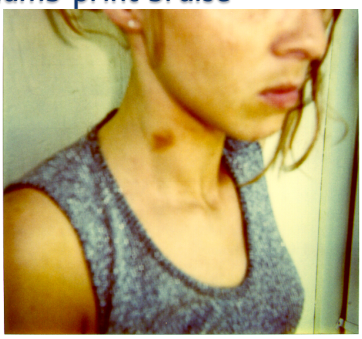
Thumb-print bruise



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Ligature mark

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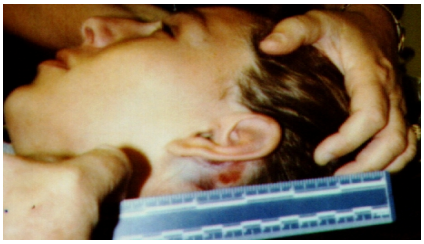
Bruises Behind the Ear



Injury/tearing of the Sternocleidomastoid muscle at the insertion point behind the ear

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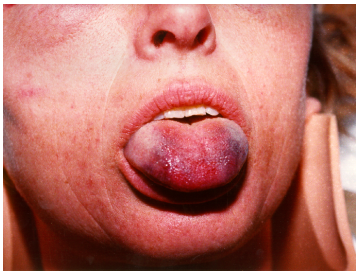
Massive tongue swelling (edema)



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PETECHIAE

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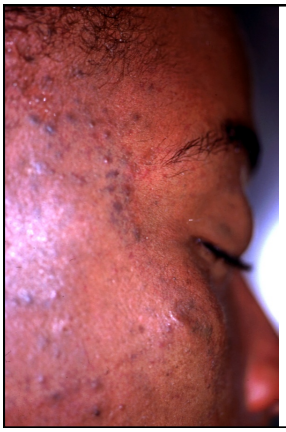

Petechiae are smooth and flat.

Acne is usually raised or bumpy.

Note the distinction.

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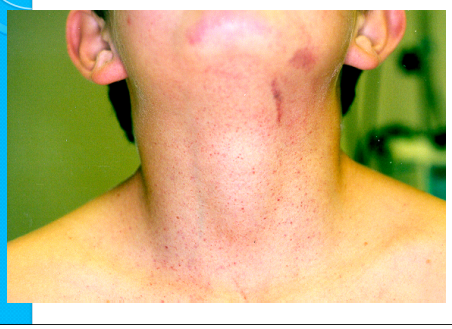
Neck



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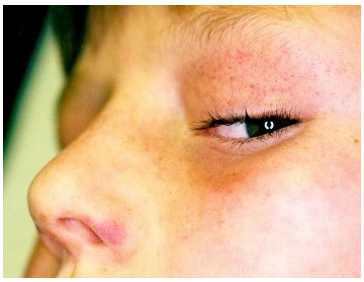
Over the Eyelid



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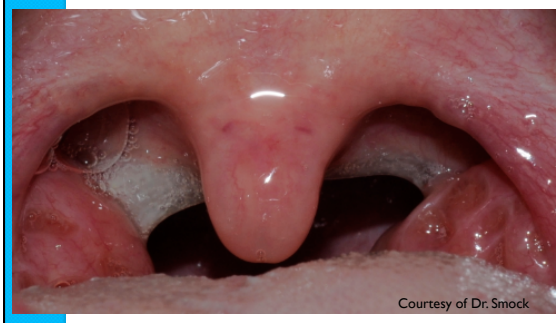
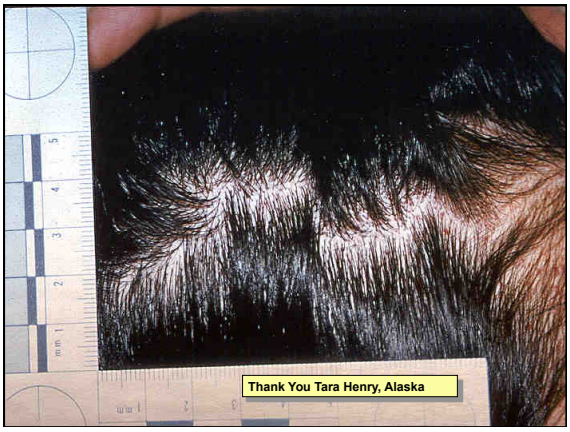
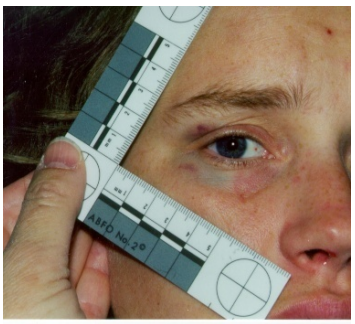


Courtesy of Dr. Smock



Thank You Tara Henry, Alaska

Petechiae - one red spot in eye



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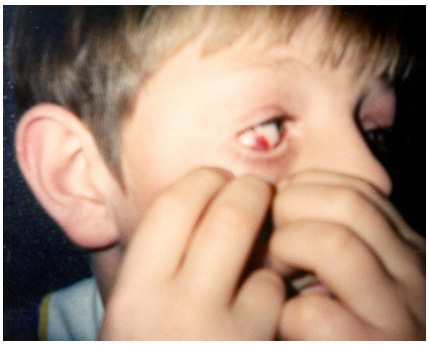

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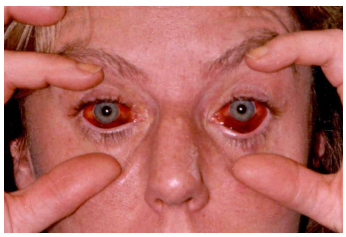
Subconjunctival Hemorrhage



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ARE THERE OTHER CAUSES FOR PETECHIAE?

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Yes!

- Strenuous labor
- Scuba diving
- Severe coughing or vomiting
- Medical conditions- thrombocytopenia

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UNCONSCIOUSNESS

- Important symptom to ask about
- Patient's may not realize that's happened
  - Gaps in time
  - Change in locations
  - Unexplained injuries
- Serious finding when present
- Indicates global hypoxia to the brain and cerebral dysfunction

Incontinence

- Serious finding in non-fatal strangulation
- Alteration in cerebral blood flow and consciousness
- Usually caused by sphincter relaxation (anal, bladder, esophageal)
  - Urinary, fecal, and gastric
- Patients may be embarrassed or ashamed to report
- Ask, must normalize it for the patient
  - *"Often times, women I care for who were strangled report that they wet themselves , did this happen to you"*

Internal/External Signs

- Involuntary urination or defecation (sphincter incontinence)

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History

- History must be targeted to the strangulation
- Must document specific elements to know where to look for injury/evidence
- Use of a form or chart tool

"THE MORE YOU KNOW, THE MORE YOU SEE, AND THE MORE YOU DOCUMENT".

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Documentation Chart for Attempted Strangulation Cases
Use this chart when a victim reports being "choked" or strangled

Symptoms and/or Internal Injury:

Breathing Changes	Voice Changes	Swallowing Changes	Behavioral Changes	OTHER
• Difficulty Breathing • Hyperventilation • Unable to breathe Other:	• Raspy voice • Hoarse voice • Coughing • Unable to speak	• Trouble swallowing • Painful to swallow • Neck Pain • Nausea • Vomiting	• Agitation • Amnesia • PTSD • Hallucinations • Unconsciousness	• Dizzy • Headaches • Fainted • Urination • Defecation

Use face & neck diagrams to mark visible injuries:

Face	Eyes & Eyelids	Nose	Ear	Mouth
• Red or flushed • Petechial red spots (petechiae) • Scratch marks	• Petechiae to R ocular/ L eyelid (circle one) • Petechiae to R ocular/ L eyelid (circle one) • Bloody red eyelid(s)	• Bloody nose • Broken nose (ancillary finding) • Petechiae	• Petechiae (external and/or ear canal) • Bleeding from ear canal	• Bruising • Swollen tongue • Swollen lips • Cuts/abrasions (ancillary finding)
Under Chin	**Chest**	**Shoulders**	**Neck**	**Head**
• Redness • Scratch marks • Bruise(s) • Abrasions	• Redness • Scratch marks • Bruise(s) • Abrasions	• Redness • Scratch marks • Bruise(s) • Abrasions	• Redness • Scratch marks • Finger tool impression • Bruise(s) • Swelling • Ligature mark	• Petechiae (on scalp) **Ancillary findings:** • Hair pulled • Bump • Skull fracture • Concussion

Please take photos and indicate the number of Photos taken: _____

EXAMINATION

Examination

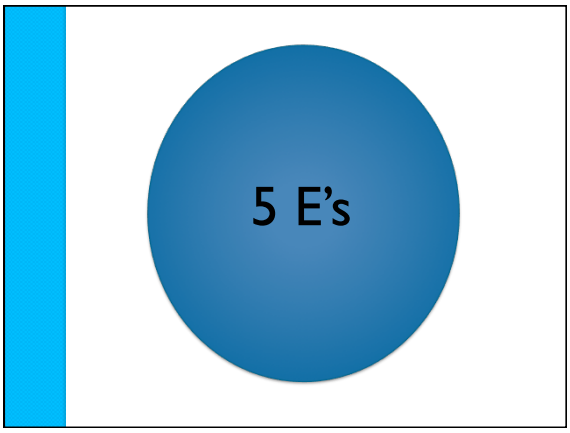
- Vital signs: Resp rate and pulse oximetry
- Look for injuries based on what happened
- Thorough head to toe assessment for injuries
- Pay close attention to the head, neck and upper thorax
- Look for other potential injuries

Forensic Concerns

- Chain of custody
- Save clothing
- Save ligatures
- Wear gloves
  - Avoid contact with the neck
- Preserve the patient as the crime scene
- ABC's take priority however

Touch/Low Copy DNA

- DNA that can be recovered due to touch of an object or person
- Small amount of DNA, using special techniques to recover/replicate
- Swab areas of the neck where perpetrator's hands were placed

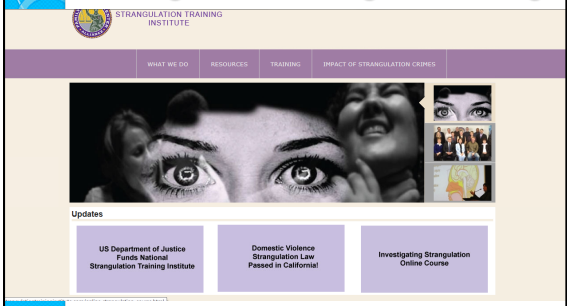


5 E's of Strangulation for EMS

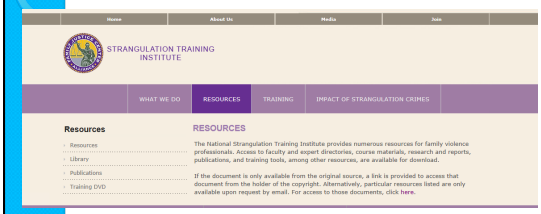
1. **Ensure** patient safety; get police or DV advocate involved.
2. **Evaluate** the patient: inquire about the events and the symptoms; check Vitals.
3. **Examine** for injuries/findings: systematic and focusing on head, neck and upper thorax.
4. **Encourage** they seek treatment in ED. And if they refuse treatment, the most important "E":
5. **Educate** them on the seriousness of strangulation, delayed symptoms and especially give them very good instructions/information on the things to watch out for such as shortness of breath, severe sore throat, seizure, neurological symptoms, inability to drink…tell them to get to the ER if they develop.

RESOURCES

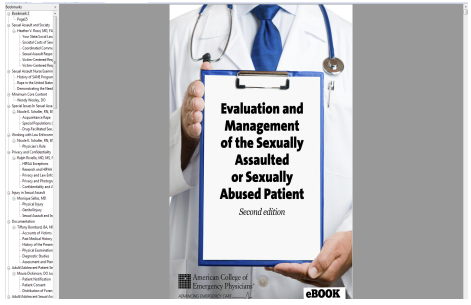
Strangulationtraininginstitute.org



Strangulationtraininginstitute.org Resources



ACEP – Sexual Assault Manual



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Ralph Riviello, MD is a Professor of Emergency Medicine at Drexel University College of Medicine, Philadelphia, PA. In addition, he serves as Medical Director of the Philadelphia Sexual Assault Response Center. The center is a freestanding forensic center for sexual assault victims serving approximately 400 patients per year. Ralph was extensively involved in the development and implementation of the center.

Ralph has his Master's Degree in Forensic Medicine and serves as a faculty member in Drexel's Forensic Science program. In March 2012, Ralph became a member of the Alliance's Training Institute on Strangulation Prevention. As an emergency medicine clinician, Ralph knows the importance of strangulation in domestic violence and sexual assault cases and works to educate his colleagues on its importance.

Ralph is the editor of the textbook The Manual of Clinical Forensic Emergency Medicine: a guide for clinicians. He is also currently serving as Chair of the Forensic Medicine Section of the American College of Emergency Physicians (ACEP) and is Immediate Past-President of the Pennsylvania Chapter of ACEP. He is also President of the Board of Directors of the Pennsylvania Coalition Against Rape (PCAR).
Ralph has lectured and written on the topic of sexual assault and forensics in emergency medicine. He recently served as Co-Director of the project to revise ACEP's handbook, Management of the Sexually Abused/Sexually Assaulted Patient. And is working with the California Clinical Forensic Medicine Training Center to develop a Sexual Assault Glossary.

In 2009, Ralph was awarded Philadelphia's Women Organized Against Rape 'Bridge to Courage Award" for his service and dedication to sexual assault survivors. And finally, in April of 2012 he was awarded Drexel University College of Medicine's Outstanding Alumni Teaching Award.

Certificate of Attendance

Webinar Training:
What Paramedics Need to Know About Strangulation
November 23rd, 2015
1.5 Training Hours

Co-Founder and CEO
Alliance for HOPE International
Director, Training Institute on Strangulation Prevention