
INOVA®
FACT
FORENSIC ASSESSMENT & CONSULTATION TEAMS

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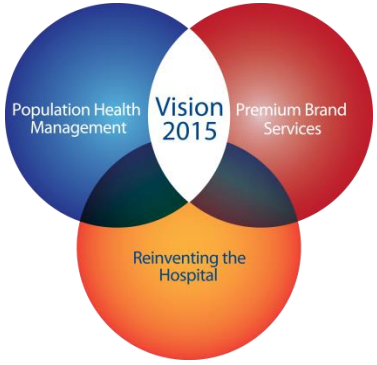
Strangulation

Beth Roach, RN, BSN,

SANE-A, SANE-P



Virginia Code S 18.2-51.6 Strangulation

Any person who, without consent, impedes the blood circulation or respiration of another person by knowingly, intentionally, and unlawfully applying pressure to the neck of such person resulting in the wounding or bodily injury of such person is guilty of strangulation, a Class 6 felony.

A term of imprisonment not less than 1 year not more than 5 years-or- jail for not more than 12 months and a fine not more than $2500, either or both

Where is it a Felony?

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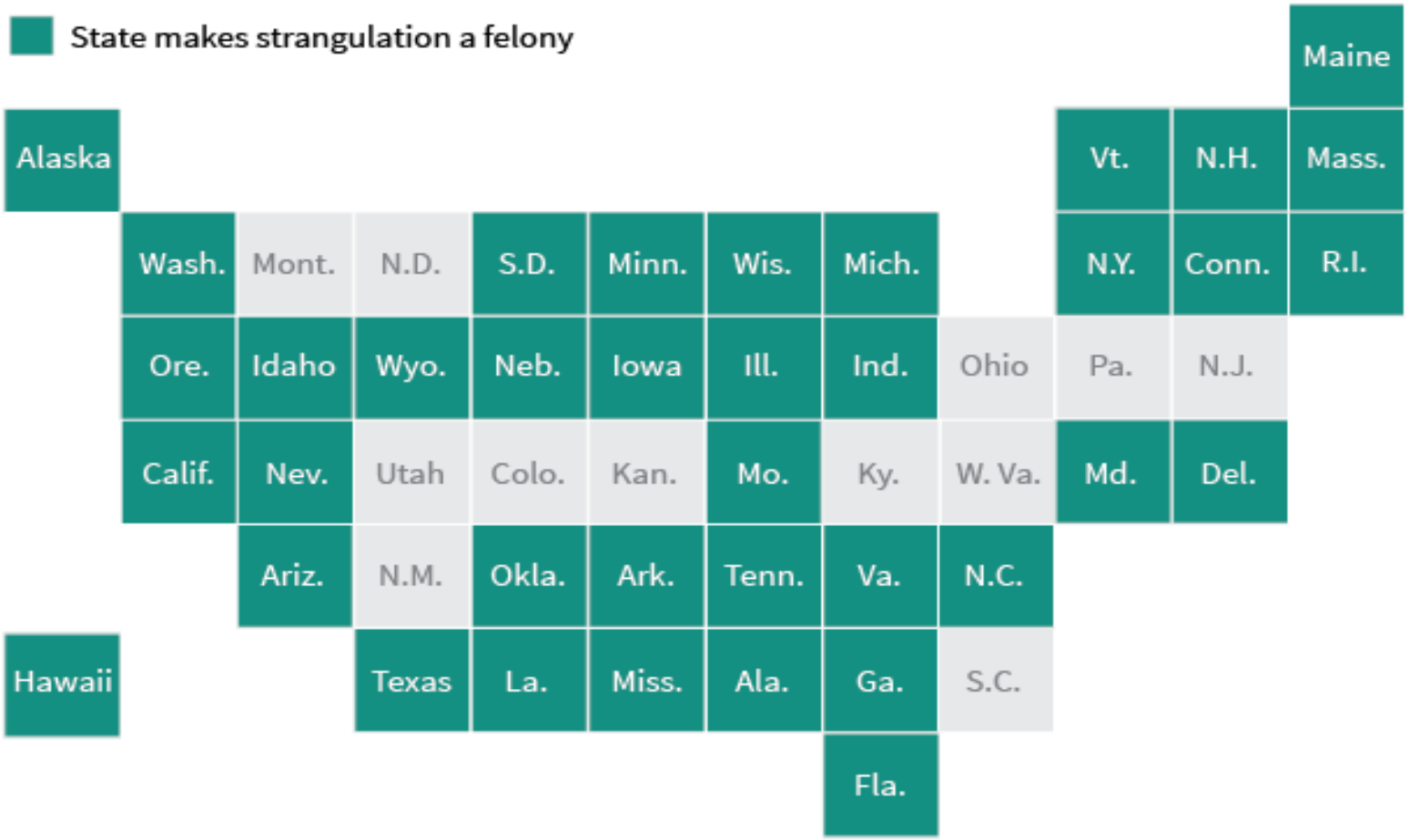
Where Strangulation Is A Felony Crime



Note: In Maryland, applies to sexual assault cases only.

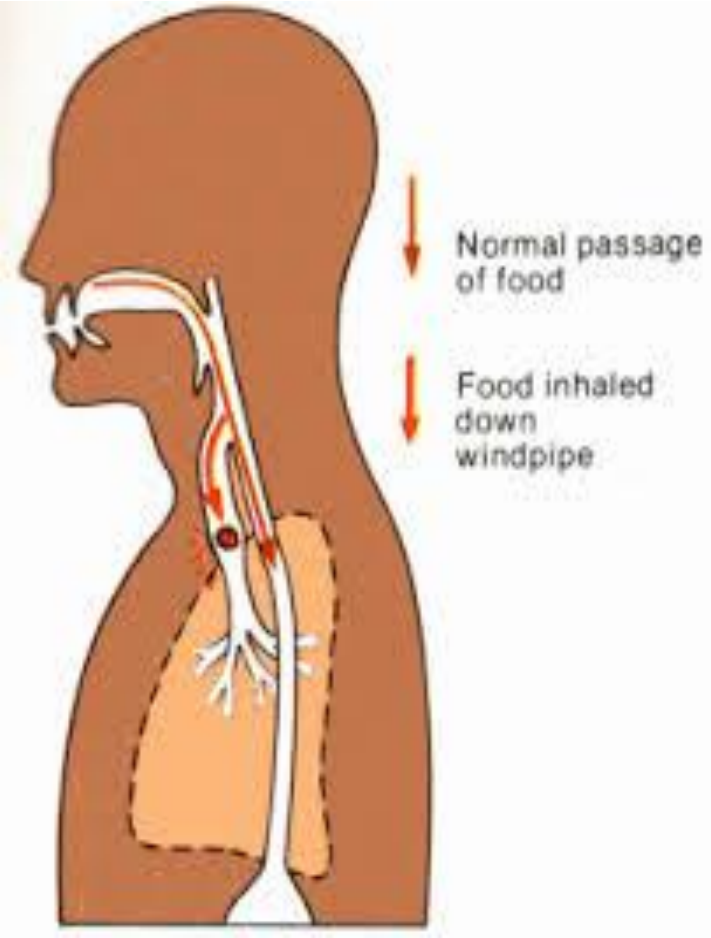
Source: The Training Institute on Strangulation Prevention

THE HUFFINGTON POST

Strangulation

- Medical evaluation of strangulation can be crucial in judicial proceedings. (Bakers & Somers 2008, Laughon et al 2009, Strack et al 2001)
- Strangulation "Impedes the circulation and respiration"

Strangulation vs Choking



- Choking is an internal obstruction that lodges in the airway and impairs the ability to get oxygen to the lungs
- Strangulation may have the same end-result but occurs due to a pressure to the outside of the body compressing essential blood vessels or air passages.

Strangulation Definition

- “Strangulation is the external compression of a person’s neck and/or upper torso in a manner that inhibits that person’s airway or the flow of blood into or out of the head.”

- “the resulting injuries can include but are not limited to blocking of the airway (asphyxia), blocking of the jugular vein or carotid arteries (cerebral hypoxia), blood pressure–related injuries (cardiac arrest, aneurysm, or stroke), or structural damage to the neck (trachea, thyroid cartilage, or hyoid bone).”

(Pitchard et al 2015)

Types of Strangulation

- **Manual strangulation**- is the result of using hands or arms to put pressure on the outside of the neck. It is the most common type. It occurs in 83% of strangulation cases. (Shield et al 2010)
- **Ligature strangulation**- is when the external pressure to the neck is caused by a rope or similar item encircling the neck
- **Hanging**- is a form of ligature strangulation which uses the person's body weight to facilitate compression of the neck
- **Postural strangulation-** is when the victim is unable to breathe because of compression of the chest. ie assailant sitting on chest. (Faugno et al 2013)

Brain Physiology

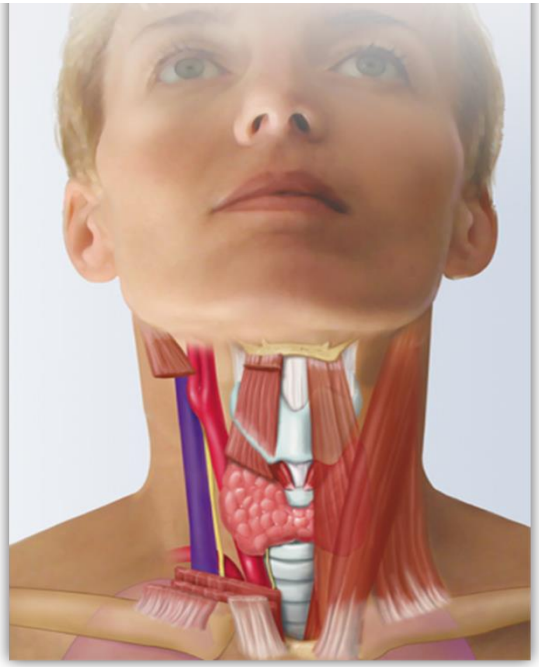
The brain needs continuous oxygen delivery to function. It is the most sensitive organ to hypoxia or oxygen deprivation.

It needs BOTH blood flow and respiration working together to accomplish oxygen delivery.

Disruption of this balance quickly leads to:

- **Symptoms- what a patient feels subjectively**
- **Signs- what others can objectively observe**

Normal anatomy

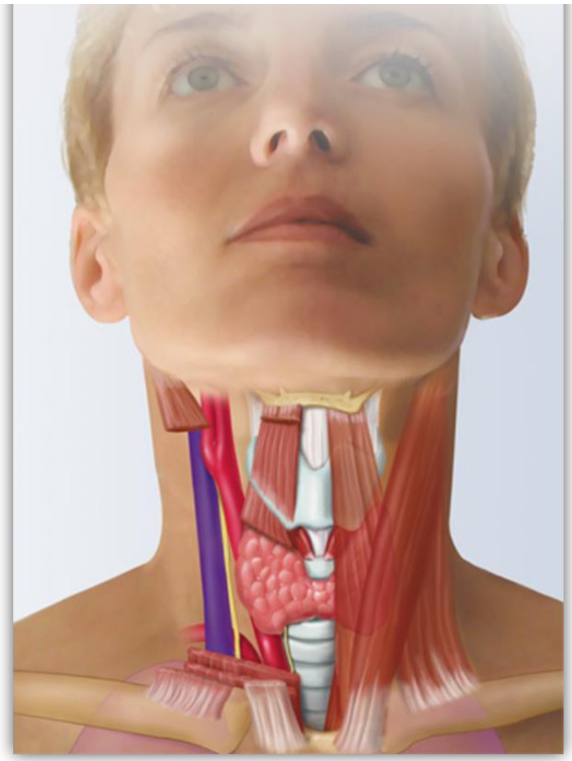


Arteries carry oxygen-rich blood and nutrients to cells

Veins carry oxygen-poor blood and cell waste products away from the cells

Trachea brings oxygen into the lungs when we inhale where it is absorbed into the blood for use by the cells. Carbon dioxide and other waste products or respiration leave the body through the trachea on exhale.

Strangulation



1. Jugular vein occlusion causes obstruction of venous blood, increased pressure in the brain and decreased blood returned to the heart. (stagnant hypoxia)
2. Carotid artery occlusion blocks oxygenated blood flow to the brain.
3. Tracheal occlusion- impeding the delivery of oxygen to the blood by impairing breathing.

(*studies were done in 1944-45 by Rossen, Kabal, Anderson)

Obstruction to circulation or respiration

Obstruction of EITHER Circulation OR respiration = Hypoxia or Anoxia

- Hypoxia is an oxygen deficiency in body tissues
- Anoxia is absence of oxygen

Taber's Cyclopedic Medical Dictionary 2009

How Much Pressure IS That?

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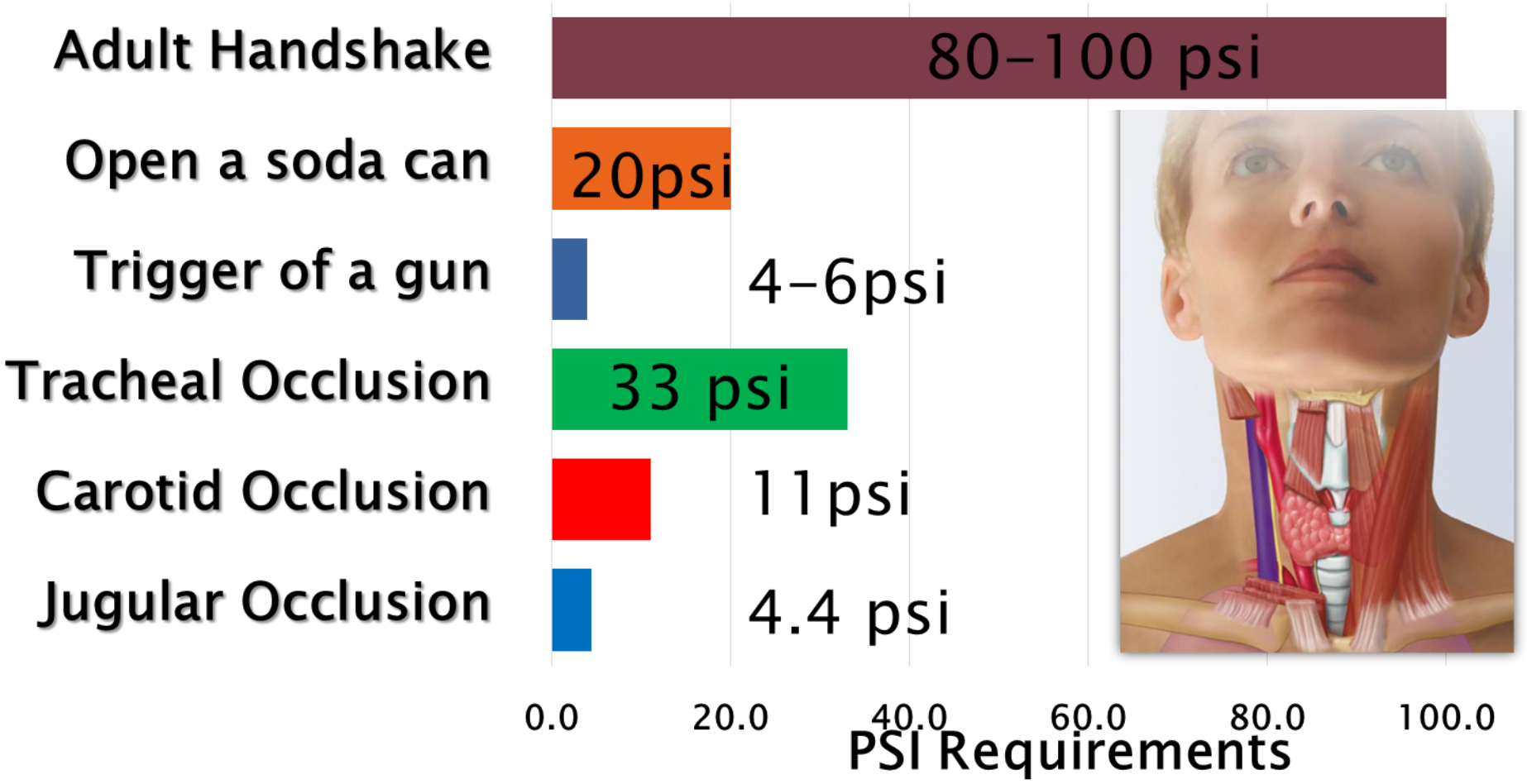

Dr. Bill Smock,
Louisville PD

Time is Life!

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50 seconds is point of no return–rarely recover even with CPR

10 seconds to unconsciousness

20 seconds should bounce back on own

30 seconds need to medically revive

Dr. Louis Pena

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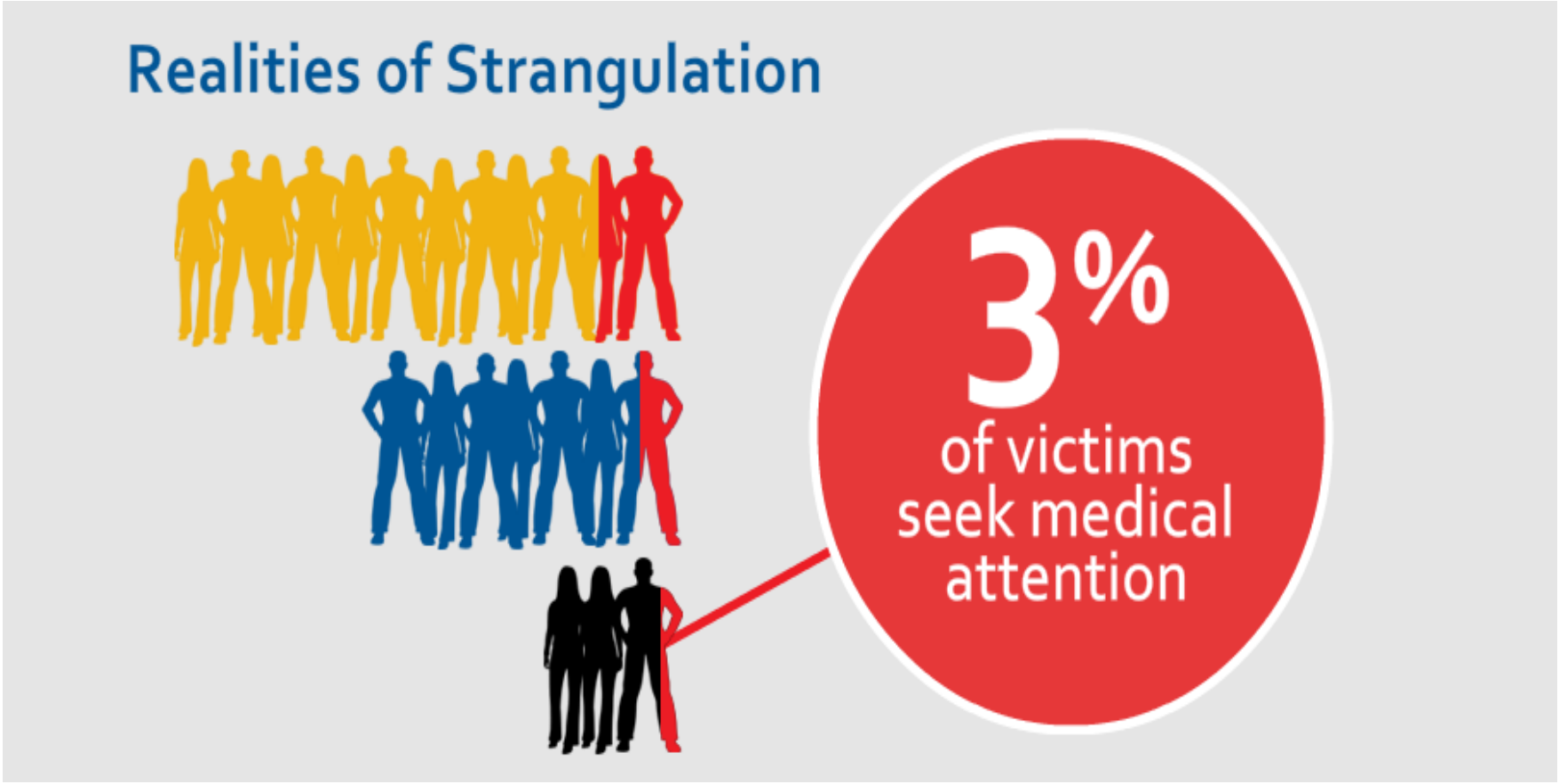
50% with no visible injury

35% with injuries too minor to photograph

15% with injuries sufficient to photograph



Strack GB, McClane G, Hawley DA; A review of 300 Strangulation Cases

WOW!

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Talk about Power and Control?!?!

- Less pressure than a handshake
- 10 seconds to being rendered incapacitated
- Near death experience for your victim
- Accomplished without leaving a mark

Patient's Experience….

The clinical sequence of strangulation is:

- Severe pain
- Followed by unconsciousness
- Followed by brain death (McClane etal 2001)

During this time there are four stages of thoughts

1. Denial-often described as an out of body experience
2. Realization
3. Primal- often engage in a vigorous primal attempt to live
4. Resignation – " this is how I will die" or thoughts of who will care for their children when they are gone.

It IS happening

National Violence Against Women Survey found:

- A lifetime prevalence of strangulation
  - 7.7% of women
  - 3.9% men

For any type of offender

on the item “choked or attempted to drown”

(Pritchard et al 2015)

Why should we care?

- **Easy to get away with**
- **Risk to our patients**
  - **Now AND for the next 24-36 hrs**
  - **AND the rest of their lives**
- **Difficult to prove**
- **Risk to our Law Enforcement personnel**

Easy to get away with

- Why is this crime so easy to get away with?

Easy to get away with

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It is minimized at every contact

Strangulation minimized by…

- Victims: “He didn’t really choke me, he just had me in a headlock and I couldn’t breathe.
- Dispatch operators: “You’re breathing OK now, right?”
- Abuser: “Why are you arresting me? All I did was choke her.”
- Healthcare Providers: “You don’t have any marks on your neck.”

We NEED to ask….

- Start simple…
  - “Did anyone put their hands or anything else around your neck or make it difficult to breathe?”
  - “How did they do that?”
  - “Were you able to breathe or speak while this was happening?”
  - “Tell me about it.” – try to determine what they remember – was their LOC, incontinence? Are you worried for their safety? Does EMS need to respond?
  - “Has this ever happened before?”

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Physiologic Dangers

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Immediate dangers:

- **Death from hypoxia or arrhythmia**

Within the next 24-36 hours:

- **Airway compromise due to swelling of neck**
- **Pulmonary edema (up to 2 weeks)**
- **Nerve paralysis leading to vocal & swallow issues**
- **Arterial spasm, tears or dissection, stroke**
- **Depression and PTSD leading to Suicide**

Up to 20 years later: Stroke from clots or arterial damage

Signs and Symptoms

- **Signs**- objective, apparent to the observer
- **Symptoms**- subjective, a change in the body or function as described by the patient

- There is no one sign or symptom that is diagnostic of strangulation

Signs & Symptoms of Strangulation

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- Redness to neck
- Scratch marks
- Rope burns
- Thumb print bruising
- Red eyes
- Petechiae (tiny red spots)
- Loss of control over bodily functions
- Pain to neck/throat
- Coughing/clearing throat
- Raspy voice
- Nausea or vomiting
- Unconsciousness
- Ears ringing
- Head rush
- Miscarriage
- Restless/Combative

Or….No visible signs at all!

Symptoms

- Since signs are often not present- Symptoms become even more essential to document!
- We need to be able to prove impairment in breathing and circulation and all we may have to do this is SYMPTOMS and the history reported to us.
- We need to get it accurately, completely and in the patient's words.

“Acute Arrest of Cerebral Circulation”

The most important study on strangulation

- 1944 – 500 controlled strangulations of adult males
- Measured pressure
- Documented characteristic reactions
  - Fixation of eyeballs (5-6 seconds)
  - Blurred vision
  - Constriction of visual fields (tunneling)
  - Loss of Consciousness – starting 6-10 seconds after loss of blood flow- 1 second after eye fixation
  - Anoxic Seizure – lasting 6-8 seconds, mild clonic tonic, no memory of seizure

(Rossen, Kabat, Anderson)

Loss of Consciousness

- Patients may not be aware they had a LOC. When the brain is subject to hypoxia it no longer creates and stores memory- we need to specifically ask:
  - Did you find yourself on the floor or in a different room without remembering how you got there?
  - Do you specifically remember when the strangulation stopped?
- Considered the most accurate *subjective finding* correlated to danger to life

(Christie et all 2010)

- LOC= ANOXIA to brain cells

Mental Status Changes

Can be the result or PTSD, Brain Anoxia or both

Often attributed to the patient being “hysterical”, “intoxicated” or an “exaggerated claim” especially when no outward signs are present.

- Restlessness and combativeness are common – especially after a LOC
- Memory loss
- Insomnia, nightmares
- Depression and suicide ideation

(Smith et al 2001)

Respiratory

Breathing changes may initially appear mild but are at risk of worsening and may kill the patient up to 36 hours later

Hyperventilation

Shortness of breath

Lung injury from aspiration or forceful attempts to breath against an obstruction can lead to pneumonia or pulmonary edema

Internal swelling to the small structures of the neck can slowly close off the airway – many times, because it is gradual, the patient can become disoriented and not notice the warning signs

(McClane et al 2001, Stanley et al 1983)

Neurological

- Eyelid or facial droop
- One sided body weakness
- Loss of sensation
- Loss of memory
- paralysis
- Tingling extremities
- Anoxic convulsions

Laryngeal Injury

- Laryngeal fractures are not often seen in non-fatal strangulation. “Forces sufficient to cause thyroid or cricoid fractures are usually sufficient to cause acute asphyxia and death.” Even when these injuries are found, it is often with out visible external signs. (Stanley & Hanson 1983)
- Fracture of hyoid bone also very unusual in non-fatal strangulation and found in at most 1/3 of fatal strangulation (Pollanen et al 1996)

- More common in manual or choke hold strangulation
- More common in patients over 50 years of age
- Often delayed symptoms or progressive hoarseness, shortness of breath and stridor

Laryngeal Injury- commonly present

Injuries from pressure to neck structures:

- Voice changes- up to 50% of patients. Can be hoarseness or complete loss of voice. Often attributed to screaming during altercation.
- Swallowing changes- can be painful, difficult or both
- Visible injuries to neck may be present
  - Fingertip bruises from assailant- often from thumb because it gives more pressure than fingers- how were hands positioned?
  - Scratches from assailant or by patient s a defensive maneuver
  - Ligature marks
  - Abrasions beneath chin from reflexive action to protect neck
  - Swelling to neck. Subcutaneous emphysema.
  - Patterned injuries – from jewelry on assailant or patient
  - Finger nail marks – incised curvilinear abrasions- singular or in sets

Incontinence

Did you lose your urine or stool while being strangled?

- It is important to ask – patients will not likely offer this information out of embarrassment and because they don't understand its significance and will often change before seeking help

Urination and defecation are controlled by the sacral nerves of the autonomic nervous system (involuntary body functions).

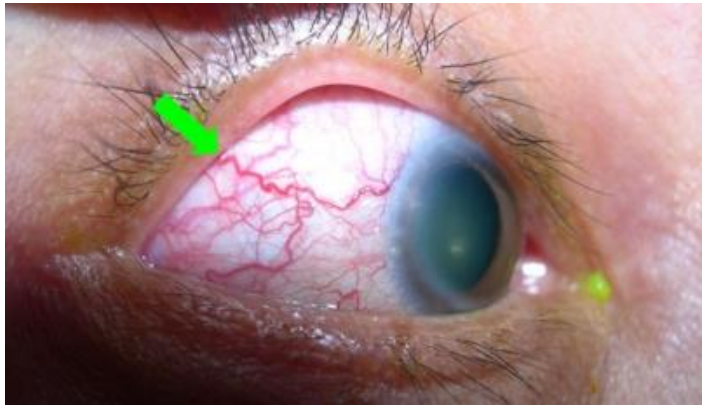
- Loss of bowel or bladder = cerebral hypoxia
- This is a LATE and CONCERNING sign
- 1944 study:
  - At least 15 seconds of Anoxia for urinary sphincter to relax
  - Even longer for bowel sphincter relaxation (30 seconds)

*** Loss of bladder/bowel = prolonged anoxic episode

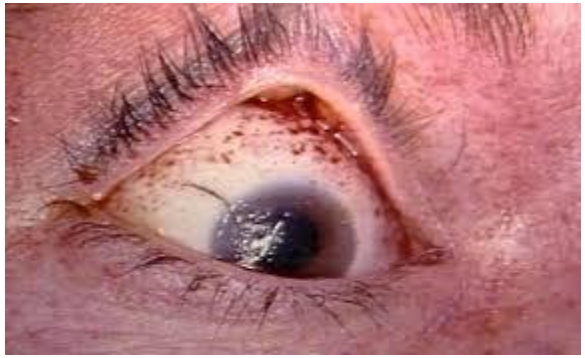
Petechiae

- Petechiae are tiny pin point hemorrhages which can be present on the skin, conjunctiva, mucous membranes and on our internal organs including the brain.
- They result as capillaries rupture from a combination of increased venous congestion and hypoxia.
- They can disappear in as little as one day.
- They are NOT specific to strangulation
- More common after violent struggle
- More common after ligature strangulation
- Considered to be “life threatening by themselves due to a considerable decrease in blood circulation” (A.Christe et al. 2010)

A Continuum…..



Venous Congestion → **Petechiae** → **Scleral Hemorrhage**



Petechiae

- Are NOT present in >50% of Strangulation
  - If there is complete compression of Arterial blood flow AND venous blood flow, no increased pressure in vessels, no rupture of vessels
- Often present around eyes
  - Rich blood supply
  - Little connective tissue supporting vessels.
  - Can also be present in ear canals, behind ears, any surface of mouth, skin

IMPORTANT!

- Presence is not diagnostic of strangulation
- Absence is not diagnostic of lack of strangulation
- BUT – When present in a history of strangulation – they are considered a life threatening sign! That strangulation was particularly lethal (A.Christe et al. 2010)

Petechiae

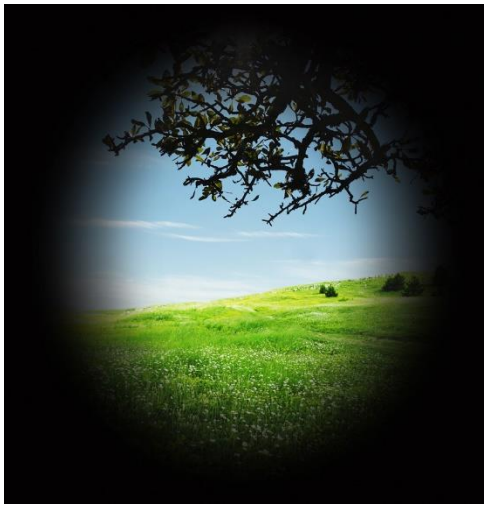
Dr. Dean Hawley- Pathologist and Strangulation expert….

- He has never done an autopsy where there were external petechiae and NOT internal petechiae
- Internal Brain petechiae= brain injury
- There small areas of hemorrhage disrupt synapse' and disrupt brain activity

Vision and Hearing Changes

Vision – Symptoms caused by lack of oxygen to the optic nerve

- Tunneling
- Stars
- Black spots in their vision
- Blurring vision



Hearing – Symptoms caused by lack of oxygen to the auditory nerve

- Tinnitis
- “roaring” noise like a train
- White noise- like listening in a seas shell

Put risk into perspective

Victims of prior attempted strangulation are:

7x or 800% more likely of becoming a homicide victim and 6x or 700% more likely of becoming an attempted homicide victim.

(Glass, et al, 2008).

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- **Difficult to prove**
- **Risk to our Law Enforcement personnel**

Difficult to prove

Lack of Diagnostic signs and symptoms

Because of the slow compressive nature of strangulation, as opposed to blunt or sharp force trauma present in most other violent assaults, the patient presents with deceivingly minor and non-specific signs and symptoms that can easily be attributed to other causes

*Only 15% had photographable injury

(Strack, McClane et al 2001)

NO visible signs…..

Does the patient History support occlusion of blood flow or airway?

"Couldn't breathe" = YES – preventing air entry

"Everything went dark" = YES – lack of oxygen to optic nerve

"Roar in my ears" = YES – lack of oxygen to auditory nerve

"I passed out" = YES – lack of oxygen to brain

"I urinated on myself" = YES – prolonged lack of oxygen leading to loss of sphincter control

"I lost stool" = YES – even longer to lose bowel sphincter

"She was shaking after she passed out" – YES – anoxic convulsion

ALL THESE = ANOXIC INJURY

When there ARE visible signs

- Follow up 48-72 hours later to document progression or resolution of injuries would be ideal!
  - Would help to validate our assessments of injuries
- Radiologic Studies – would also be helpful to quantify injury – especially when there are no signs

    also helpful in the safe discharge of our patients

    need education and buy-in of our ED

BUT

- Who would pay?

Difficult to Prove

- Victims may be reluctant to participate since many strangulations occur in the DV context
- The patient may not have a clear recollection of the assault due to the hypoxia and possible LOC
- Many times the only witness' to the assault are the victim and the perpetrator
- Hearsay, in the form of statements to the police at the scene and statements made to obtain restraining order, may be difficult to get admitted into evidence

Difficult to Prove

Lack of Reporting

- Only 5% of patient's sought medical care for strangulation in a retrospective study of 300 strangulation cases (Strack et al 2001)
- We need to ask- "did anyone put pressure on your neck and/or make it difficult for you to breathe"
- Many times, even when they present for treatment a medical forensic report is not completed.

Difficult to prove

"What did he say when he strangled you? What made him stop?"

- It is important to document what the assailant says immediately before or during the strangulation.
- This can be used to speak to his intent
  - "I'm going to kill you"= attempted murder

  Or- to show he was not acting in self defense

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Risk to Law Enforcement

- Retrospective study of Law Enforcement officers killed in the line of duty 1993-2013
- 50% of those officers were killed by a criminal suspect with a public records act history of strangulation assault against a woman in a prior relationship

Riverside County
District Attorney's Office
2013 Study, Gerald Fineman, J.D

Strangulation can be the last violent act before homicide.

Are we dropping the Ball?

- “Patients who do present to the ED and report being strangled are often under-evaluated and frequently dismissed as only being drunk, hysterical or hyperventilating”
- Police Officers may arrest the victim of strangulation on DV cases… because the strangulation victim will have no visible injuries but will have caused visible injury to the perpetrator while attempting to breathe.

Sadly, it is one of the most commonly minimized forms of violence.

With increased awareness, better interviewing and documentation by all of us, we can improve victim outcomes, safety and potentially save a life.

Strangulation

- Forensic Exam-document injuries, signs and symptoms of strangulation and can refer to a higher level of care. Symptoms may be delayed.
  - Concerning symptoms include
    - Vision changes/blurred vision or hearing changes
    - Neck pain and/or swelling, pain with swallowing
    - Difficulty breathing and coughing
    - Nausea/vomiting
    - Loss of urine or bowels
    - Hoarseness or voice changes
    - Fainting, headache or loss of memory
    - Anyone who is pregnant REQUIRES evaluation in ED/OBGYN

Medical Forensic Evaluation

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Patient Needs

- Medical evaluation
- Crisis intervention
  - Danger assessment
  - Safety Plan
  - Emotional support
  - Resources
- Follow up instructions

Judicial Needs

- Detailed history of events and symptoms
- Documentation of physical findings with photography
- Evidence collection
- Interpretation of findings
- Expert testimony

Court Testimony…

- FNEs can give expert testimony

  as to the seriousness of strangulation when there is the lack of visible marks on the neck.
- Statements made by patient. Medical Exception to Hearsay Rule.
- And helping to LINK the specific signs and symptoms, however subtle, to the specific medical terminology of the law.

Inova FACT Department

12.5% of our total cases involved strangulation
(including suspects, follow ups…)

- **Type of case**:
  - 68% IPV/DV
  - 30% SANE
  - 2% Strangulation alone
- **Signs and symptoms**:
  - 77% had Signs and symptoms
  - 7% had NO signs or symptoms
  - 16% had signs OR symptoms
- **Jurisdiction:**
  - 48% Alexandria
  - 30% Fairfax County – utilizing LAP since July 1st 2015
    - 54% DV screened =high-danger –OF THOSE -64% reported a history of strangulation
  - 12% other

(Department statistics Feb1- mid September)

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Strangulation is a red flag…

- "The most dangerous domestic violence offenders strangle their victims. The most violent rapists strangle their victims. We used to think all abusers were equal. They are not. Our research has now made it clear that when a man puts his hands around a woman's neck he has just raised his hand and said, 'I am a killer.' They are more likely to kill police officers, to kill children, and to later kill their partners. So when you hear, 'He choked me,' now we know you are at the edge of a homicide."

  (Casey Gwinn, President and Co-founder of the National Family Justice Center Alliance)

Resources

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