

Strangulation Injuries

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Manual Strangulation in Surviving Victims

- The first hint that manual strangulation injuries in surviving patients were underreported appeared in 1985 in the publication "Strangulation: A Full Spectrum of Blunt Neck Trauma"
- Most documentation of strangulation injuries until then have come from forensic pathologist

Definition

Strangulation

- "a form of asphyxia characterized by closure of the blood vessels or air passages of the neck as a result of external pressure on the neck."

Iserson K. Strangulation: a review of ligature, manual and postural compression injuries. *Annotated Emerg Med* 1984; 13(3):179-85

Asphyxia

- Any process which deprives the tissue cells of oxygen
 - Mechanisms can include strangulation, choking, and suffocation
- Asphyxia, anoxia, hypoxia are virtually synonymous

Mechanism of Injury in Strangulation

- Studied 116 cases of strangulation – 79 survivors with stigmata, 37 fatalities
 - One hand
 - Two hand
 - One/two hand behind
 - Ligature
 - Caused by a ligature where body is not suspended
 - Two thumb
 - Other methods were not included in this study
 - Ham and Rajs 1989

Statistics

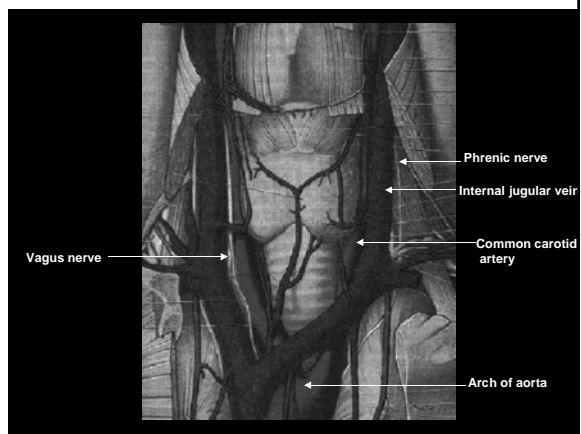
- Manual strangulation makes up 80% strangulation cases
- Ligature 15%
- 1.5 million women per year are strangled
- 85% strangulation victims are female and usually strangled at home
- Only 10% seek medical attention

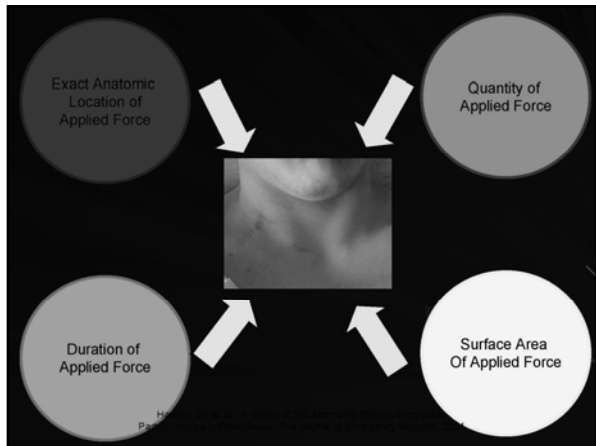
Uniform Crime Reporting FBI Statistics

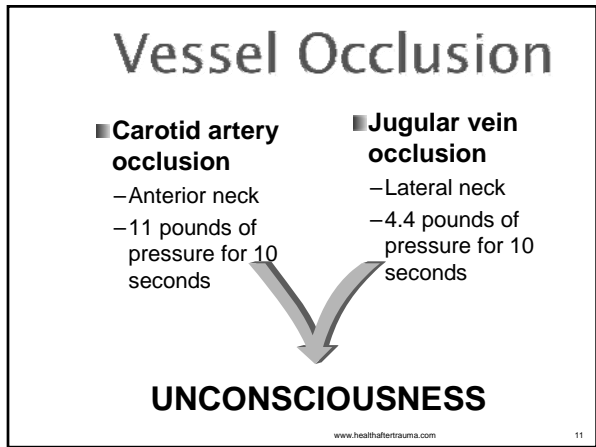
- Strangulation and asphyxiation deaths represented 1.75% of total number of murder victims of the total number of 14,054 in the US
- Strangulation is the fourth most common cause of homicide in the US followed by sharp instrument, guns, and hitting.

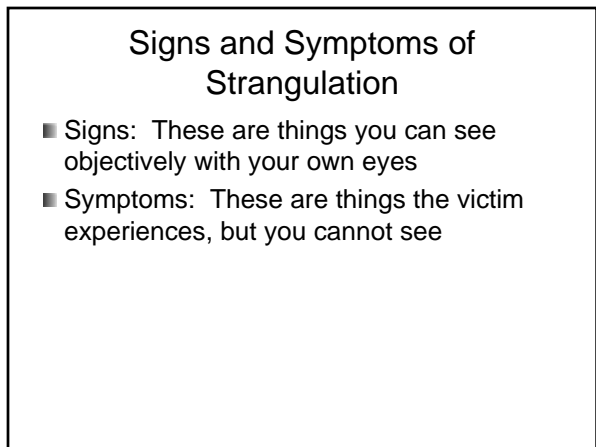
Pathophysiology of Strangulation

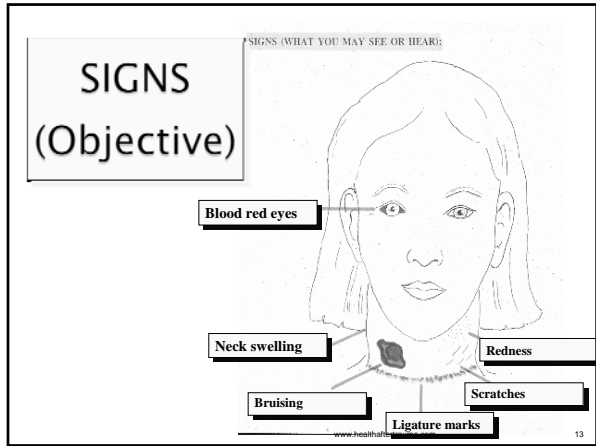
- Violent manual strangulation or ligature strangulation initially produces severe pain and panic.
- Initially the external force compress jugular veins that stops blood flow in the brain
- Stronger force stops arterial blood flow which stops oxygen delivery to the brain
- This leads to unconsciousness
- The muscles in the neck relax, the same amount of pressure can cause complete arterial occlusion



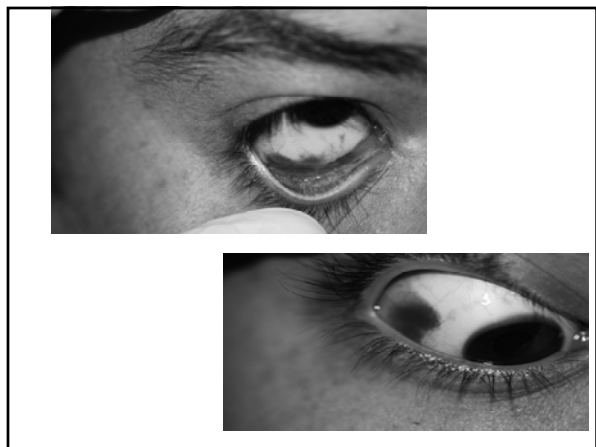










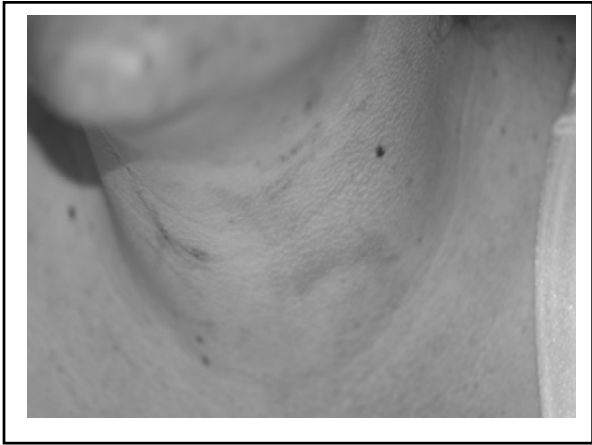








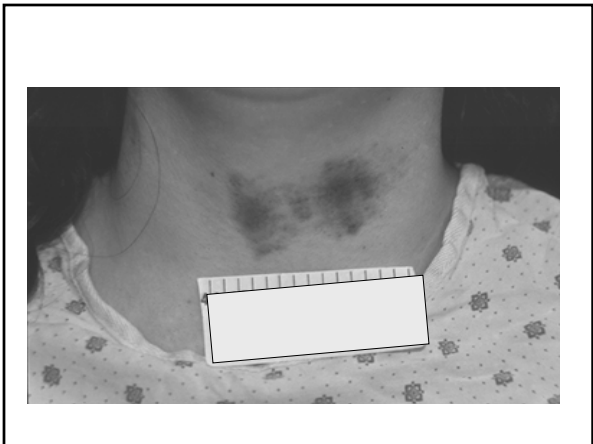
























Ligature Marks










Over the Eyelid




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A black and white photograph showing a close-up of a person's eye. The upper eyelid is closed, and there is a dark, crescent-shaped bruise on the skin of the eyelid. The surrounding skin appears slightly red and swollen. The text "Over the Eyelid" is printed in a bold, sans-serif font above the image. At the bottom of the image, there is a small URL "www.healthaftertrauma.com" and the number "35".





Symptoms of Laryngeal Injury

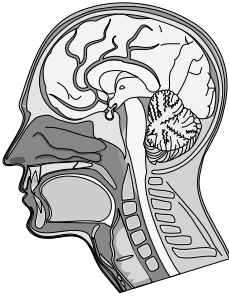


- Voice changes
 - 50% of victims
 - Nerve (recurrent laryngeal nerve)
 - Hoarseness (dysphonia)
 - May be permanent
 - Loss of voice (aphonia)

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Symptoms of Laryngeal Injury

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

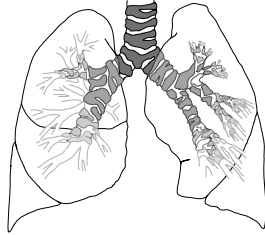


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Symptoms of Laryngeal Injury

■ 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



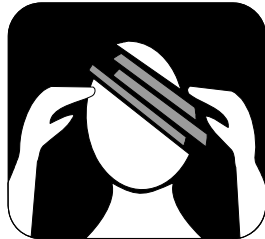
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Symptoms of (asphyxia or hypoxia)

■ 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



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Neurological Changes

- Muscle spasms
- Transient hemiplegia
- Central cord syndrome
- Seizures
- Spinal cord injury:
 - Short-term autonomic dysfunction
 - Long-term paraplegia
 - Quadriplegia

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Results: Signs



Why Is Strangulation Minimized?

- Limited visible injuries
- Poor understanding of medical significance of symptoms
- Victim's failure to report symptoms
- Victim's unwillingness to see medical attention

Tests of Choice?

- Pulse Oximetry and Cardiac Monitoring
- Soft Tissue Neck Films
- CT Neck +/- Angiography
- MRI Neck
- MRI Brain
- ENT Consultation -- Laryngoscopy
- Neuro Consultation
- Psychiatric Consultation

24 Hour Observation

Documentation

- CMTC has web site for Domestic Violence Forensic Medical forms
- <http://www.ccfmtc.tv/pdfs/forms/CALEMA-502.pdf>

Photography Tips

- Take pictures with patient in clothes initially to get the whole picture
- Put a scale in the plane of injury
- For depth and texture do side photos
- If injury is only on one side of neck, take picture of other side of neck also
- Keep camera plane parallel to plane of finding so no distortion is created
- Minimize flash

Strangulation Documentation

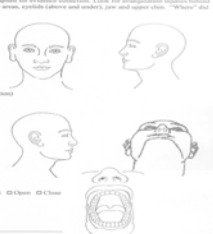
STRANGULATION DOCUMENTATION FORM

When a victim asks or states that she/he was choked and/or strangled, the following questions should be answered, both in writing and photographed for evidence collection. List the strangulation injuries below the top back of neck, throat and shoulder areas, visible abrasions and marks, lacerations, "Whoa" and "Whoa" marks (redness/bruising/abrasions)

- No injury noted/visible
- Neck pain
- Hoarseness
- Swallowing trouble
- Voice changes (e.g. raspy or hoarse)
- Difficulty swallowing
- Difficulty breathing
- Difficulty urinating
- Difficulty defecating
- Head/neck/shoulder/neck/bruising
- Fainting or unconsciousness
- Light-headed
- Dizziness
- Head spins (vertigo) and/or dizziness
- Ring or road signs
- Neck swelling
- Irritability
- Loss of consciousness
- Loss of reflexes
- Photophobia (sensitivity to light)
- Abnormal eye reflexes and vision

Method of strangulation

- Choke with F H K L U V W X Y Z
- Hand F H K L U V W X Y Z
- Ligature
- Apparel/Strap/Belt
- Apparel/Strap/Belt
- Other (specify): _____



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Practical Tips for Investigating Officers

■ Treat your strangulation cases seriously

- Start by changing your vocabulary and using words like strangled or attempted strangulation
- Treat the case as a felony. California has an aggravated assault crime under Penal Code section 245(a).
- PC 273.5

Practical Tips

■ Conduct a Thorough Interview and Investigation at the Scene

- There are many ways a victim can be strangled – ask questions that will elicit information about her symptoms she may be having and method used
- Remember there may be no visible injuries at all

Practical Tips

■ Questions for Method and/or Manner

- Ask victim to describe how she was strangled ie one hand, two hands, straddled, banged against wall etc
- Document points of contact and photograph area. Document property damage
- Identify where strangulation attempt took place, look for corroborating evidence
- How long did the incident occur, how many times, how many different methods were used
- On a scale of one to ten, how hard was the suspect's grip

Practical Tips

■ For Identifying Visible Injuries

- Look for injuries behind ears, around face, neck, scalp, chin, eyelids, chest area, pull down eyelids to look for bleeding
- Look for redness, scratch marks, scrapes, finger-print marks, thumb-print bruising, ligature marks, tiny red spots, swelling and/or lumps on neck
- Ask victim to remove make up
- Did the victim feel nauseated or vomit?

Practical Tips

■ Establishing Motive, Intent, and Minimizing Recantation

- Use quotes to state what suspect said when he was strangling victim
- Describe suspect's demeanor and facial expression
- If an object was used, determine if suspect brought the object to the scene
- What did victim think was going to happen?
- What caused the suspect to stop?
- Witnesses?
- Prior incidents of strangulation or abuse?

Practical Tips

■ To eliminate defenses/excuses

- Did the victim attempt to protect herself
- Any injuries to the suspect – on face, neck, arms
- Take photos of suspect especially if no injuries

Practical Tips

- **Take Care to Identify Dominant Aggressor**
 - Many times there are claims of mutual combat, many times the suspect may be the only one with visible injuries – biting, scratching
 - Consider the following factors:
 - Height/weight of parties
 - Who is fearful of who
 - Detail of statement and corroboration
 - History of domestic violence
 - Pattern evidence
 - Signs and symptoms of strangulation
 - Defensive injuries



Practical Tips

- **Obtain copies of your 911 tapes or tape record your interview with victim**
 - 50% of strangulation victims experience voice changes and documentation is important evidence

Courtroom Presentation

- Have witness clearly explain mechanism of how strangulation occurred
- Use photographs to show anatomy of the vascular structures in the neck.
- Explain the pathophysiology of what occurs during strangulation

Courtroom Presentation

- **Questions to ask regarding strangulation**
- *When the victim is on the stand ask her the following questions:*
 - Have her describe how she was strangled, identifying points of contact. Have her describe where her body was and how the defendant was on top of her
 - Have her describe on a scale of 1 to 10, ten being the most pressure, how hard was the defendant's grip
 - Have her describe the pain she felt around her neck
 - Ask her if she lost consciousness or felt like she was going to "black" out.
 - Have her describe how long the strangulation occurred, or what the last thing she remembered before losing consciousness and the first thing she remembered after regaining consciousness (if she lost consciousness)
 - Ask her to describe what the suspect said before, during and after the strangulation
 - Ask her what she was thinking while he was strangling her, did she feel like she was going to die
 - Ask her if she had trouble breathing afterwards, pain in her throat, trouble swallowing. What did she feel like; did she have trouble seeing well?
 - What caused the suspect to stop?

Courtroom Presentation

- Questions to ask expert:
- Describe what strangulation is
- Define what manual strangulation is, what is the significance difference between the different types of strangulation injury
- Define asphyxia
- What makes the neck so vulnerable to injury from strangulation
- What causes unconsciousness in strangulation injury
- Describe the mechanism of how unconsciousness occurs
- What will happen if the pressure is not released and loss of consciousness continues
- What type of physical evidence can indicate that unconsciousness has occurred
- What are the objective signs you may see in strangulation injuries
- What can cause death in strangulation injury

Demonstrative evidence

■ Dynamometer



Dynamometer

- Used to measure pounds of pressure
 - Reliable measure of hand grip
 - Standardized measurement – meets Fry standard
 - Measures force and output
 - Measures isometric strength
 - Objective measure
 - Used for routine screening in physical therapy department

Dynamometer

- Used primarily as a teaching tool to demonstrate how little pressure it takes to strangle someone.
- Count the seconds aloud while holding dynamometer to demonstrate venous compression to the point of unconsciousness

Photographs

- Use patient photographs to show injury pattern if any
- Have an expert educate a jury why the victim may not seek medical attention or have no outside signs of trauma
- Use picture of neck anatomy to show why the neck is vulnerable to compression

Thank You

- For caring enough to save lives!!!!
