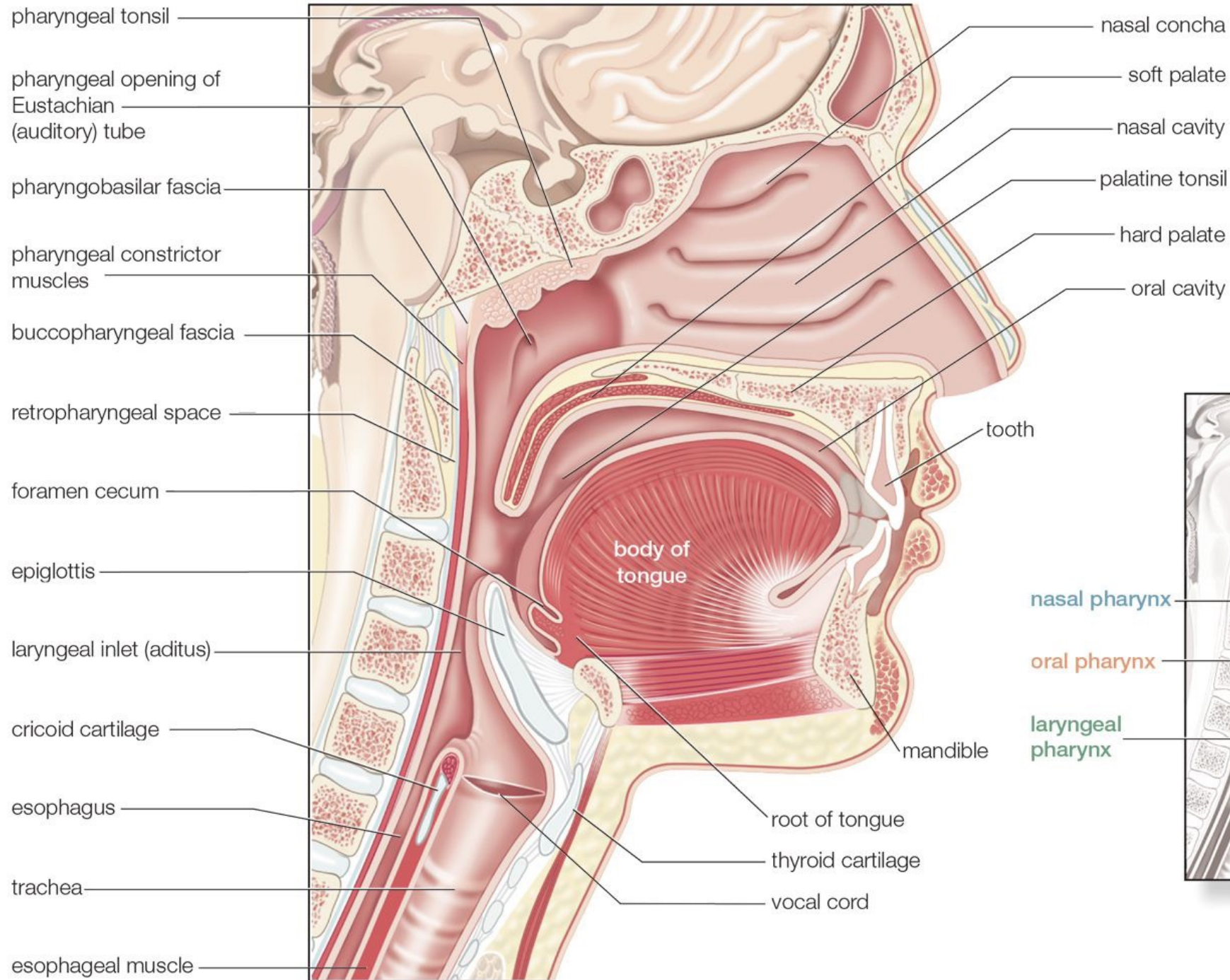


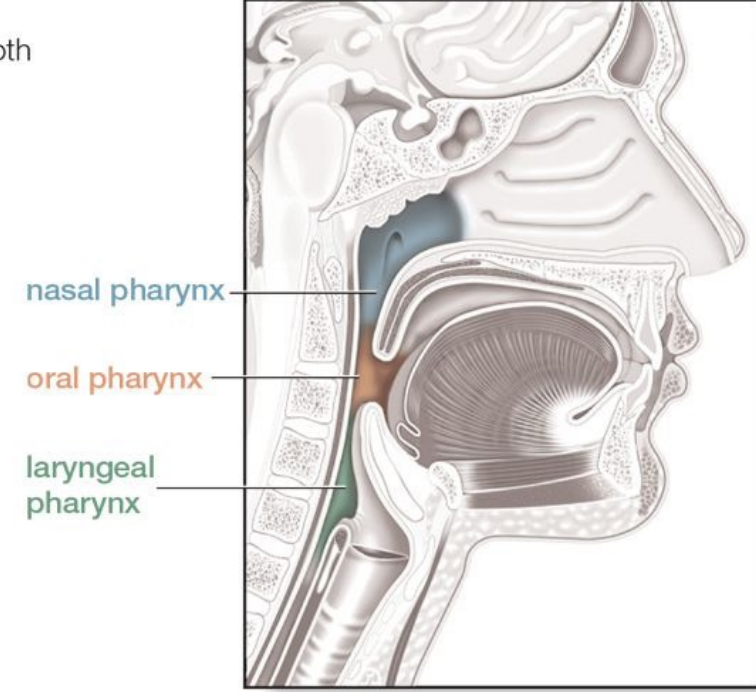
Asphyxial Fatalities

Rory Deol, D.O.

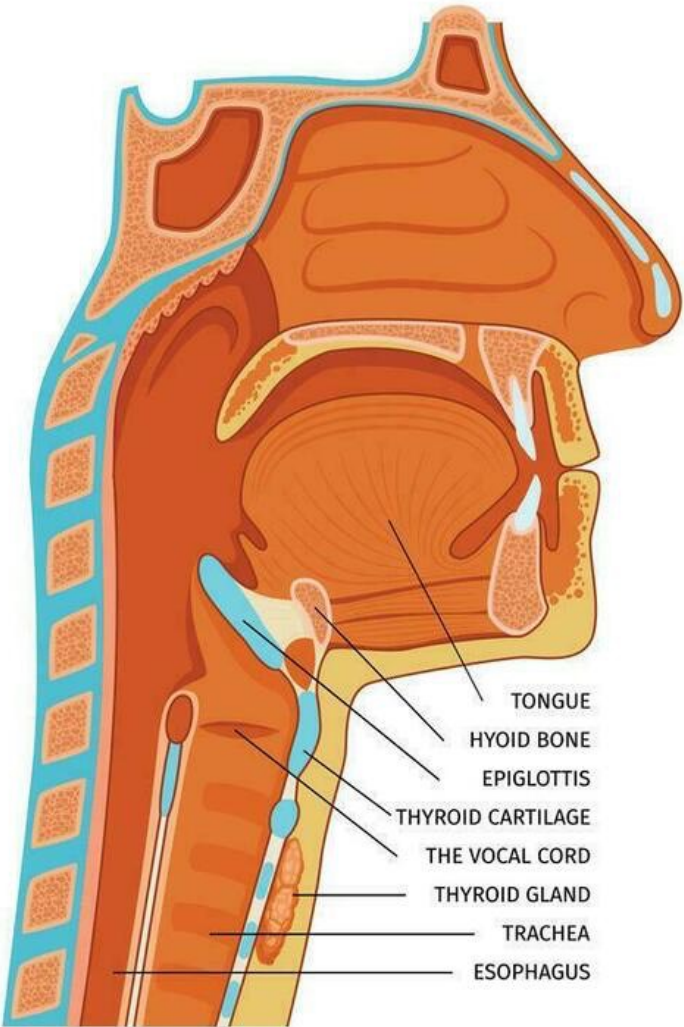
- Undergraduate: **University of Northern Iowa**
- Medical school: **AT Still University**
- Residency: **St Louis University**
- Fellowship: **Oklahoma Office of the Chief Medical Examiner**
- 2021-2023: **Oklahoma Office of the Chief Medical Examiner**
- 2024-present: **Iowa Office of the State Medical Examiner**



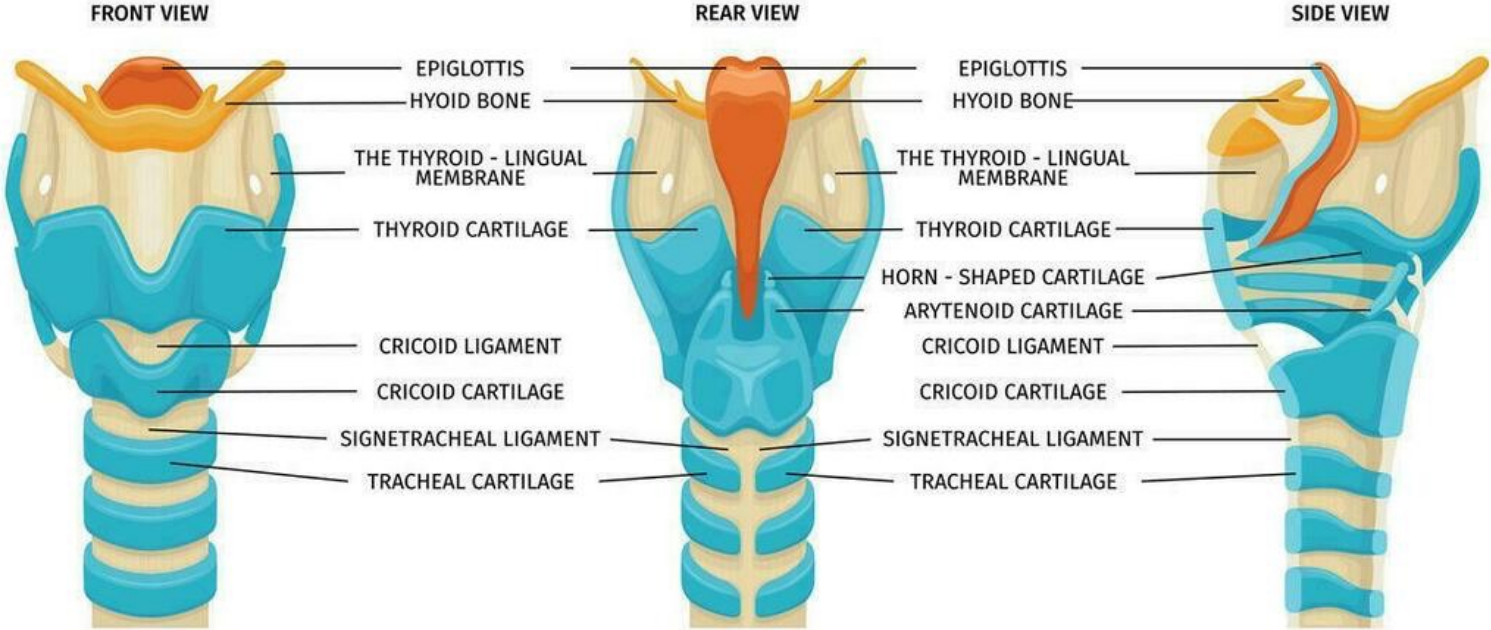
Regions of the pharynx



ANATOMY OF THE LARYNX



- TONGUE
- HYOID BONE
- EPIGLOTTIS
- THYROID CARTILAGE
- THE VOCAL CORD
- THYROID GLAND
- TRACHEA
- ESOPHAGUS



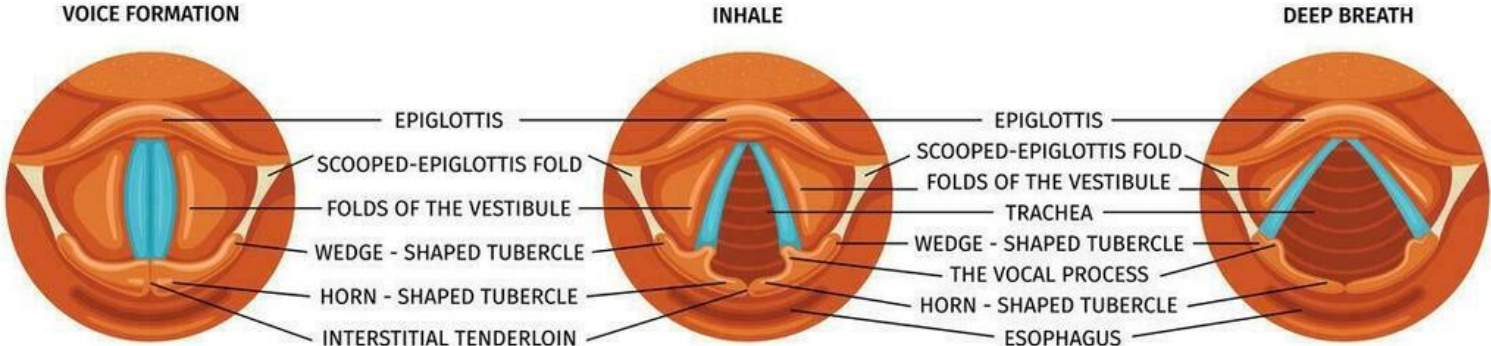
FRONT VIEW

REAR VIEW

SIDE VIEW

- EPIGLOTTIS
- HYOID BONE
- THE THYROID - LINGUAL MEMBRANE
- THYROID CARTILAGE
- CRICOID LIGAMENT
- CRICOID CARTILAGE
- SIGNETRACHEAL LIGAMENT
- TRACHEAL CARTILAGE

- EPIGLOTTIS
- HYOID BONE
- THE THYROID - LINGUAL MEMBRANE
- THYROID CARTILAGE
- HORN - SHAPED CARTILAGE
- ARYTENOID CARTILAGE
- CRICOID LIGAMENT
- CRICOID CARTILAGE
- SIGNETRACHEAL LIGAMENT
- TRACHEAL CARTILAGE



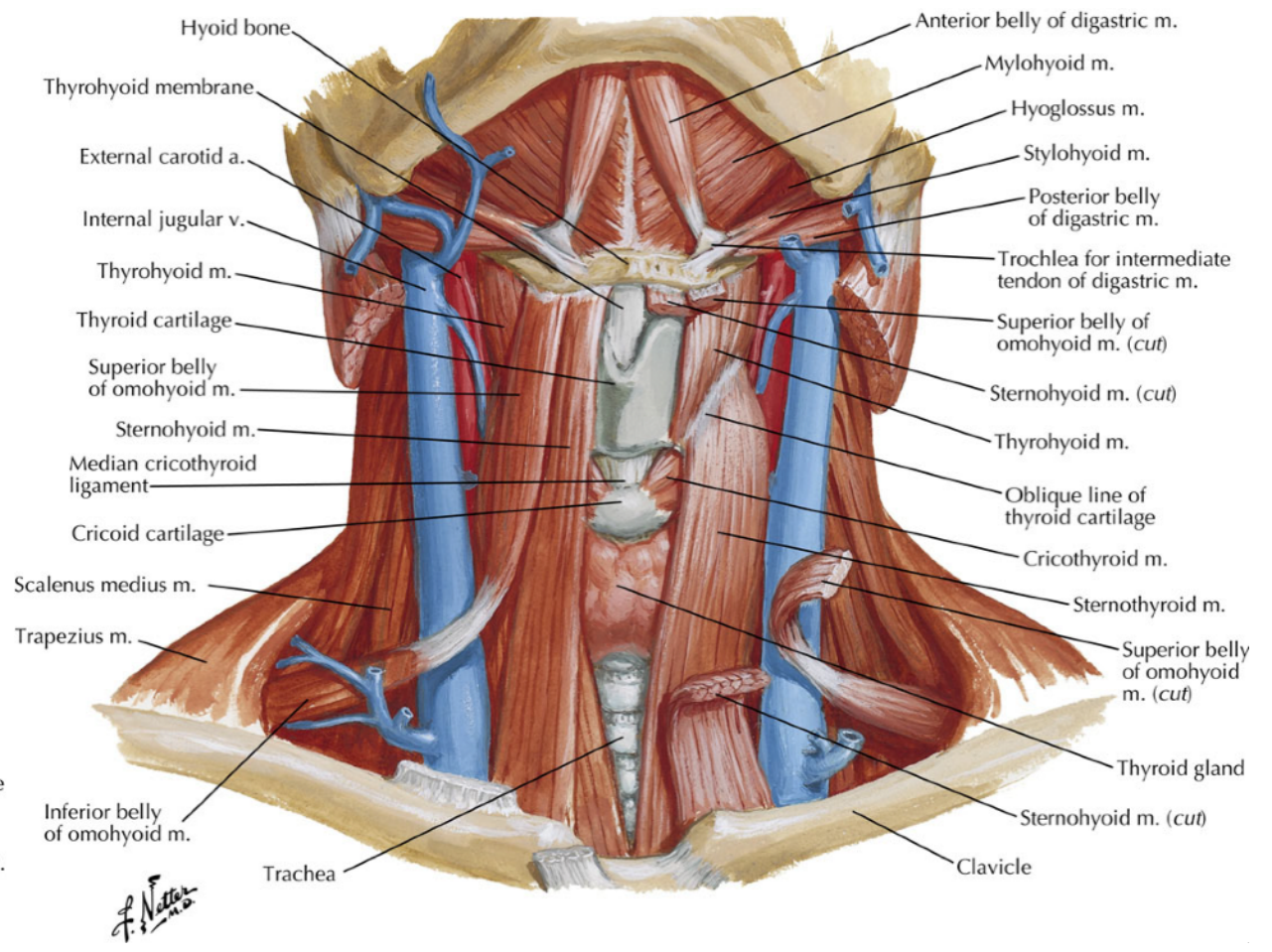
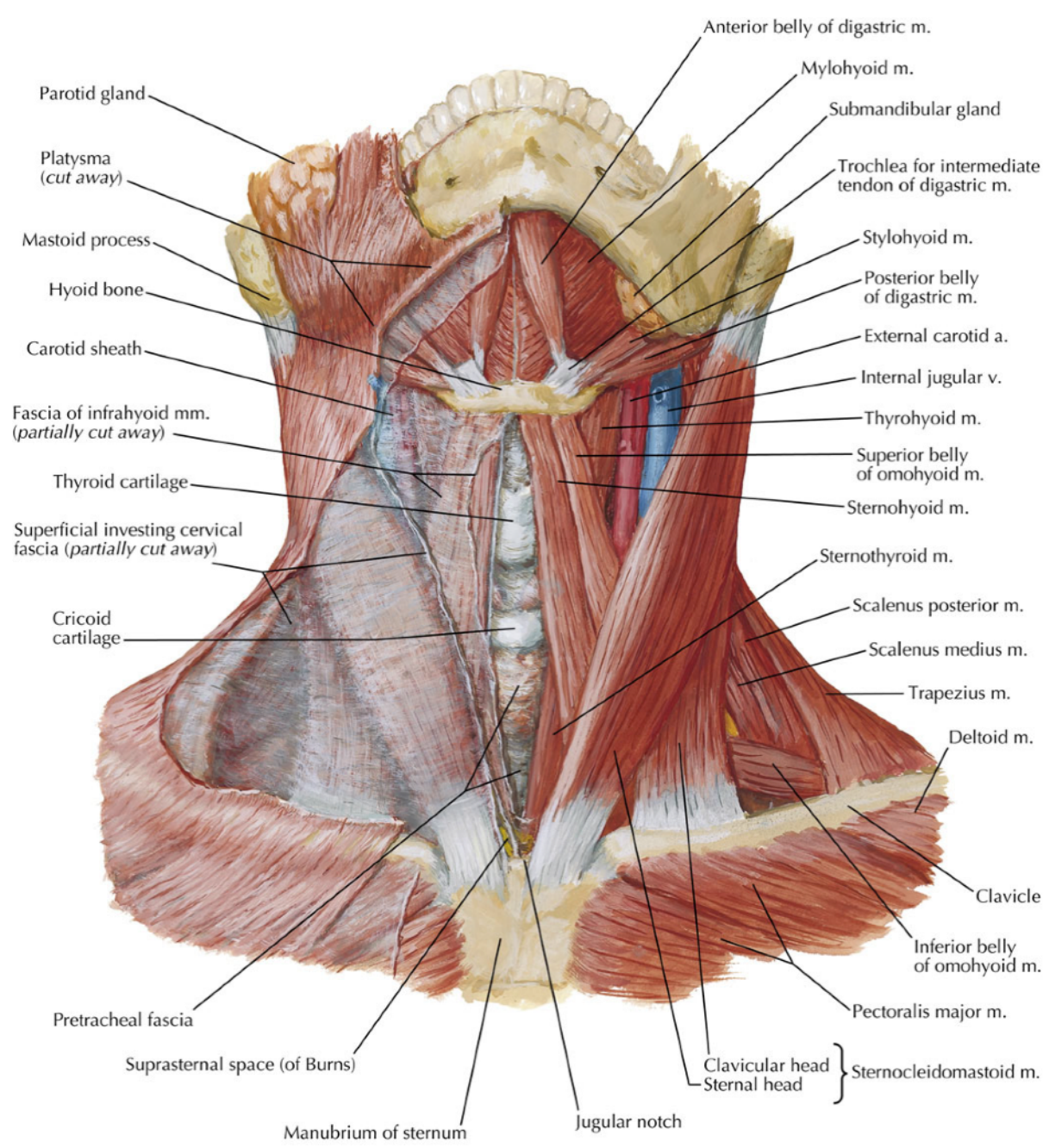
VOICE FORMATION

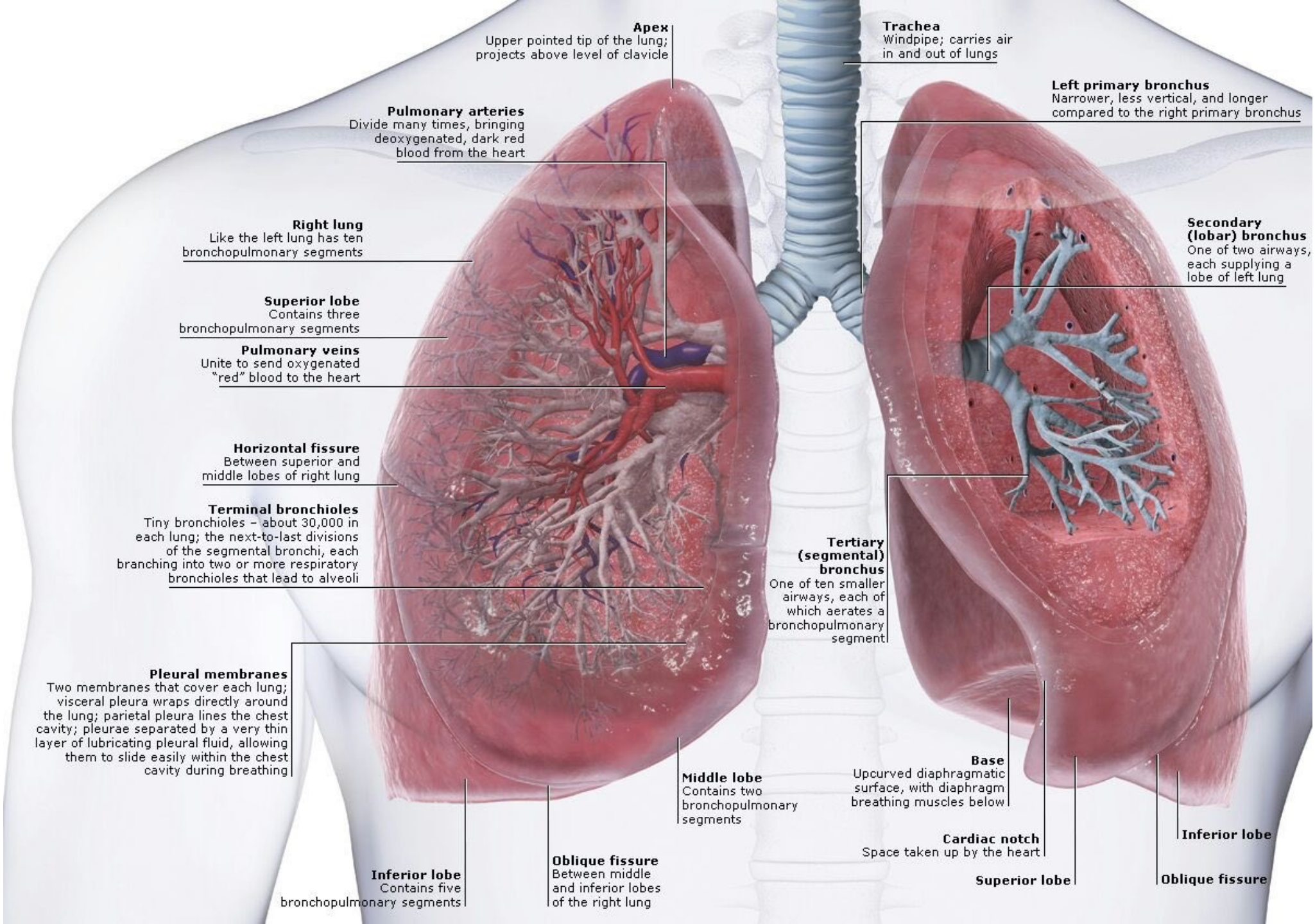
INHALE

DEEP BREATH

- EPIGLOTTIS
- SCOOPED-EPIGLOTTIS FOLD
- FOLDS OF THE VESTIBULE
- WEDGE - SHAPED TUBERCLE
- HORN - SHAPED TUBERCLE
- INTERSTITIAL TENDERLOIN

- EPIGLOTTIS
- SCOOPED-EPIGLOTTIS FOLD
- FOLDS OF THE VESTIBULE
- TRACHEA
- WEDGE - SHAPED TUBERCLE
- THE VOCAL PROCESS
- HORN - SHAPED TUBERCLE
- ESOPHAGUS





Apex

Upper pointed tip of the lung; projects above level of clavicle

Trachea

Windpipe; carries air in and out of lungs

Left primary bronchus

Narrower, less vertical, and longer compared to the right primary bronchus

Pulmonary arteries

Divide many times, bringing deoxygenated, dark red blood from the heart

Right lung

Like the left lung has ten bronchopulmonary segments

Superior lobe

Contains three bronchopulmonary segments

Pulmonary veins

Unite to send oxygenated "red" blood to the heart

Horizontal fissure

Between superior and middle lobes of right lung

Terminal bronchioles

Tiny bronchioles - about 30,000 in each lung; the next-to-last divisions of the segmental bronchi, each branching into two or more respiratory bronchioles that lead to alveoli

Pleural membranes

Two membranes that cover each lung; visceral pleura wraps directly around the lung; parietal pleura lines the chest cavity; pleurae separated by a very thin layer of lubricating pleural fluid, allowing them to slide easily within the chest cavity during breathing

Tertiary (segmental) bronchus

One of ten smaller airways, each of which aerates a bronchopulmonary segment

Base

Upcurved diaphragmatic surface, with diaphragm breathing muscles below

Cardiac notch

Space taken up by the heart

Inferior lobe

Oblique fissure

Inferior lobe

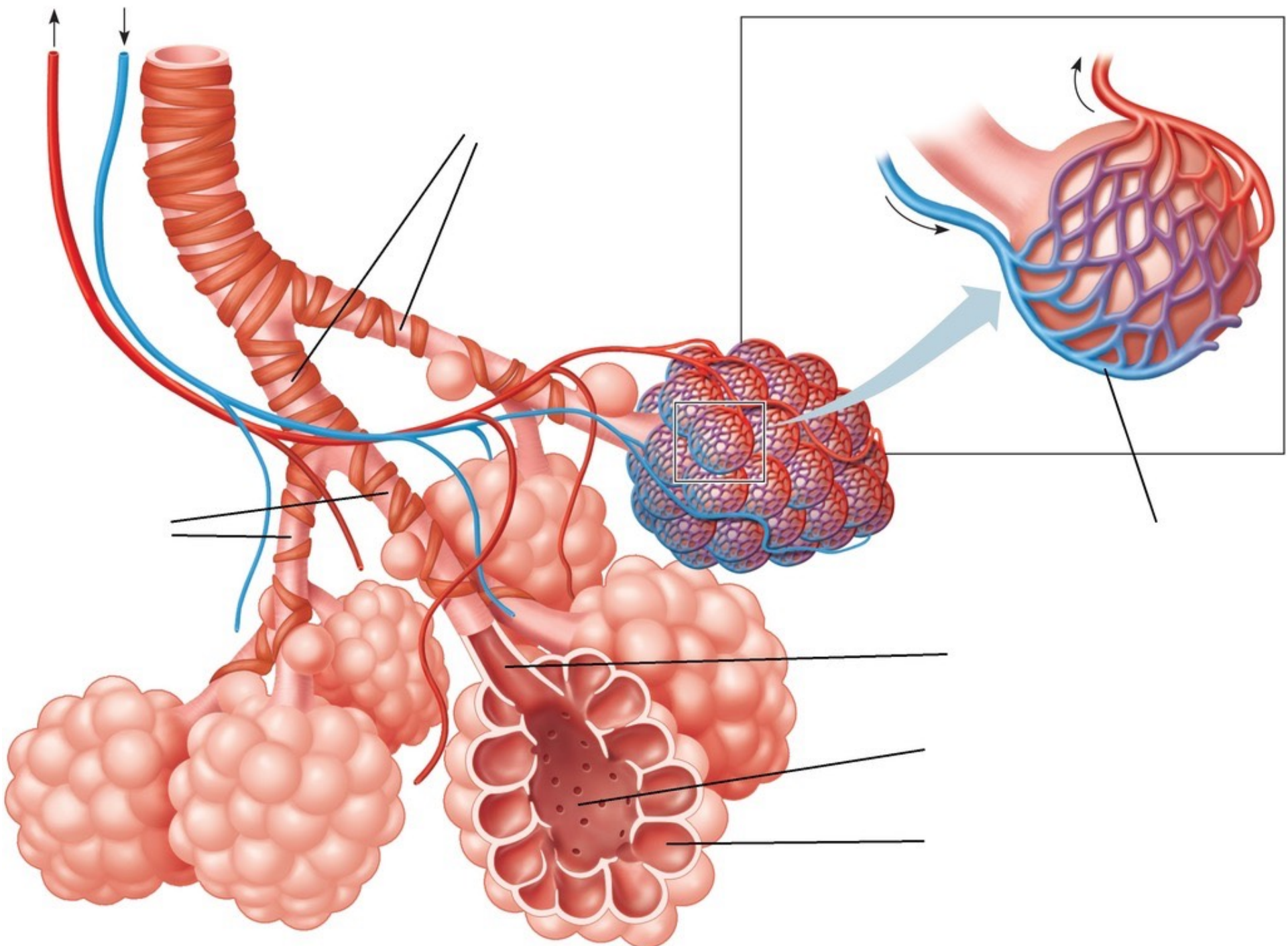
Contains five bronchopulmonary segments

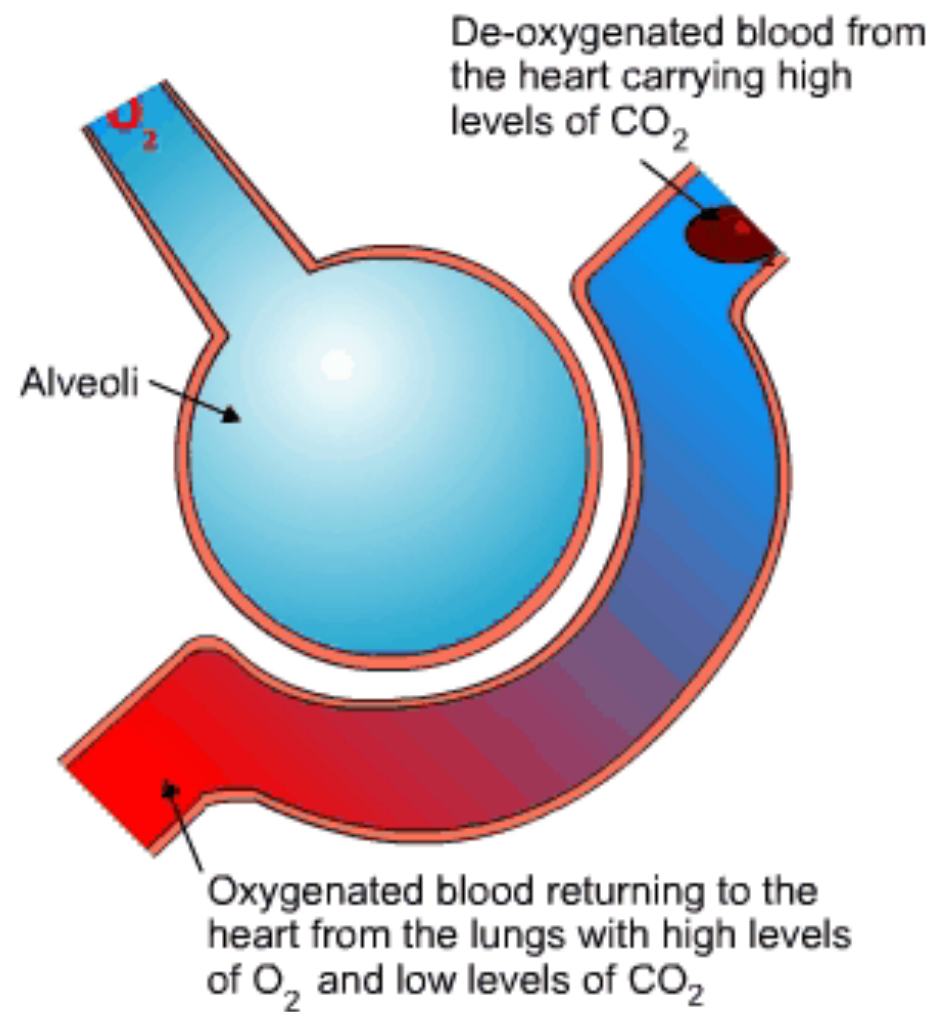
Oblique fissure

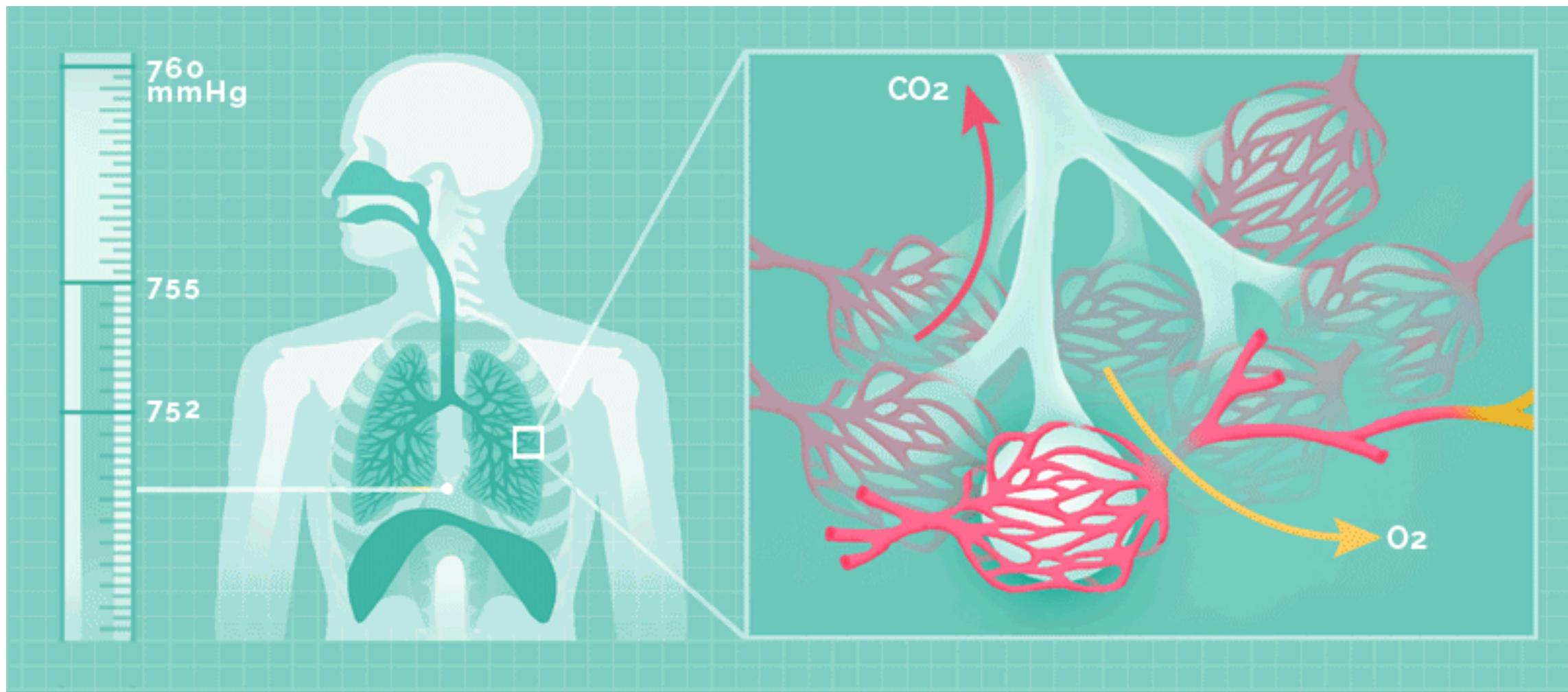
Between middle and inferior lobes of the right lung

Middle lobe

Contains two bronchopulmonary segments







Terminology

- **Asphyxia:** death from oxygen failing to reach tissues
- **Suffocation:** failure of oxygen to reach the blood
- **Strangulation:** occlusion of blood vessels or airway
- **Chemical asphyxia:** inhaled compounds inhibit oxygen delivery at the cellular level

Asphyxia

Suffocation

Entrapment / Environment

Smothering

Choking

Mechanical

Positional, Traumatic, Riot-Crush

Mechanical / Smothering

Gases

CO₂, CH₄, N₂

Strangulation

Hanging

Ligature

Manual

Chokeholds

Chemical

Cyanide, CO, H₂S

Asphyxia

Suffocation

Entrapment / Environment

Smothering

Choking

Mechanical

Positional, Traumatic, Riot-Crush

Mechanical / Smothering

Gases

CO₂, CH₄, N₂

Strangulation

Hanging

Ligature

Manual

Chokeholds

Chemical

Cyanide, CO, H₂S

Suffocation

Entrapment / Environmental

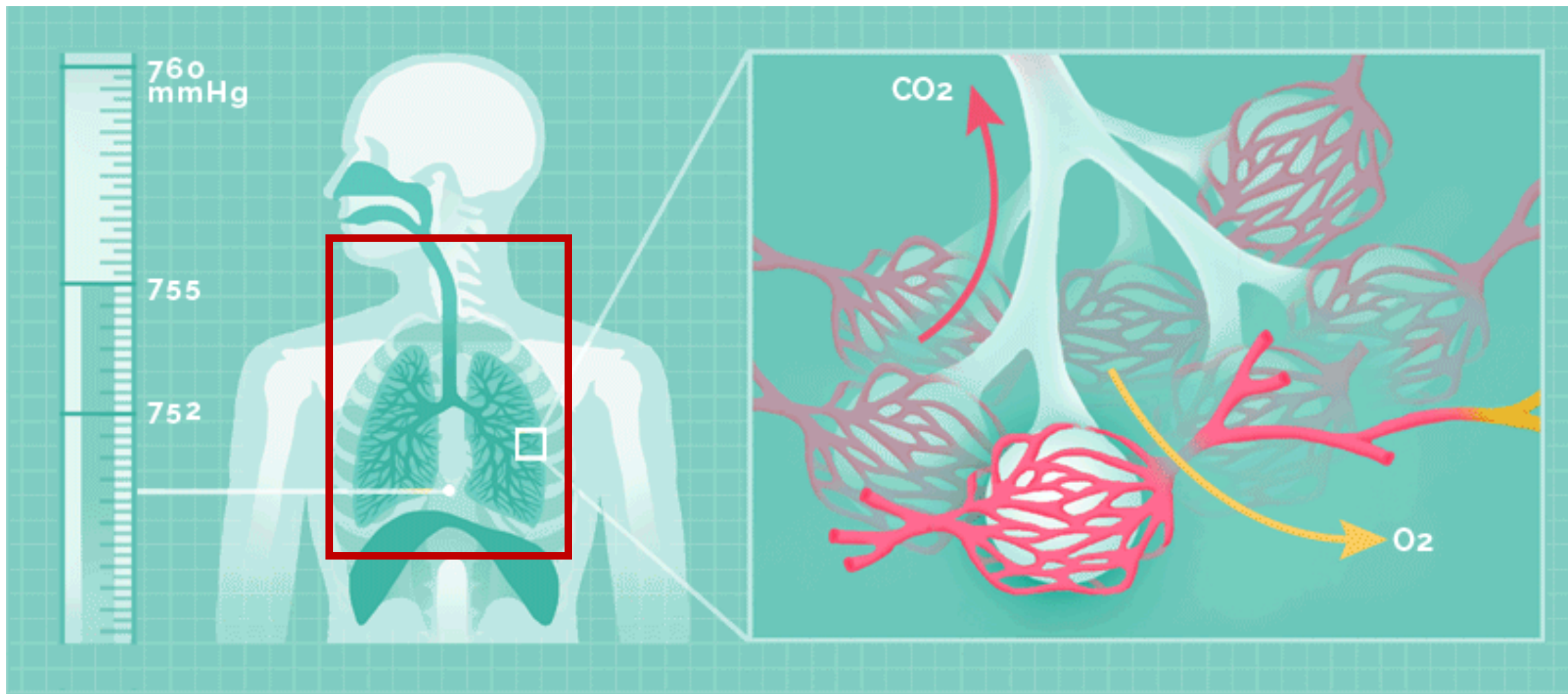




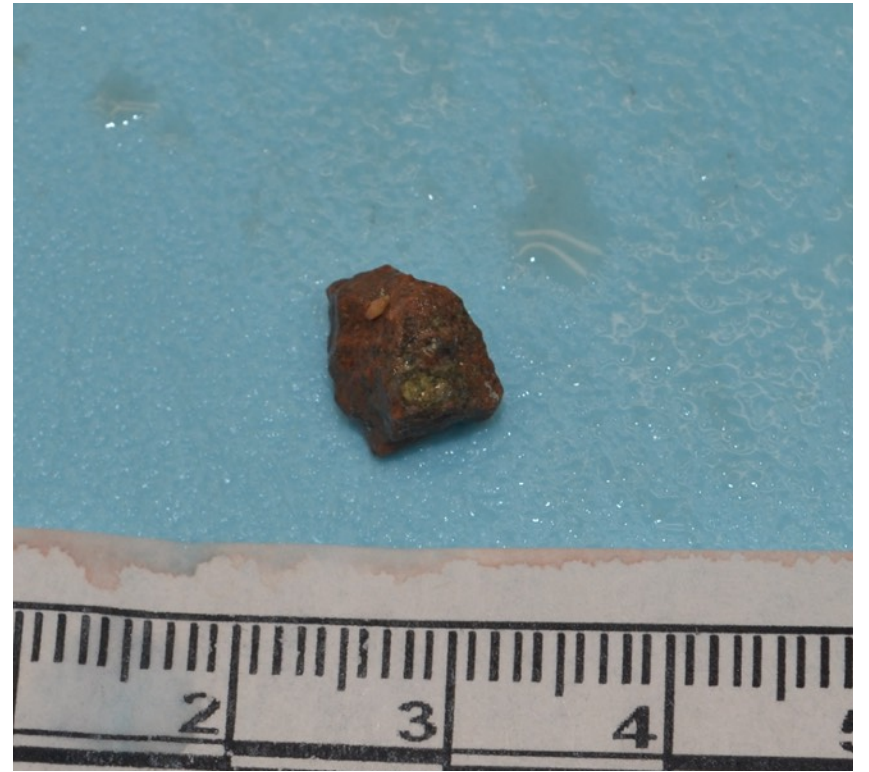


Suffocation

Choking





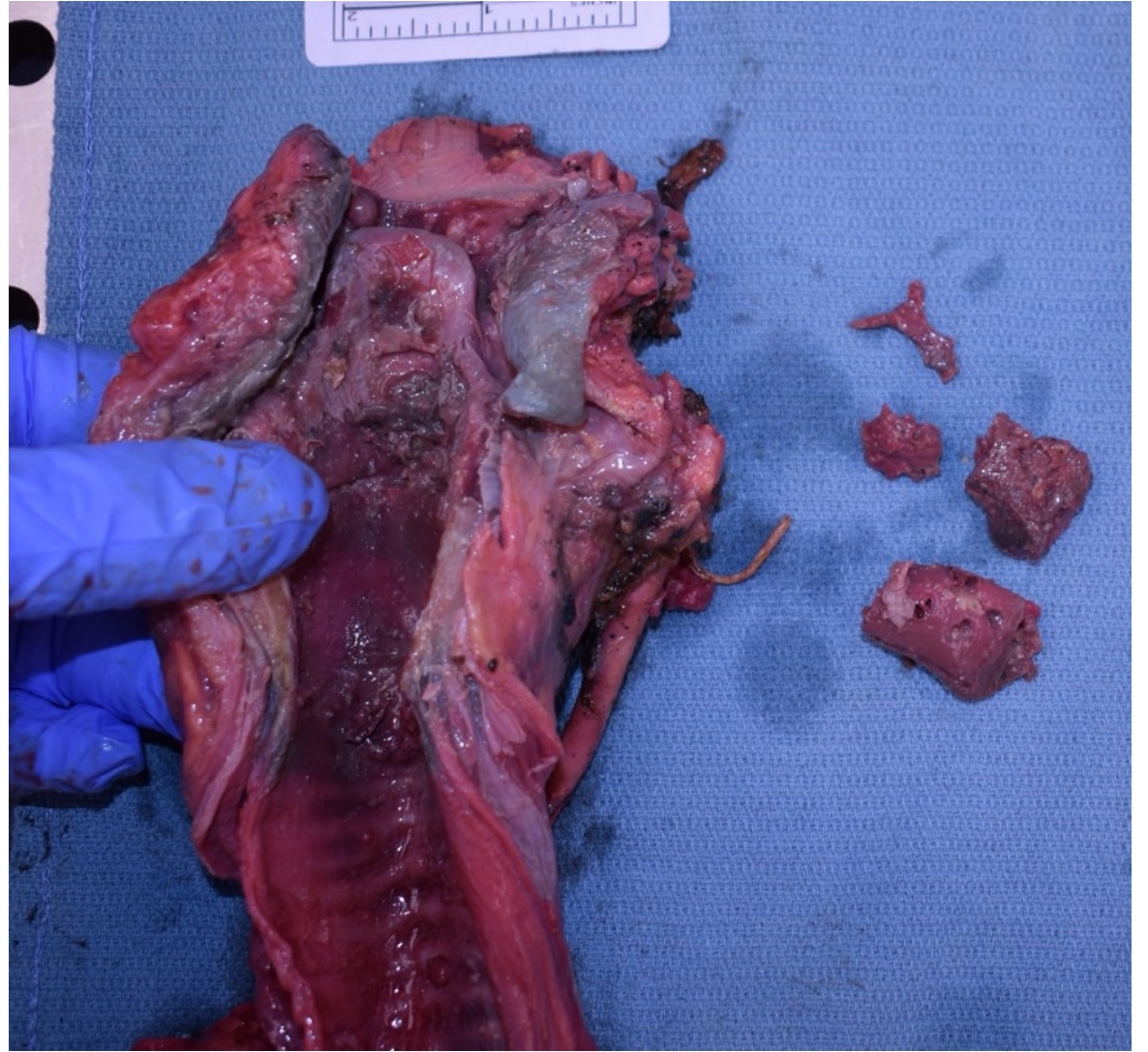
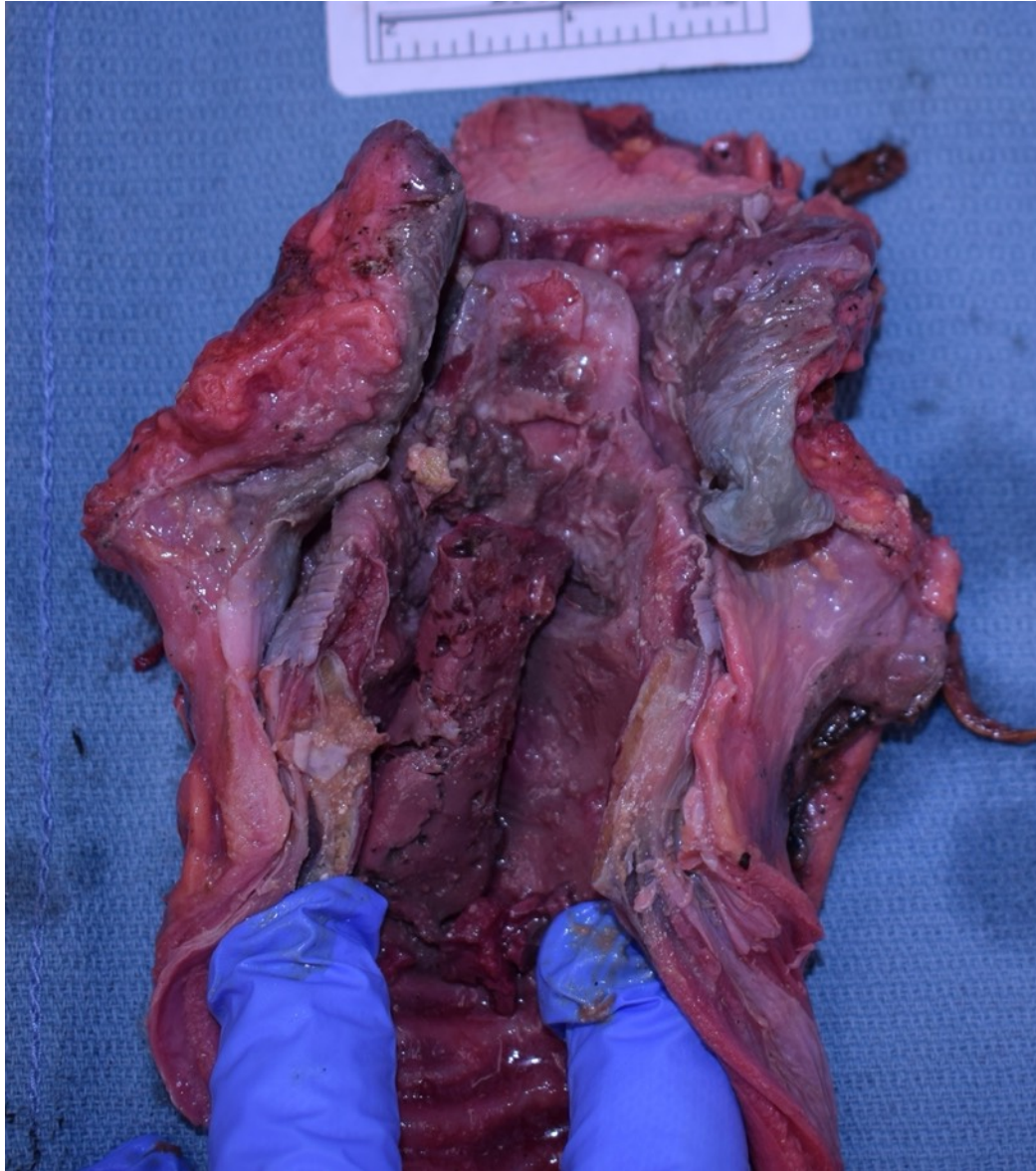












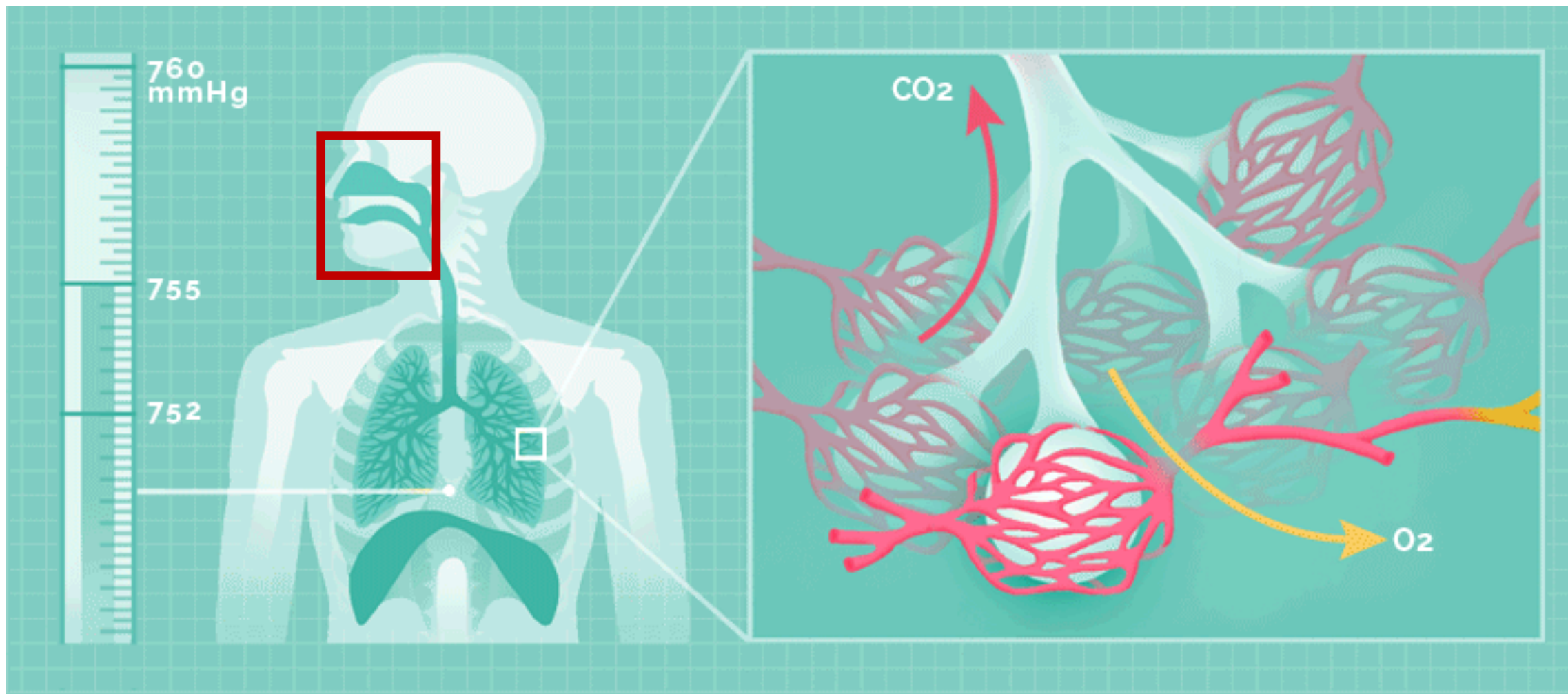
Suffocation

Mechanical

Suffocation

Mechanical

Positional











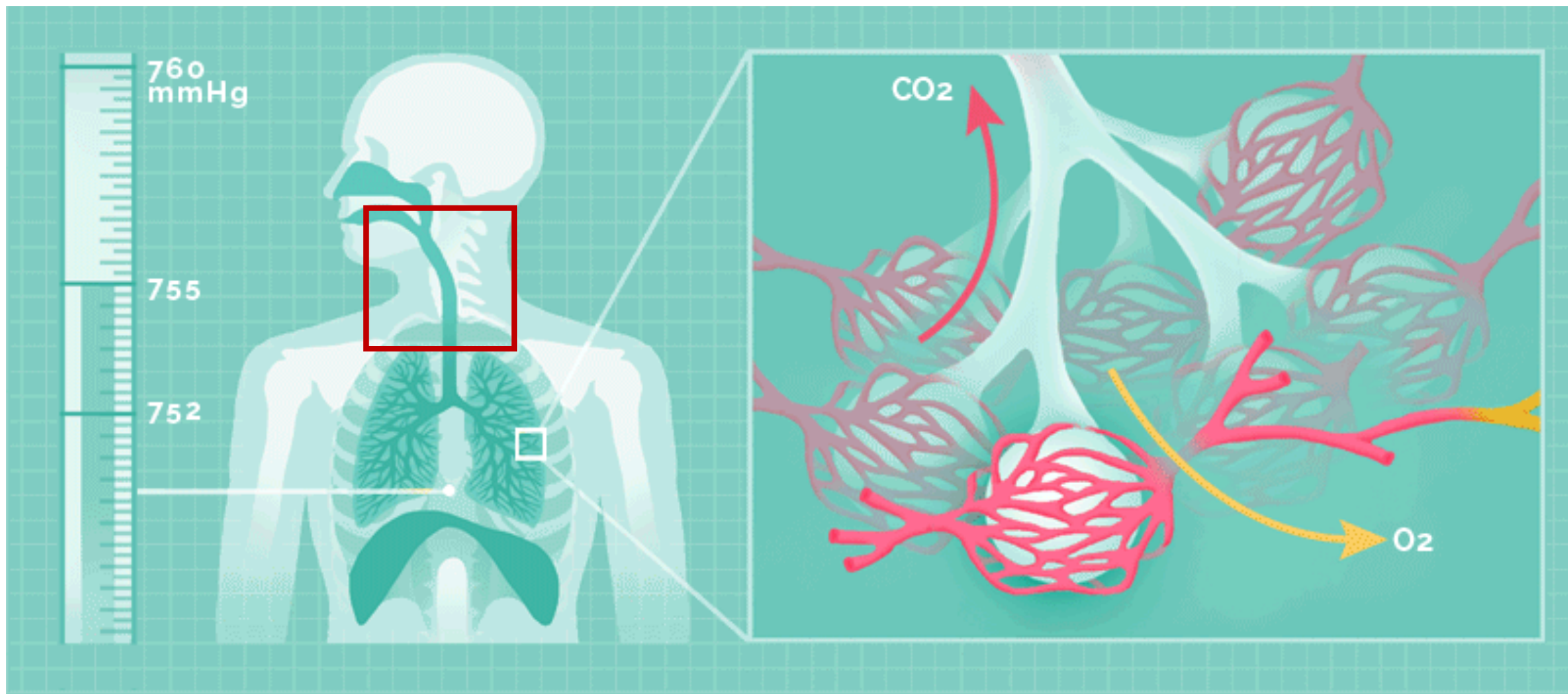




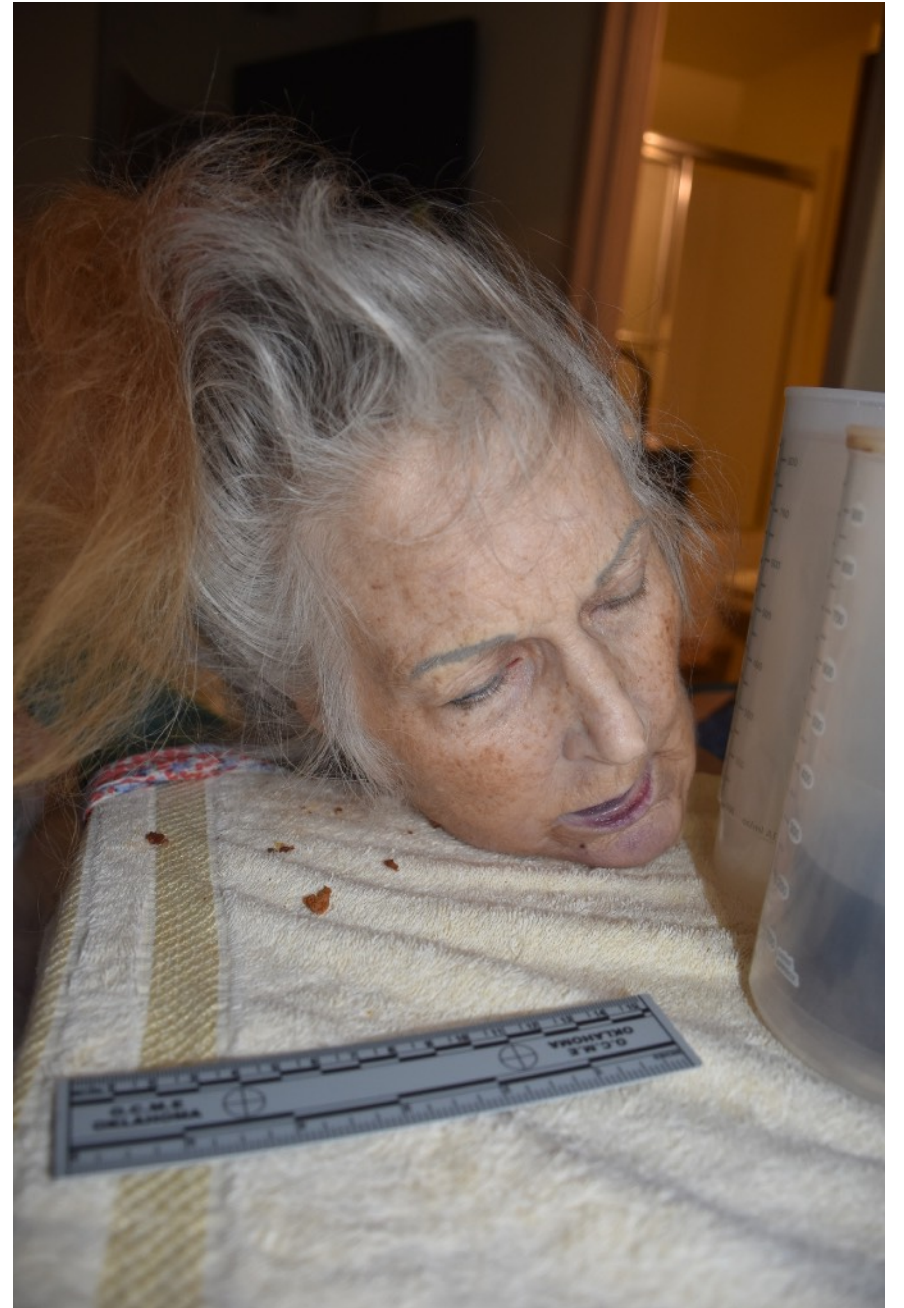










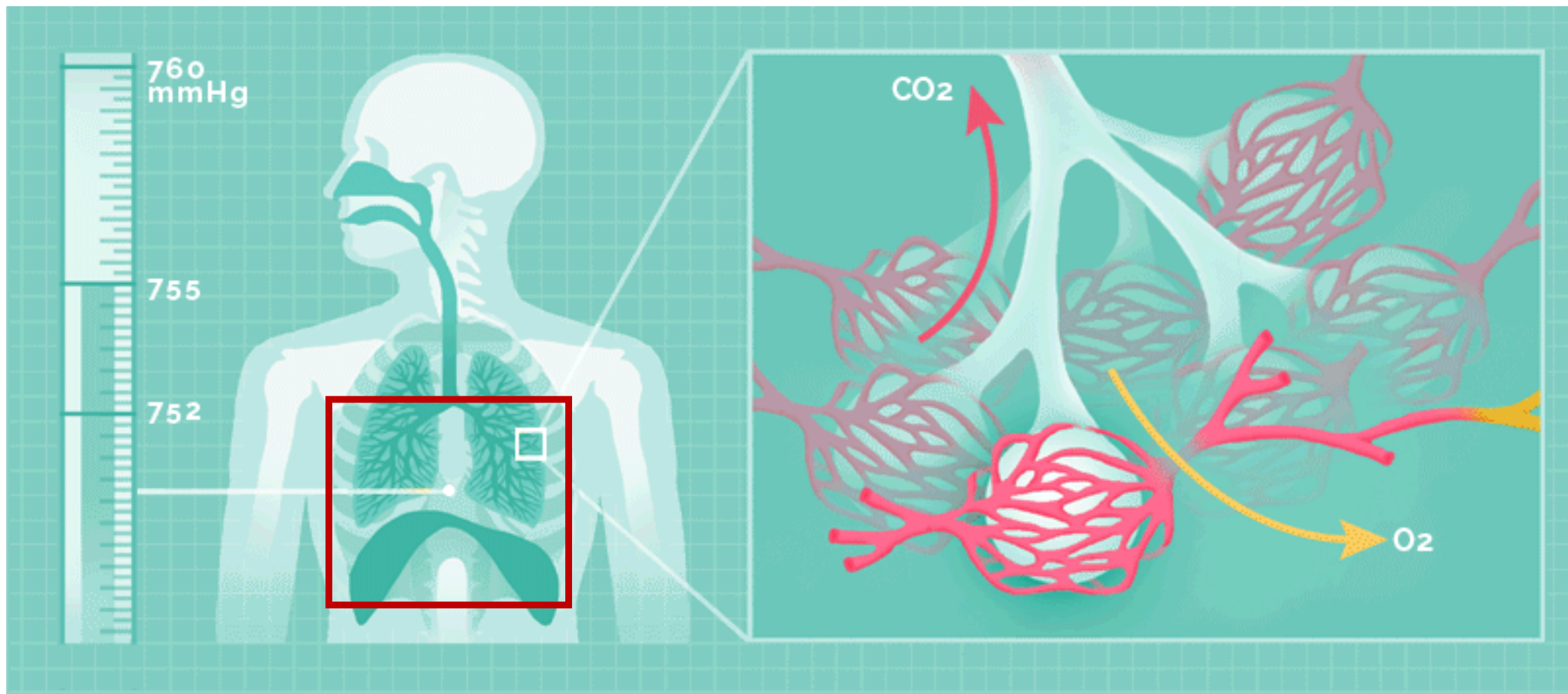




Suffocation

Mechanical

Traumatic











Suffocation

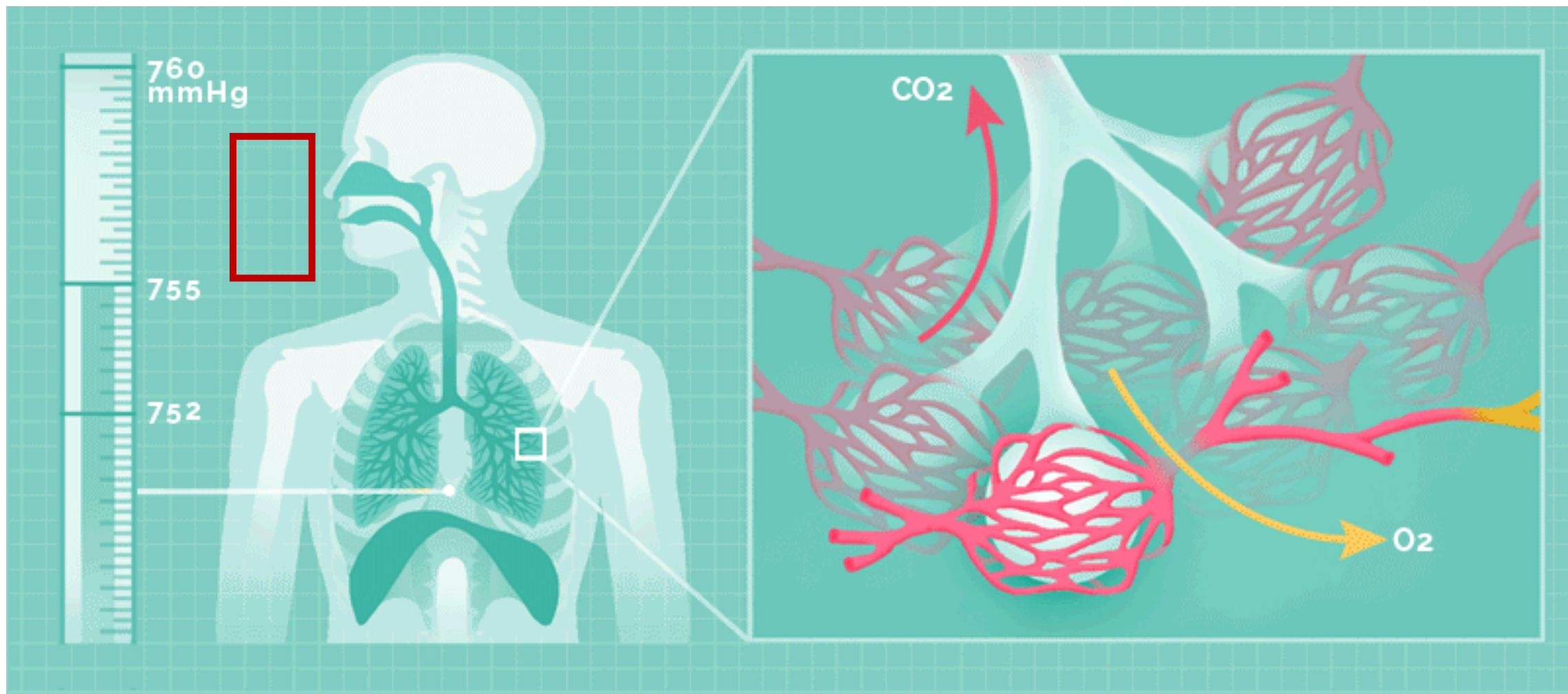
Mechanical

Riot-Crush



Suffocation

Smothering







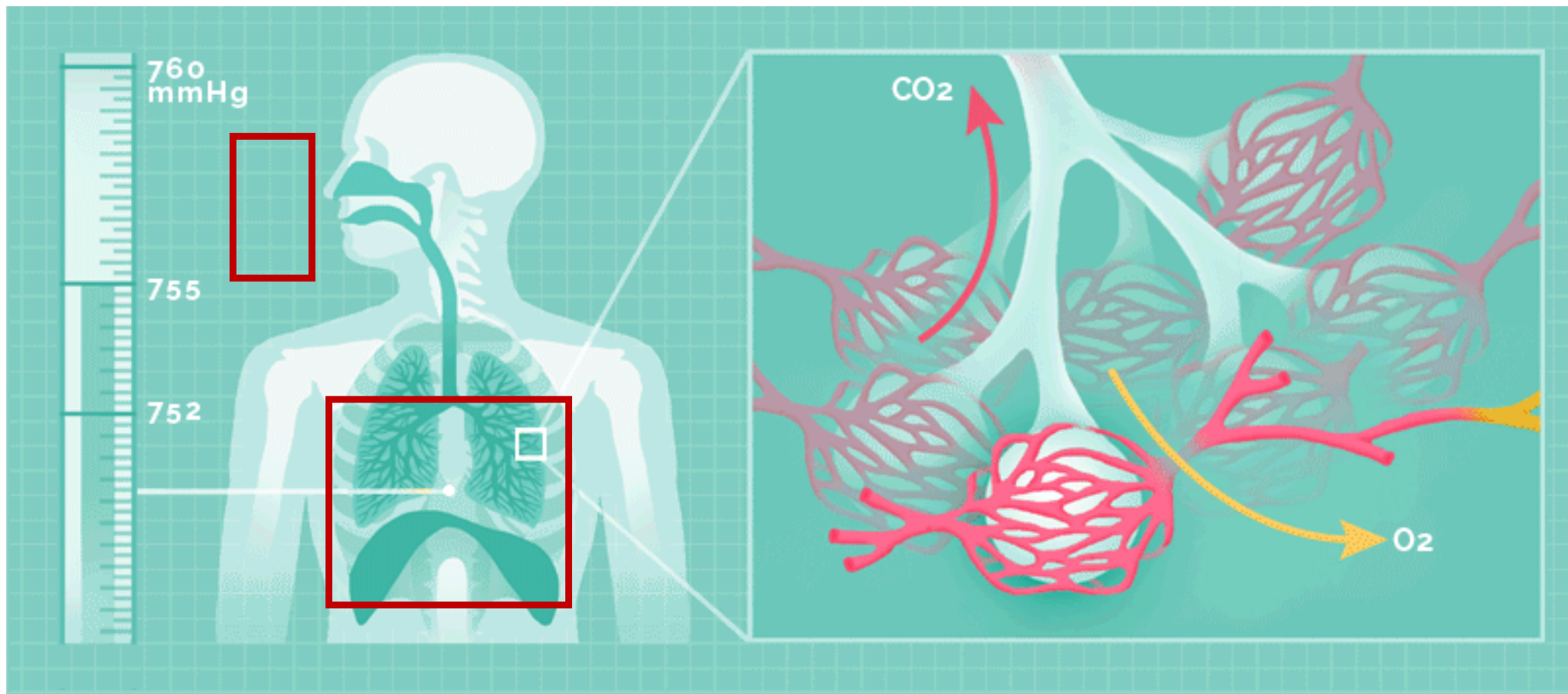




Suffocation

Mechanical / Smothering

“Burking”

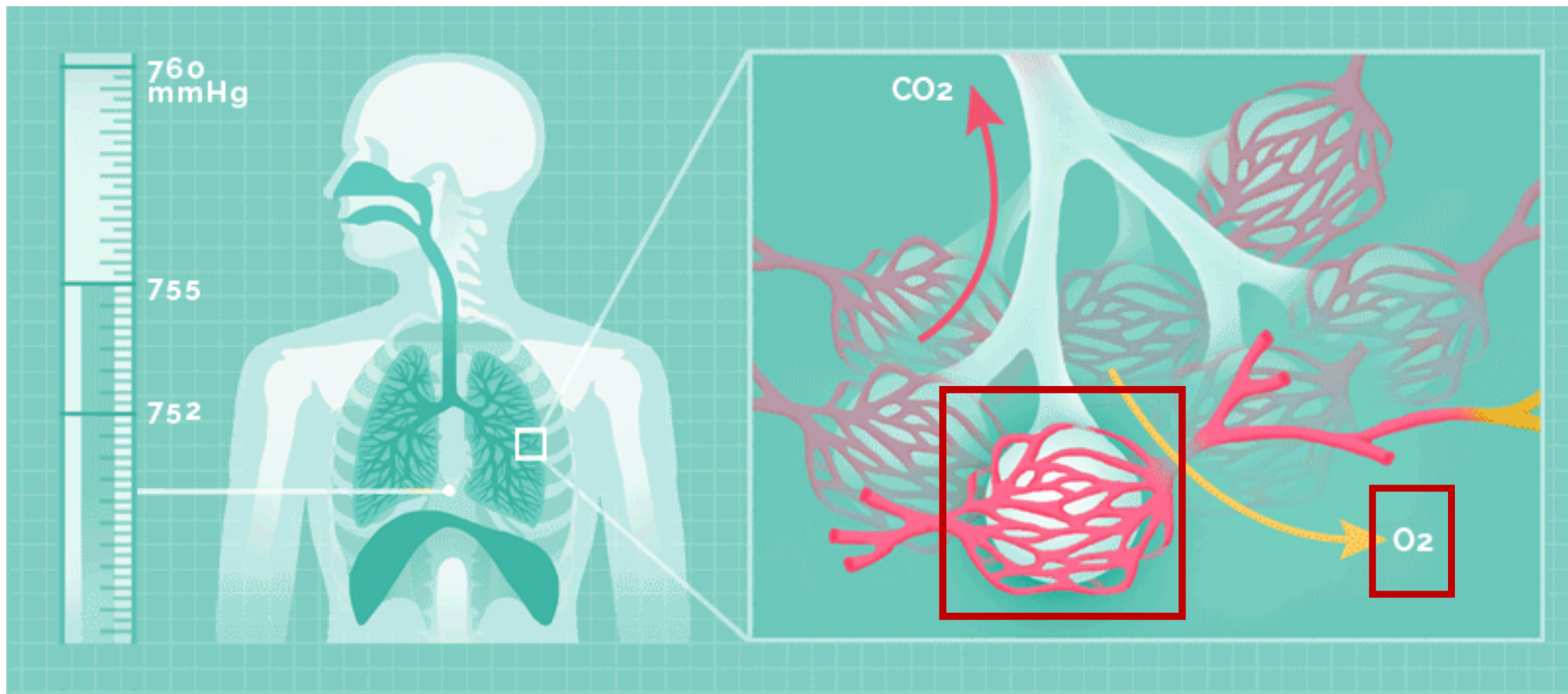




Suffocation

Gases

Helium, CO₂, Hydrocarbons









Asphyxia

Suffocation

Entrapment / Environment

Smothering

Choking

Mechanical

Positional, Traumatic, Riot-Crush

Mechanical / Smothering

Gases

CO₂, CH₄, N₂

Strangulation

Hanging

Ligature

Manual

Chokeholds

Chemical

Cyanide, CO, H₂S

Strangulation

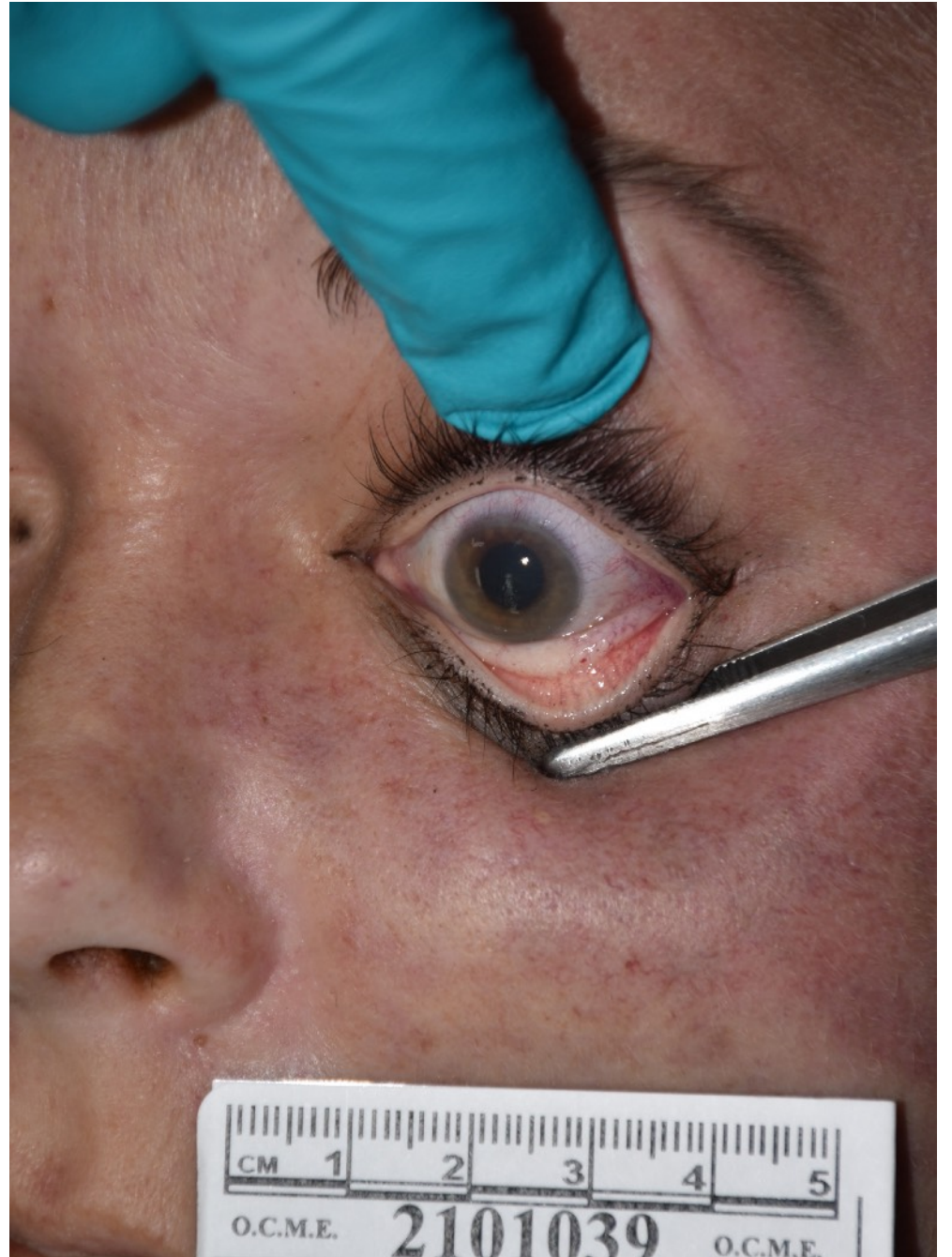
Hanging



















Strangulation

Ligature

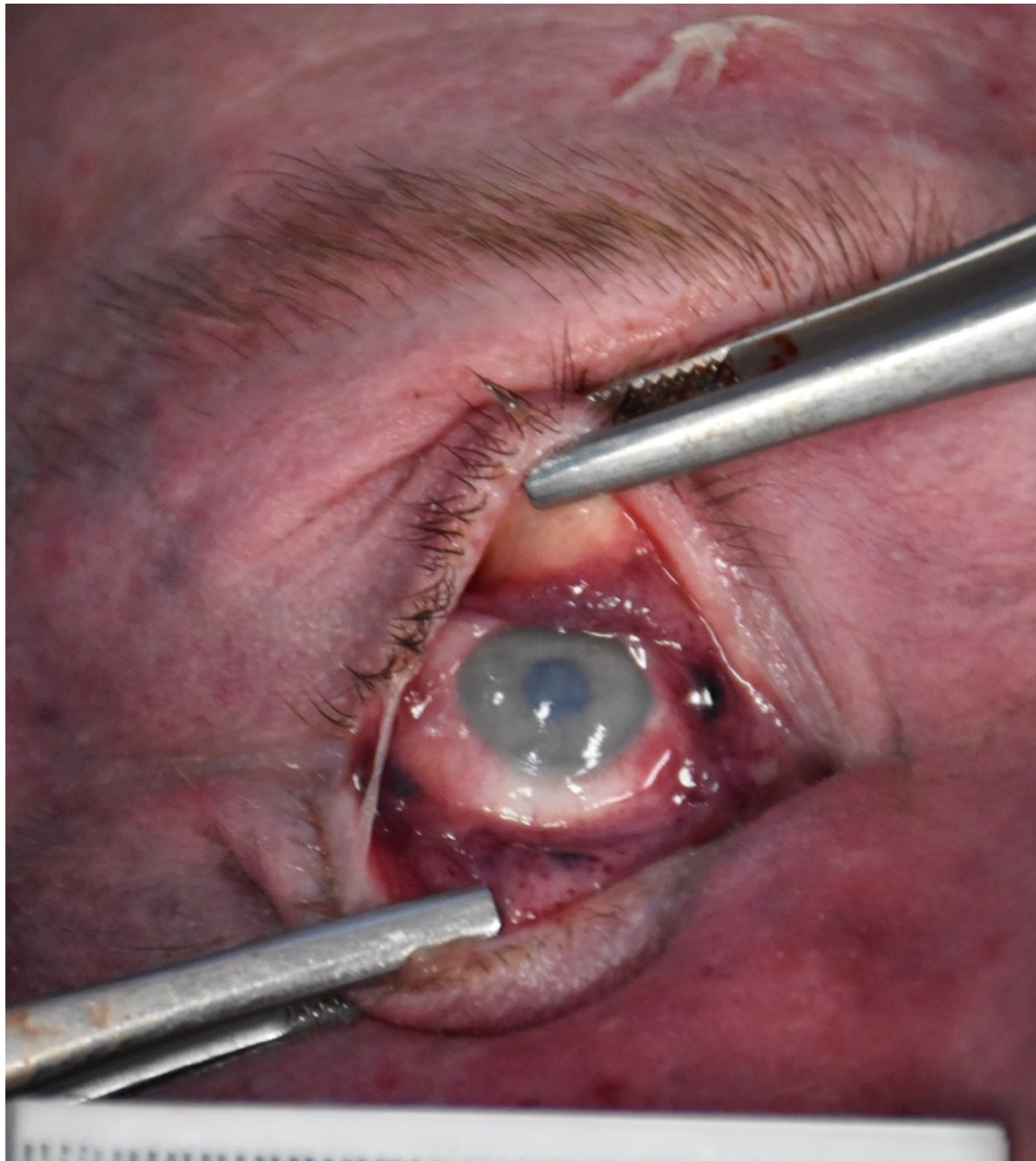


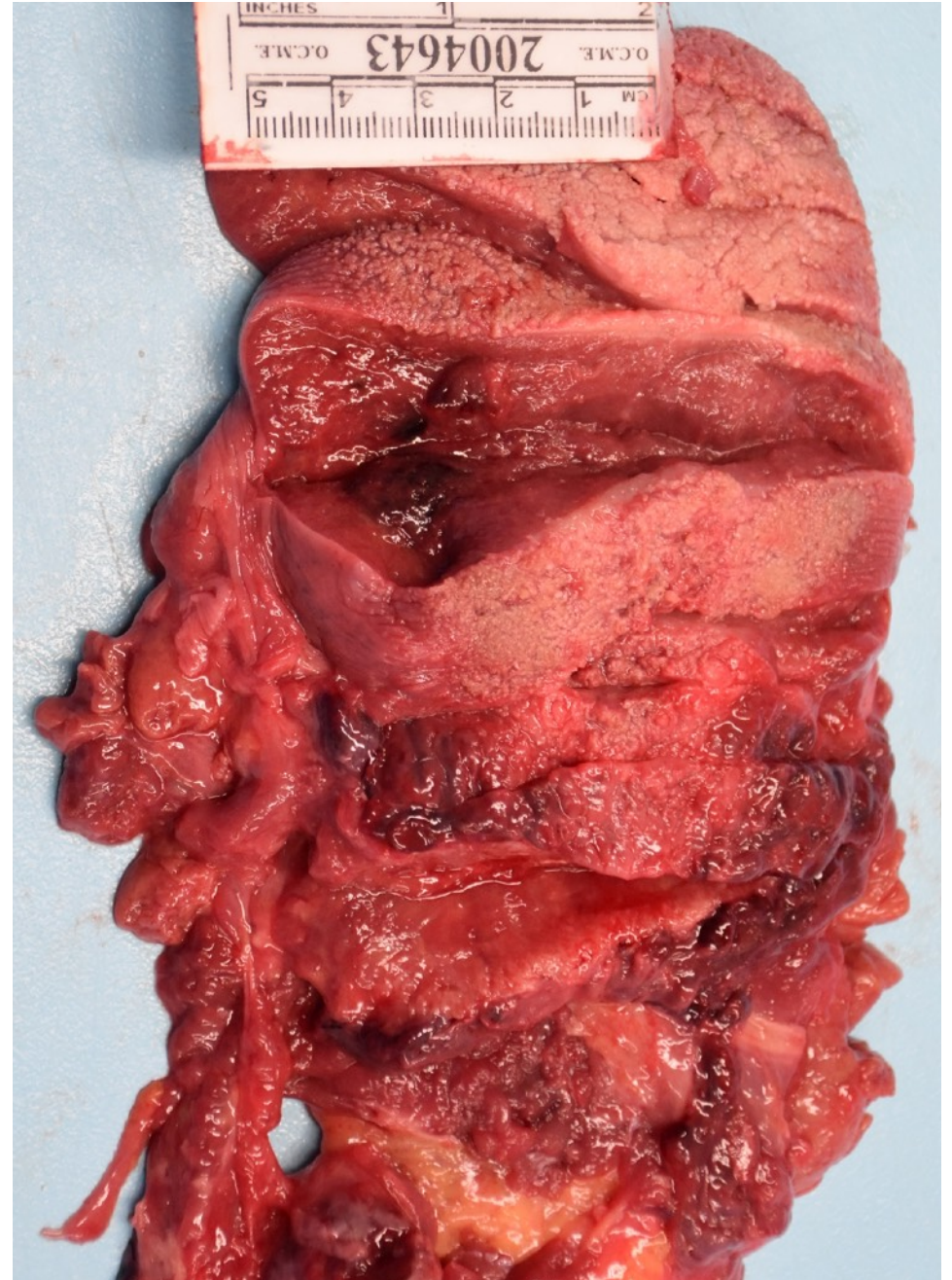










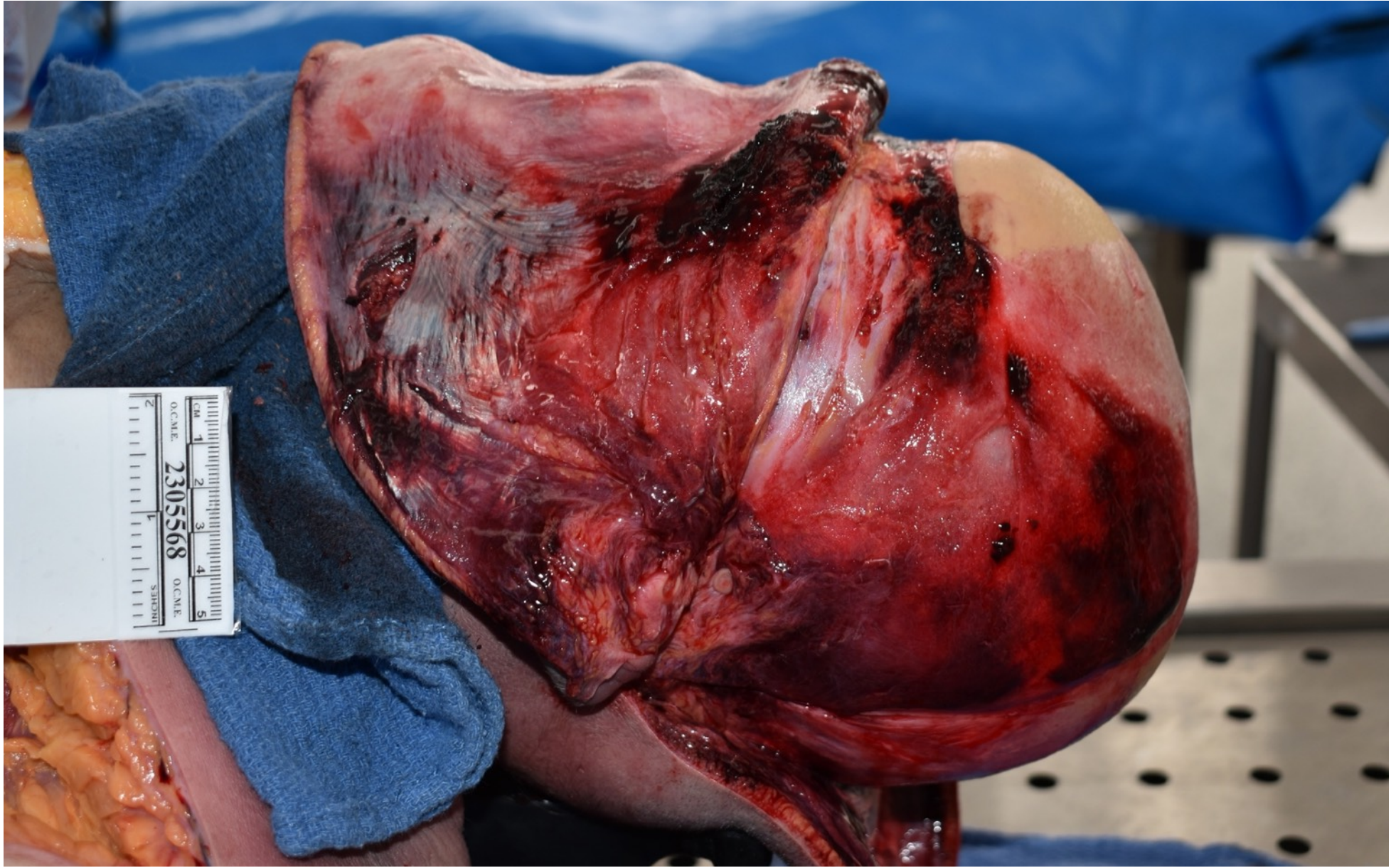


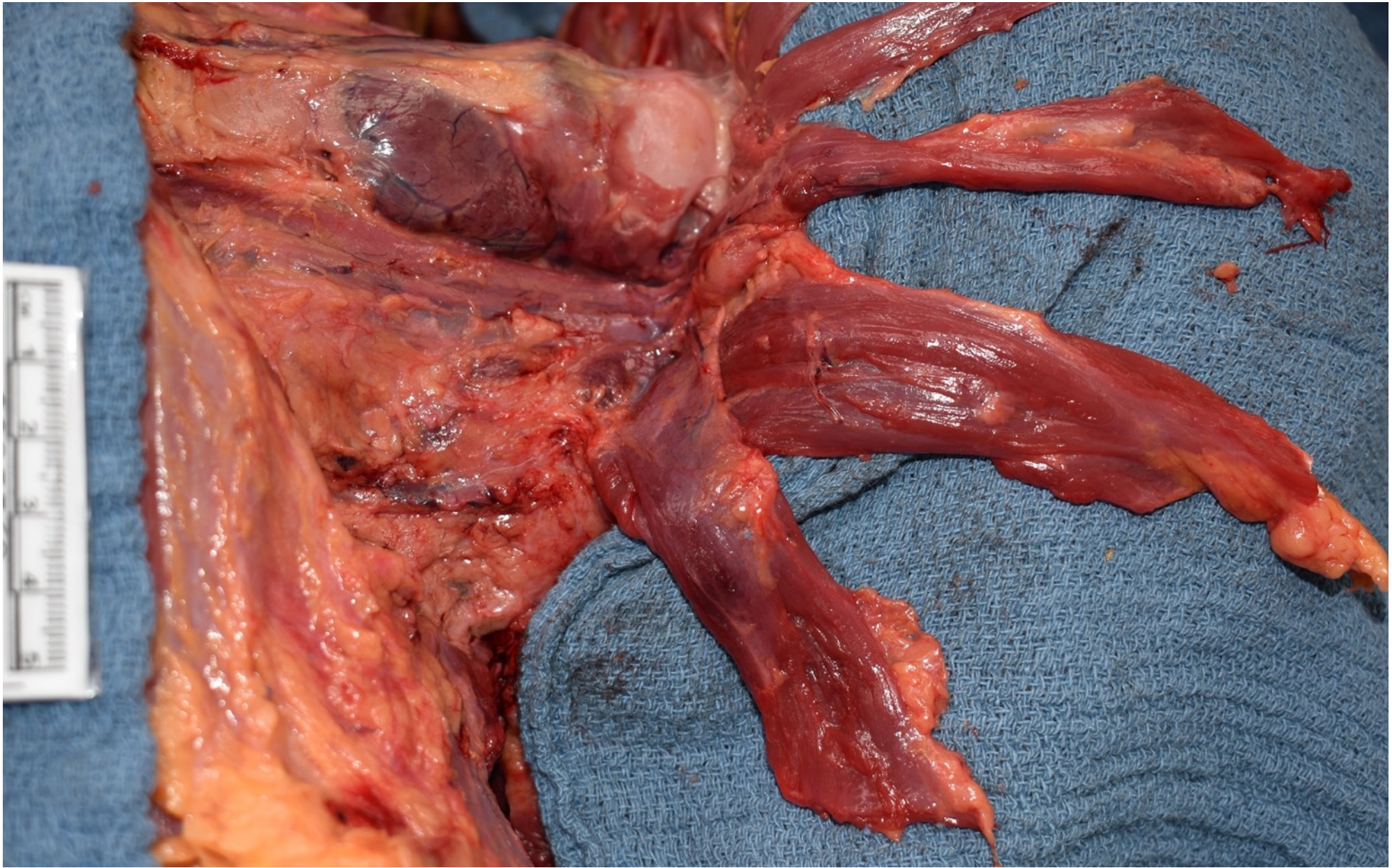
Strangulation

Manual

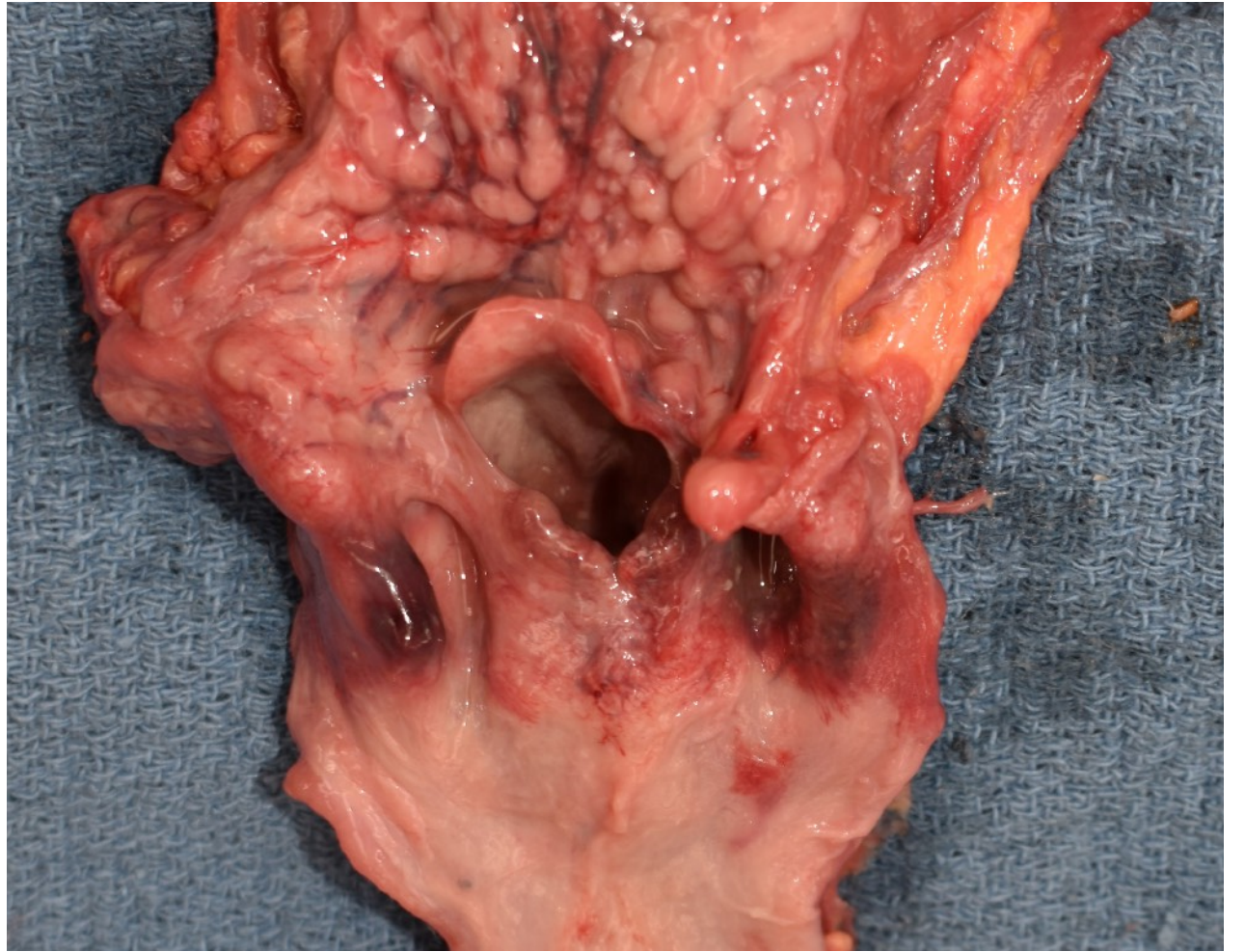
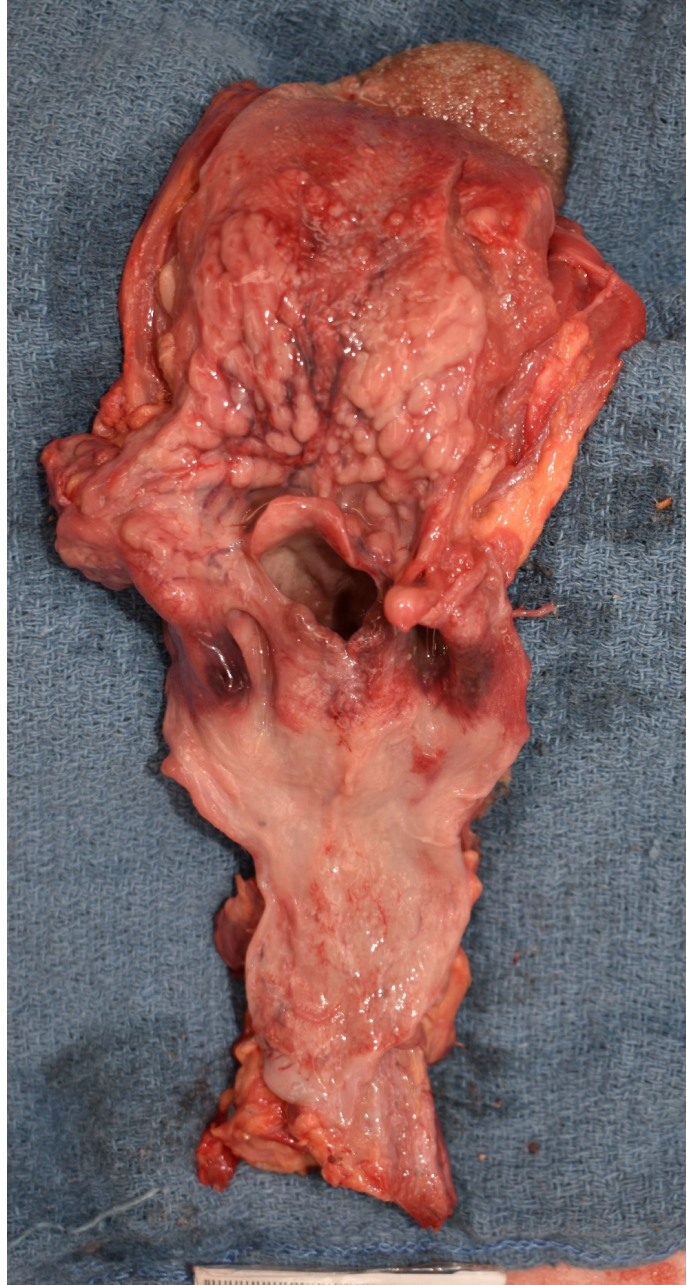








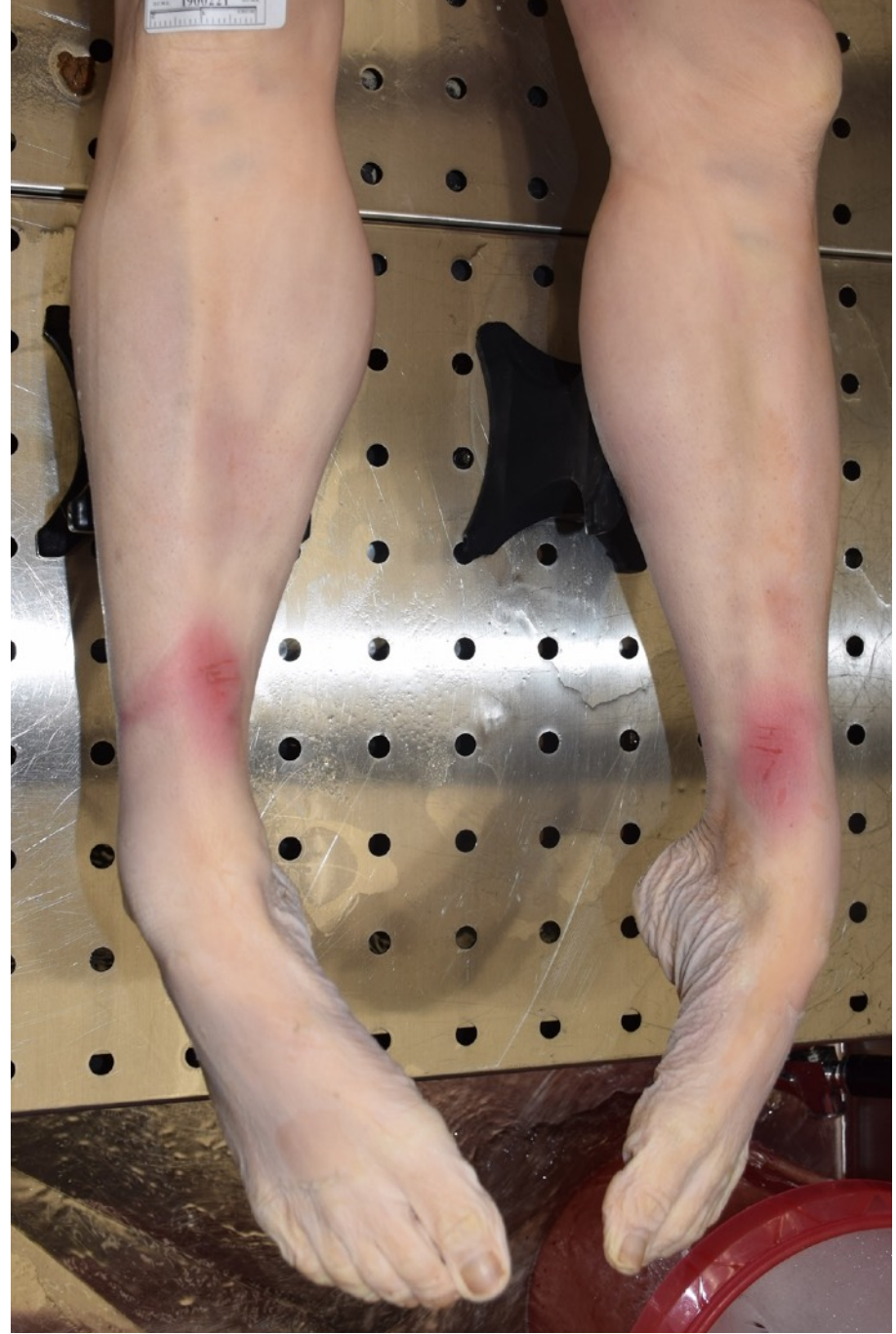




Strangulation

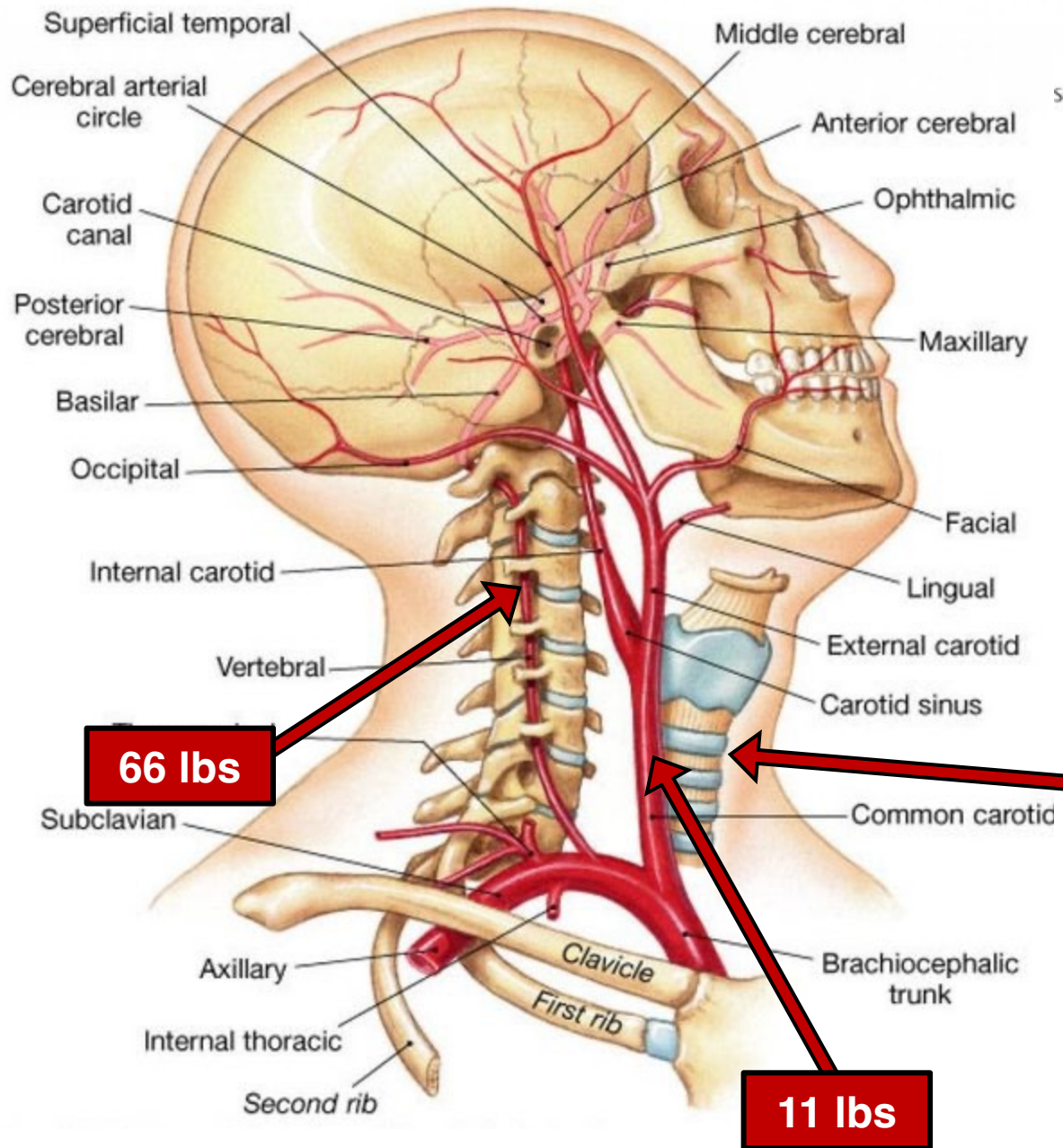
Chokeholds







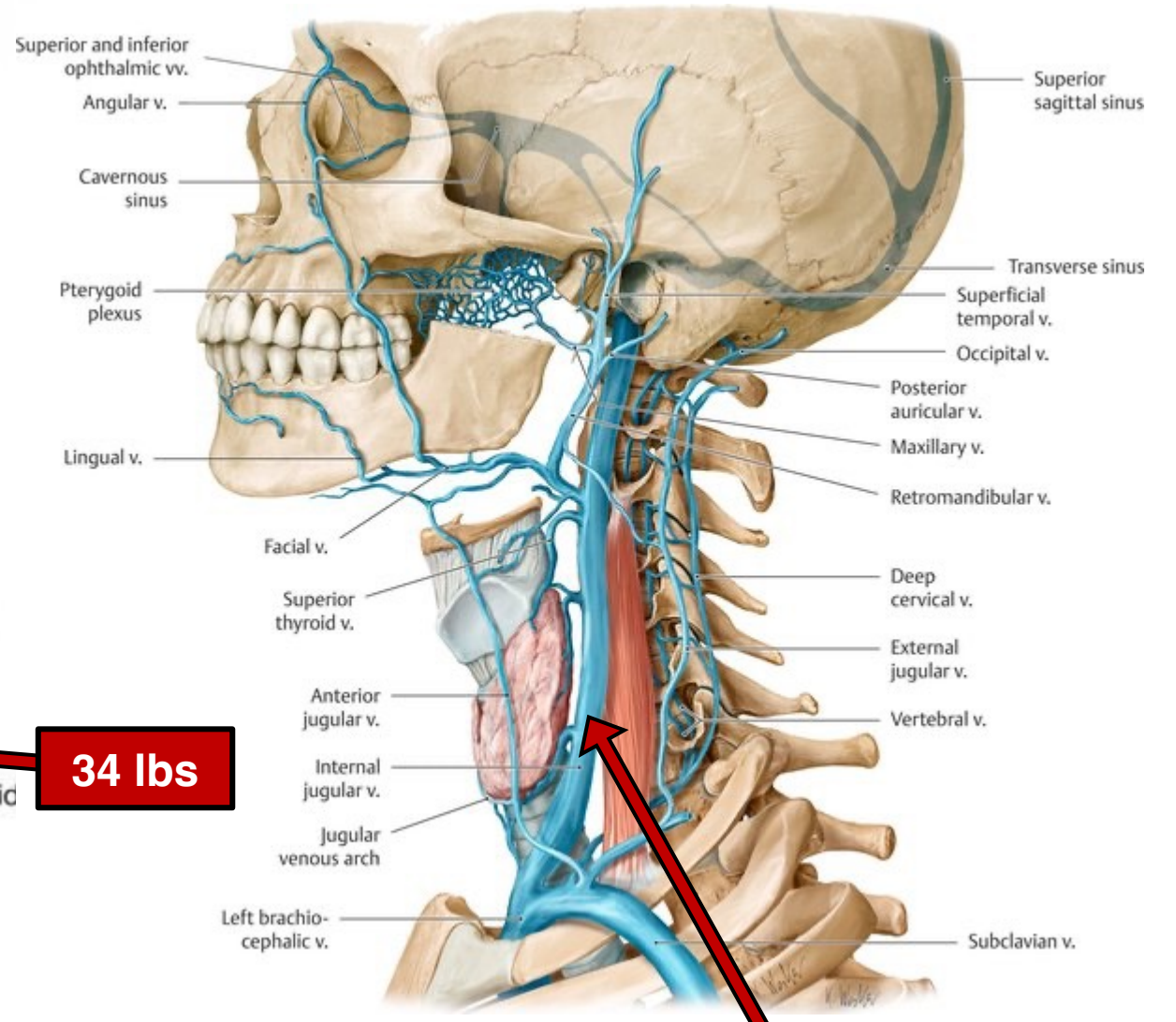




66 lbs

34 lbs

11 lbs



4.4 lbs

Asphyxia

Suffocation

Entrapment / Environment

Smothering

Choking

Mechanical

Positional, Traumatic, Riot-Crush

Mechanical / Smothering

Gases

CO₂, CH₄, N₂

Strangulation

Hanging

Ligature

Manual

Chokeholds

Chemical

Cyanide, CO, H₂S

Chemical Asphyxia

Carbon Monoxide

Hydrogen Sulfide

Cyanide

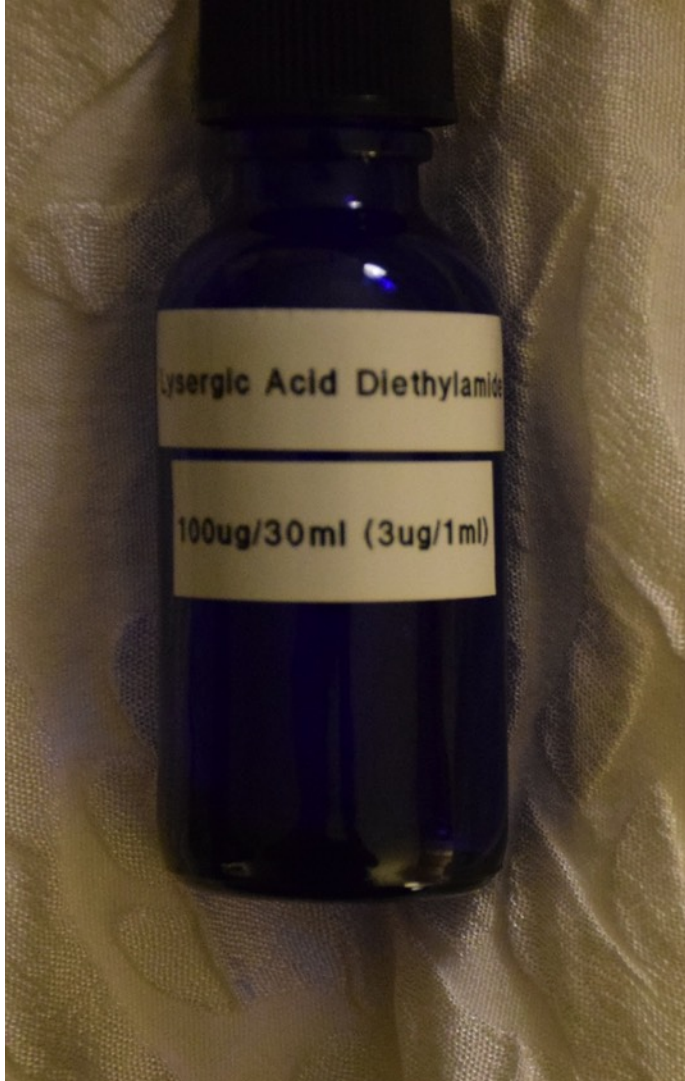
Nitrate / Nitrite

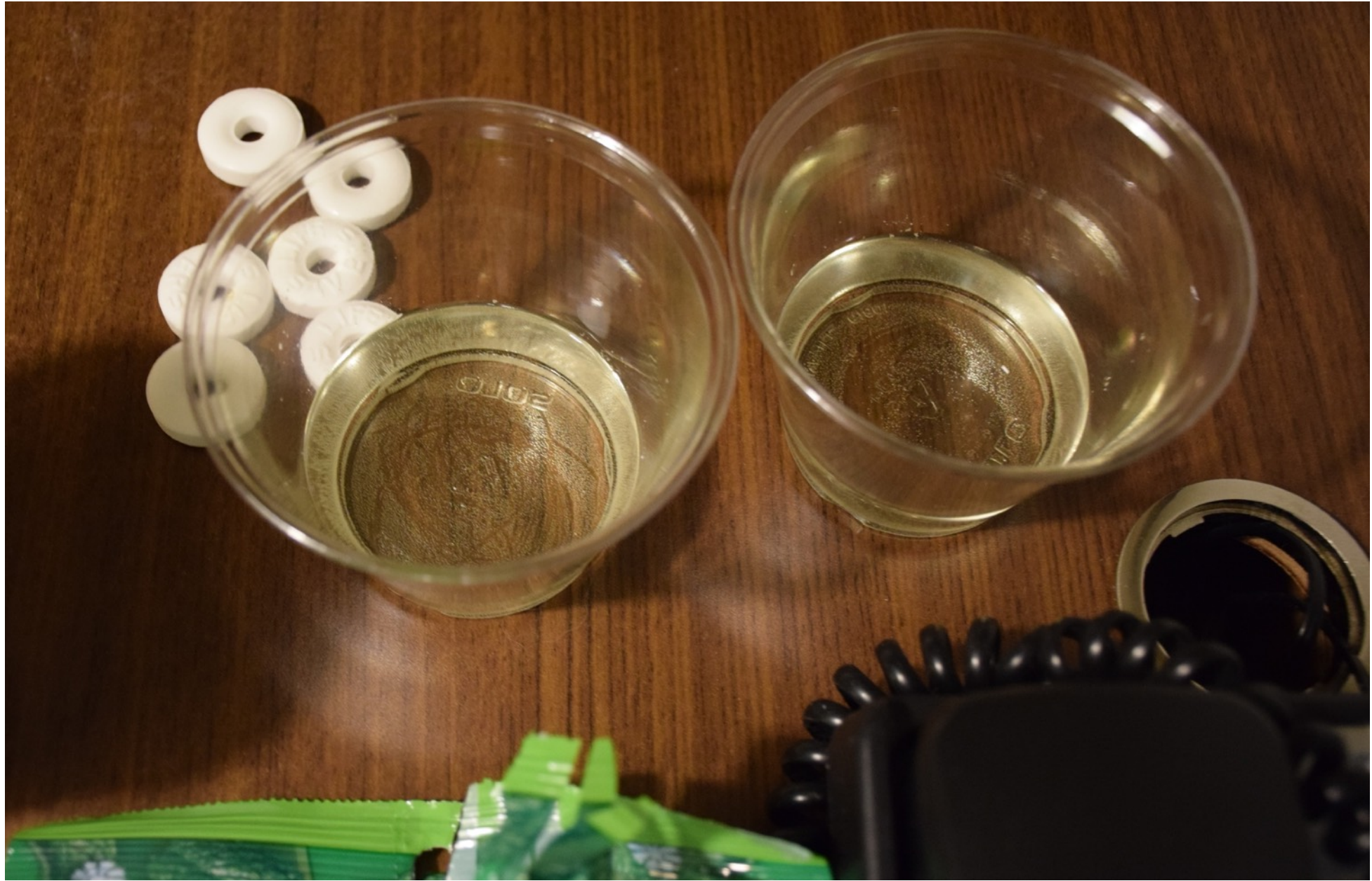












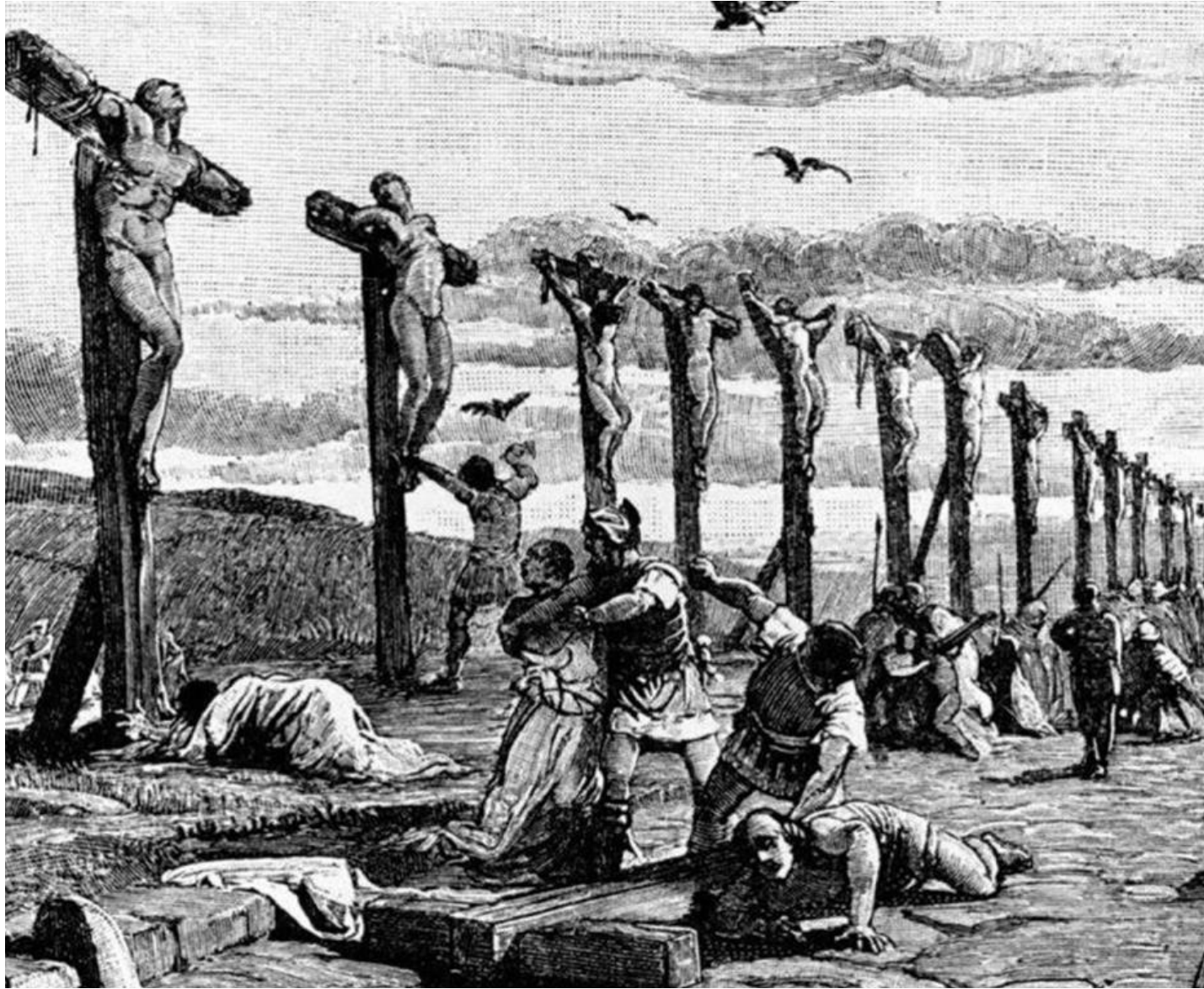
Special Topics

Upside-Down Suspension



Special Topics

Crucifixion









Special Topics

Space





Factors above 100km altitude

- **Space exposure:** Exposure, without protection, beyond the limits of the Earth's atmosphere
- Mortal factors (descending order) :
 - Ebullism
 - Decompression Sickness
 - Hypoxia
 - Hypocapnia
 - Extreme temperature fluctuation
 - High velocity penetrating microparticles
 - High-energy photons and sub-atomic particles

Special Topics

Nature









References

- Autoerotic Deaths - Practical Forensic and Investigative Perspectives (2013)
- DiMaio's Forensic Pathology (3rd edition)
- Knight's Forensic Pathology (4th edition)
- Rosai and Ackerman's Surgical Pathology (11th edition)