



# THE ANATOMY OF THE “KNOCK-OUT”

WHAT'S THE HECK IS  
REALLY GOING ON?

# 2022 ABC CONVENTION

## July 23 - July 28, 2022

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**BOARD CERTIFIED (ABIM) – INTERNAL MEDICINE**

Co-Chair – ABC Medical Committee

**Chief Ringside Physician:**

- ▶ Mohegan Sun Athletic Commission;
- ▶ Mashantucket Pequot Athletic Commission;
- ▶ State of Connecticut Athletic Division

# THE ANATOMY OF THE “KNOCK-OUT

- ▶ What happens to these fighters?
- ▶ What causes them to be so injured that they cannot continue with the contest?
- ▶ Why do ringside physicians stop a fight?
- ▶ When should the referee or commission step in?
- ▶ Fighters are not just “Throwing in the Towel”
- ▶ **Knockouts and stoppages can be confusing.**

# THE ANATOMY OF THE “KNOCK-OUT

- ▶ Concussions
- ▶ Liver shots
- ▶ Solar Plexus
- ▶ Bleeding
- ▶ Chokes
- ▶ Cuts
- ▶ Other

# THE ANATOMY OF THE “KNOCK-OUT”



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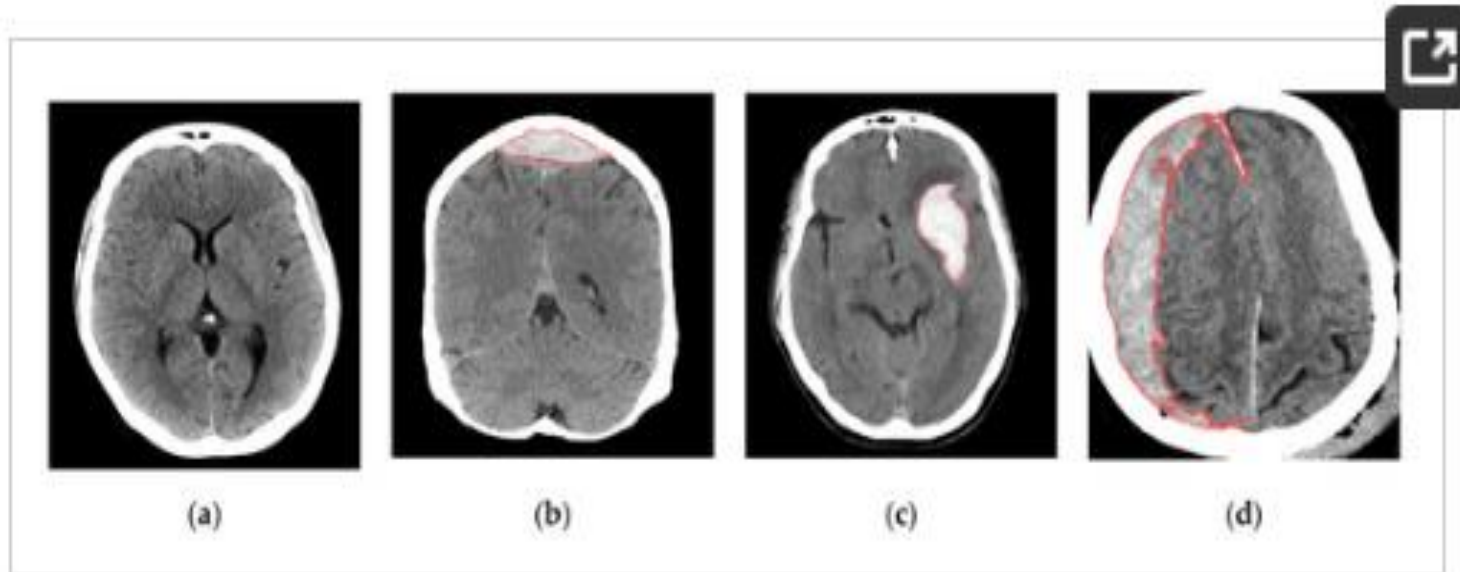
# Simiso Buthelezi Death

- ▶ **South African fighter Simiso Buthelezi died after a bout in South Africa**
- ▶ Buthelezi fought in a 10-round World Boxing Federation All Africa lightweight fight against compatriot Siphesihle Mntungwa on Sunday, but the contest was stopped by the referee when he appeared to fight an invisible opponent.
- ▶ He was rushed to hospital after the referee stopped the fight.
- ▶ Doctors fear he may have gone into the fight with an injury already present, as he was comfortably winning the bout and landing the heavier blows before the stoppage.

# BRAIN BLEEDS

- ▶ **Acute subdural hematoma which is the most common acute brain injury in boxing, accounts for 75% of all acute brain injuries and is the leading cause of boxing fatalities.**
- ▶ **Intracranial hemorrhage encompasses four broad types of hemorrhage: epidural hemorrhage, subdural hemorrhage, subarachnoid hemorrhage, and intraparenchymal hemorrhage**
- ▶ **Aneurysm, malformations, previous bleeds, coagulation (clotting) abnormalities.**
- ▶ **Preexisting injury???**
- ▶ **Did the fighter have an MRI prior to the fight?**

# BRAIN BLEEDS



**Figure 1.** (a) Normal brain image is compared with the three types of hemorrhage: (b) epidural hemorrhage, (c) intraparenchymal hemorrhage, and (d) subdural hemorrhage.



**ALWAYS** watch the gait...  
Balance generally goes first with a  
concussion



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**SHOBOX**  
— THE NEW GENERATION —

**RULES**

**POWELL** vs **BUNDRAGE**

- ★ 10 POINT MUST SYSTEM
- ★ 3 JUDGES SCORE FIGHT
- ★ NO 3 KNOCKDOWN RULE
- ★ NO STANDING 8 COUNT
- ★ CANNOT BE SAVED BY THE BELL
- ★ ONLY THE REFEREE CAN STOP THE FIGHT

**ALWAYS** watch the gait...  
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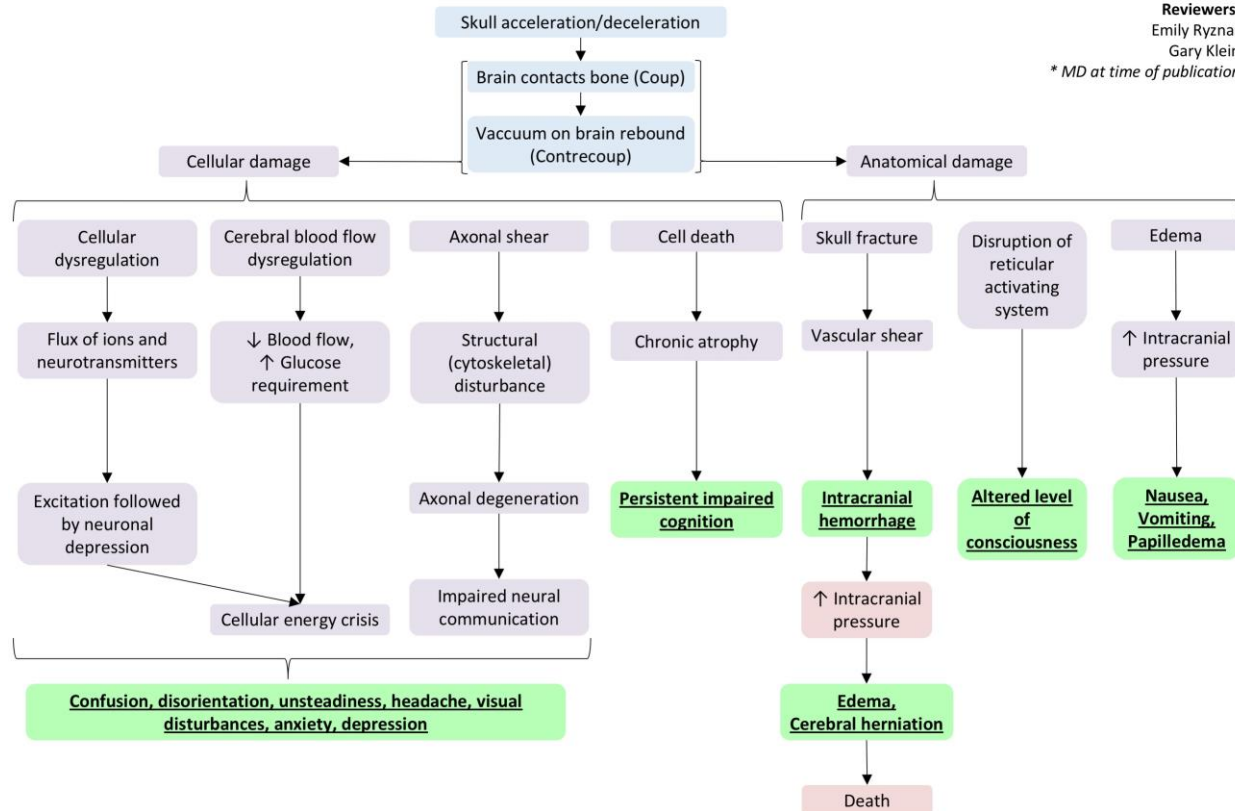




# WHAT HAPPENS DURING A *concussion*?

## Concussion: *Acute pathophysiology and Findings*

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*\* MD at time of publication*



# SIMPLIFIED...

- ▶ **Brain** cells (Neurons) and nerve connections (axons) get hurt.
- ▶ Electrolytes in the Brain cells move in and out.
- ▶ **Potassium ions (K<sup>+</sup>) within the brain cells exit the neurons, while calcium ions (Ca<sup>++</sup>) rush into the cells.**
- ▶ When calcium enters, the blood vessels constrict, resulting in a decreased blood supply to the brain.
- ▶ The brain is not happy.
- ▶ Bad things happen.

# SO...WHAT HAPPENS DURING A CONCUSSION?

- ▶ WHY DOES THE GAIT GO FIRST?
- ▶ WHY DOES COORDINATION PROBLEMS FOLLOW?
- ▶ WHY DOES CONFUSION THEN OCCUR?
- ▶ Cerebellum injuries common - results in ataxia, nystagmus, and dysarthria
- ▶ Loss of balance as the legs are controlled by the Longest nerves (Neuro-networks) away from the brain and are the first affected.
- ▶ Frontal Lobes (Personality, emotional control and cognition) and Temporal Lobes (memory) are very sensitive to head blows.
- ▶ Fighters who suffer concussions often get confused and are unable to recognize the situation.
- ▶ They become belligerent and combative.
- ▶ THESE ARE THE SIGNS TO STOP A FIGHT BEFORE A SERIOUS INJURY OCCURS!!!

# THE LIVER SHOT





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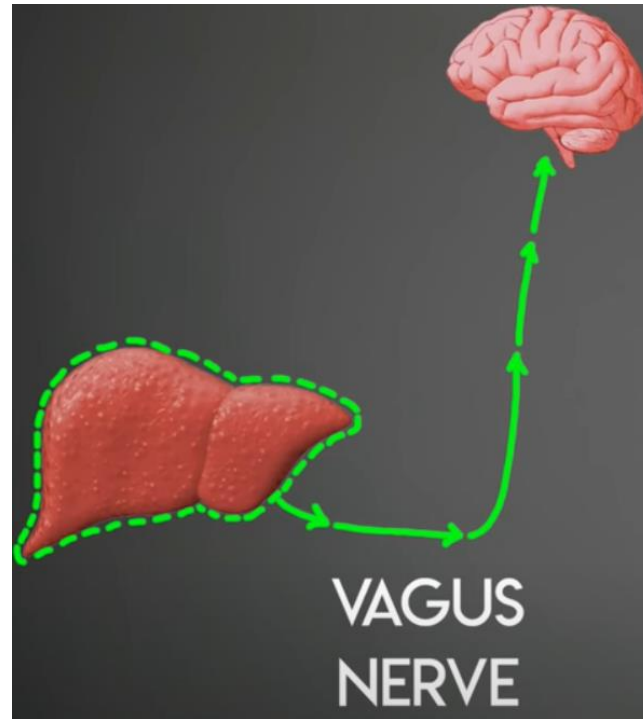
# THE LIVER SHOT



# THE LIVER SHOT

- ▶ When someone throws a strong liver shot, the vagus nerve is activated along with the parasympathetic nervous system. The body goes into a physiological shutdown, prompting blood pressure and heart rate to decrease, lightheadedness, dizziness, and nausea — terrible symptoms to experience.
- ▶ Often people describe it feeling like your legs are paralyzed and it can cause you to pass out.
- ▶ It is extremely painful and debilitating
- ▶ **NOTE THE DELAYED REACTION WHILE THE NERVES ARE REACTING TO THE PUNCH**

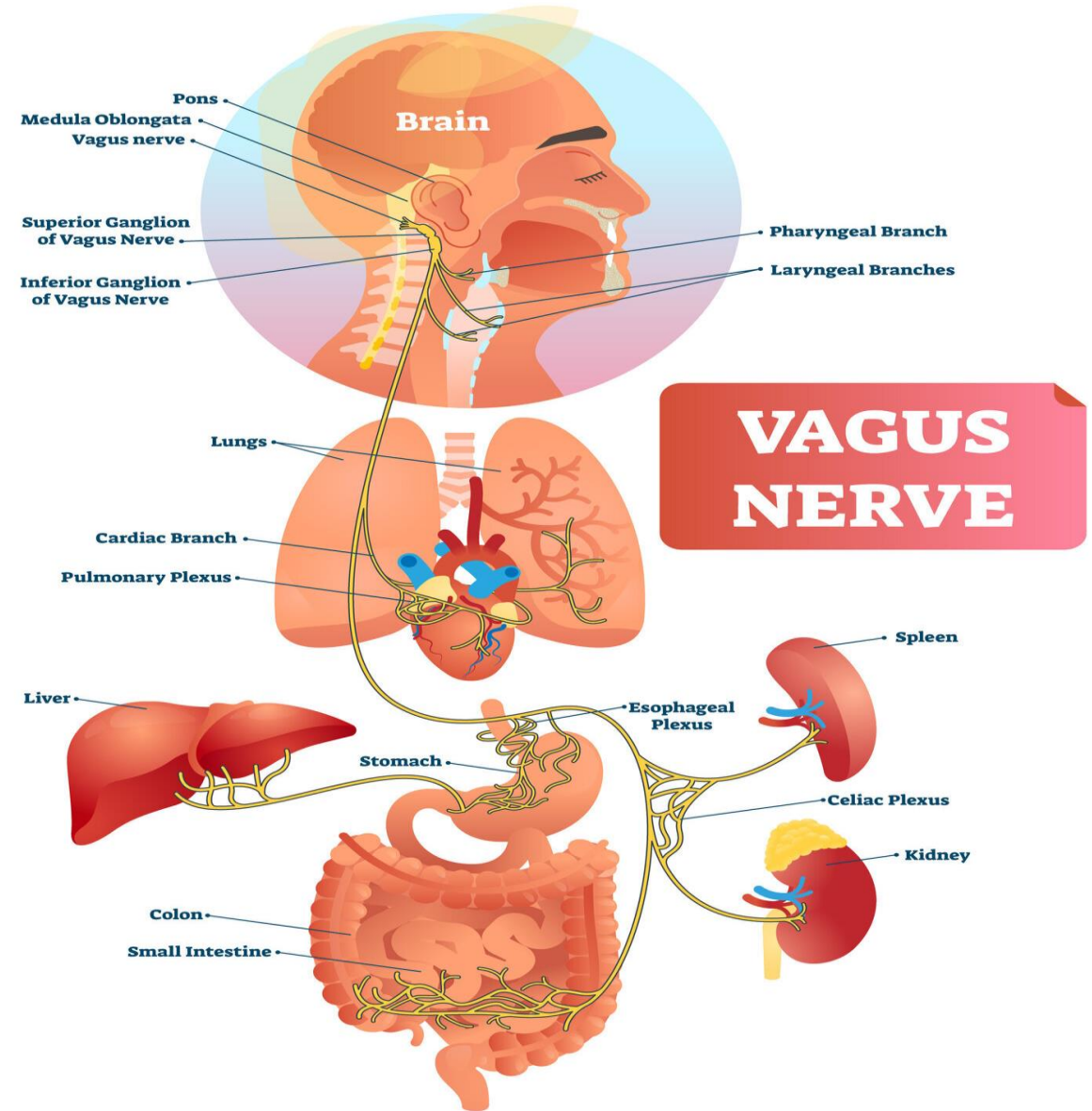
# THE LIVER SHOT



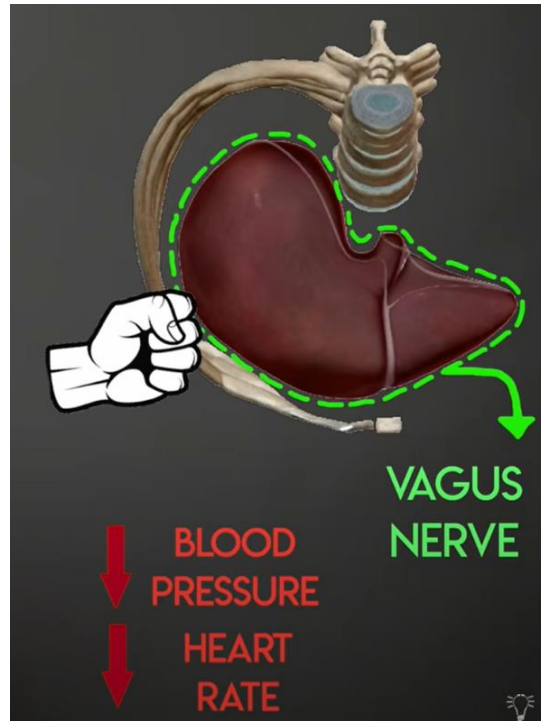


# THE LIVER SHOT

- ▶ A liver knockout is caused by an effective blow (punch, kick, elbow or knee) to the liver which **aggravates the vagus nerve**.



# THE LIVER SHOT





# THE SOLAR PLEXUS



# THE SOLAR PLEXUS

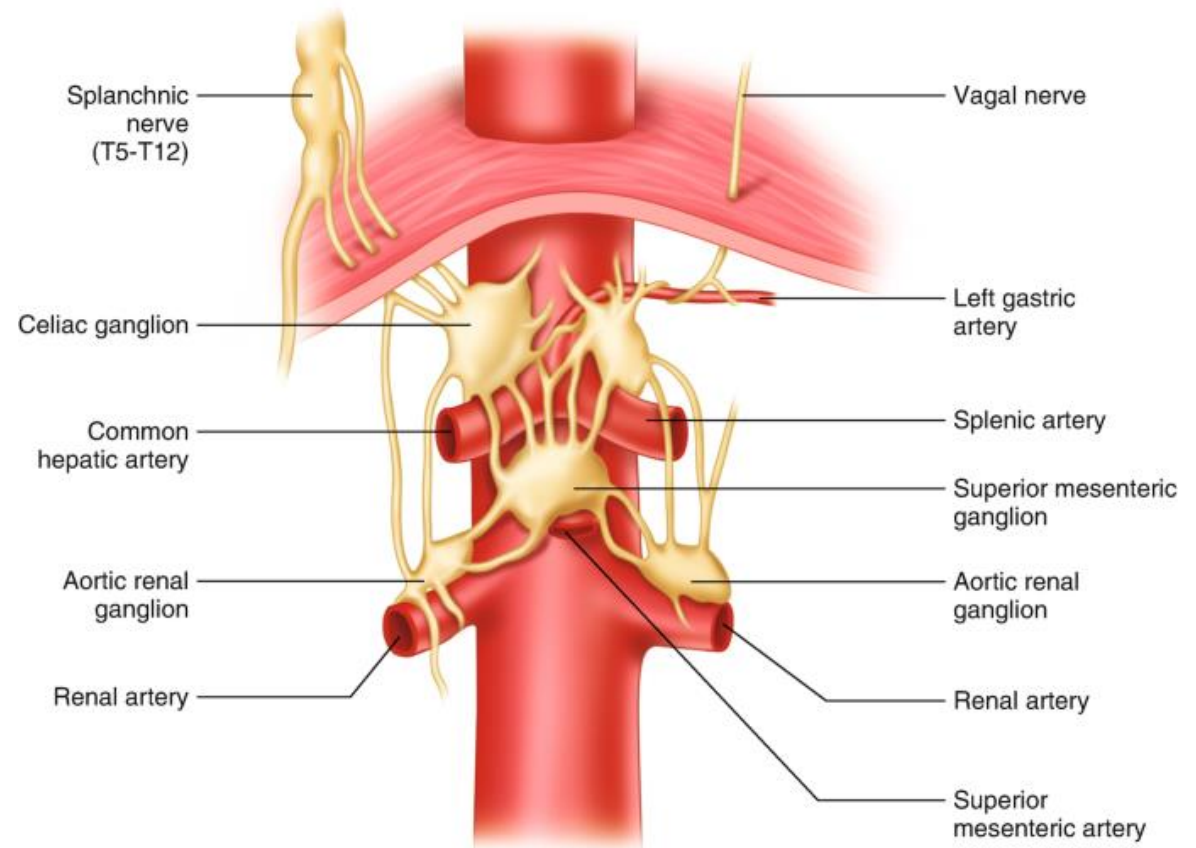


# THE SOLAR PLEXUS



# THE SOLAR PLEXUS

**LOTS OF NERVES AND OTHER STUFF**

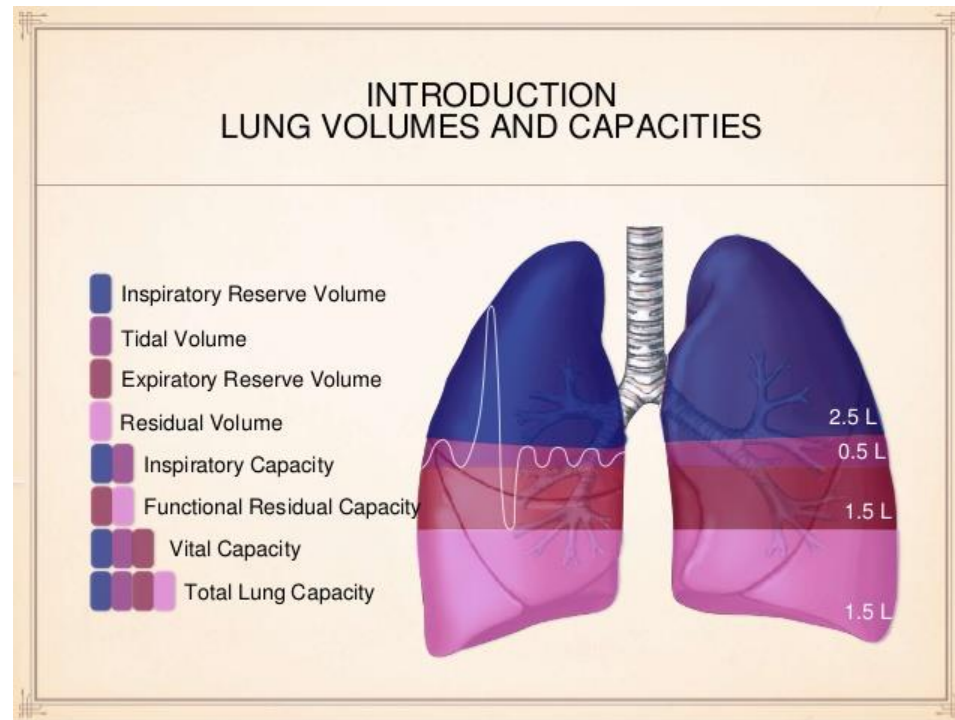


# THE SOLAR PLEXUS

- ▶ The celiac plexus is **part of the nervous system**. This bundle of nerves in the upper abdomen sits behind the pancreas close to the aorta, the body's largest blood vessel. Celiac plexus nerves send signals to the brain and spinal cord from digestive system organs.
- 1. A punch to the solar plexus temporarily causes the diaphragm (breathing muscle) to spasm (cramp) and knocks out your residual lung volume (your wind)
- ▶ Takes several seconds to several minutes to recover.
- ▶ Very uncomfortable feeling



# RESIDUAL VOLUME



# CHOKE HOLDS



# CHOKE HOLDS





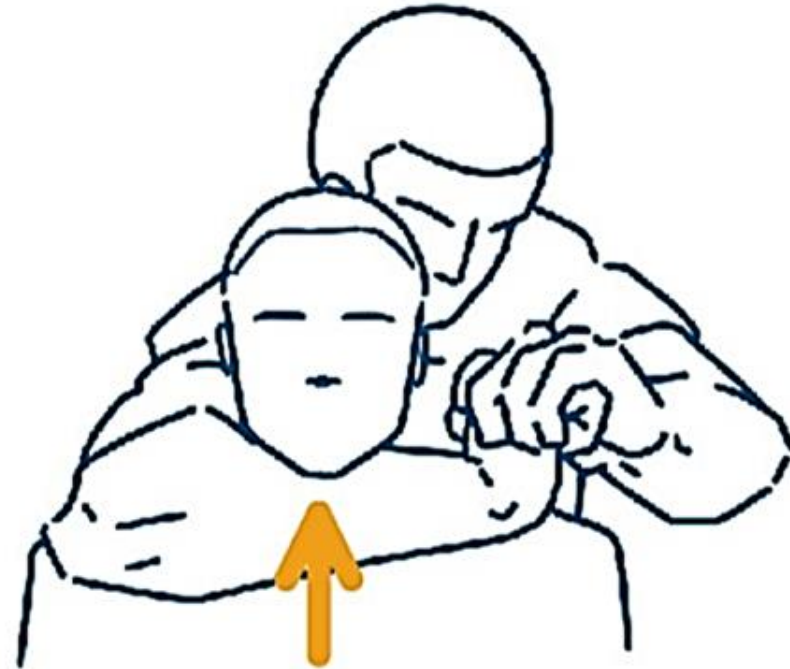
# CHOKES HOLDS

- Triangle Choke. A triangle choke has a very visible name that can easily be understood through the shape of a triangle. ...
- Arm Triangle. Usually, you will not hear the word arm triangle because most people call it side choke. ...
- Anaconda Choke. ...
- Rear Naked Choke. ...
- Guillotine. ...
- Gogoplata. ...
- North-South Choke. ...
- D'Arce Choke.

# CHOKE HOLDS

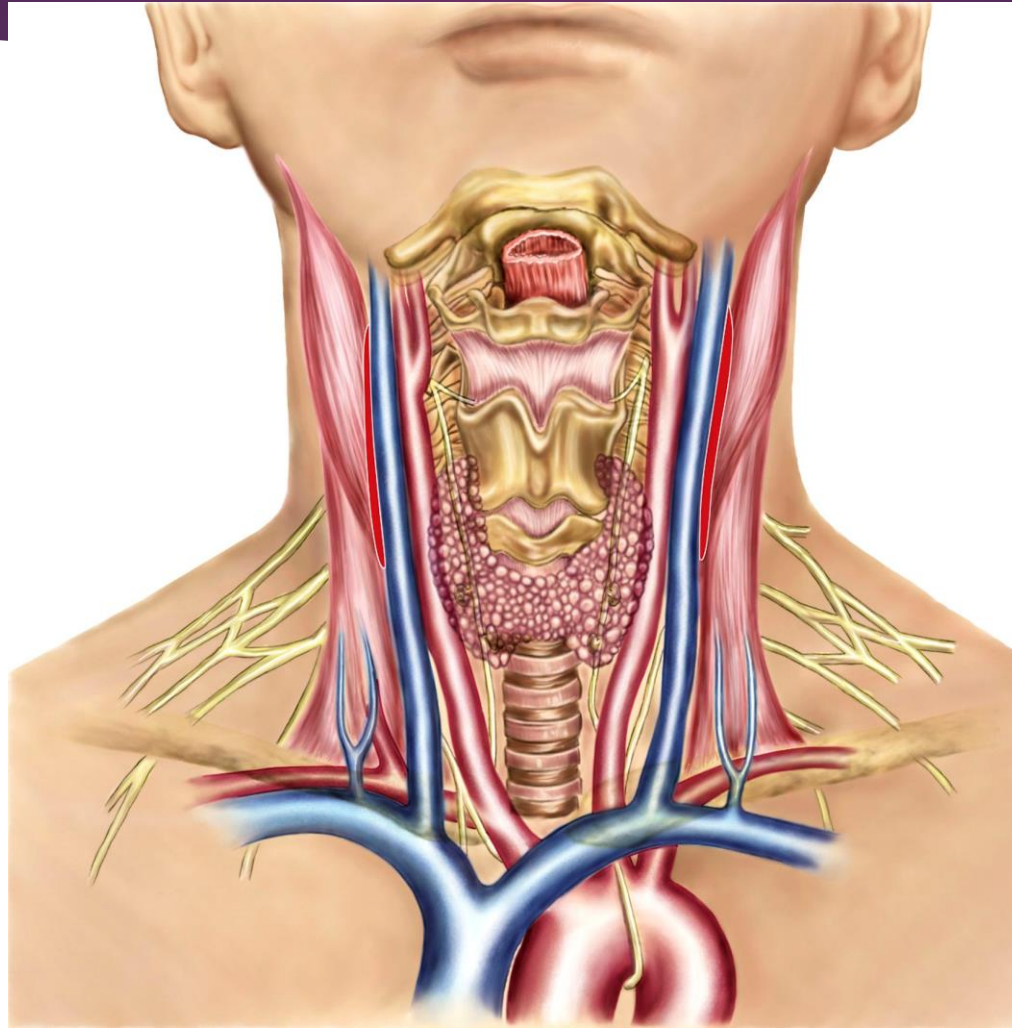


**Blood Choke**



**Air Choke**

# CHOKER HOLDS



# EXCESSIVE BLEEDING



# BAD CUTS



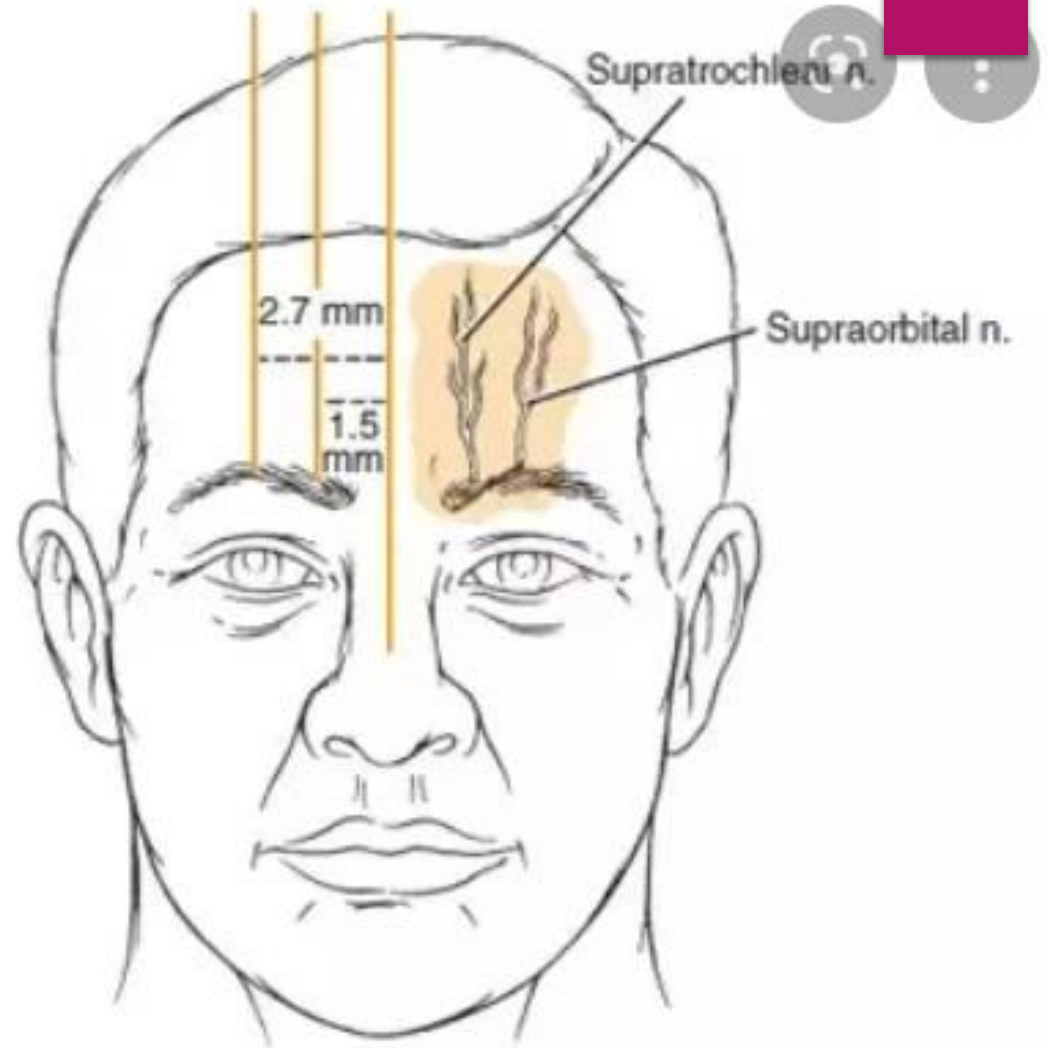


# BAD CUTS



# NERVES ABOVE THE EYELID

- ▶ Damage to the supraorbital nerve, you may experience **supraorbital neuralgia with pain above your eyebrow, possibly even extending to the scalp.**
- ▶ Supratrochlear neuralgia is an uncommon disorder causing pain in the medial region of the forehead.



# OTHER TKO's





# Recognize Dangers

СПОРТ 1

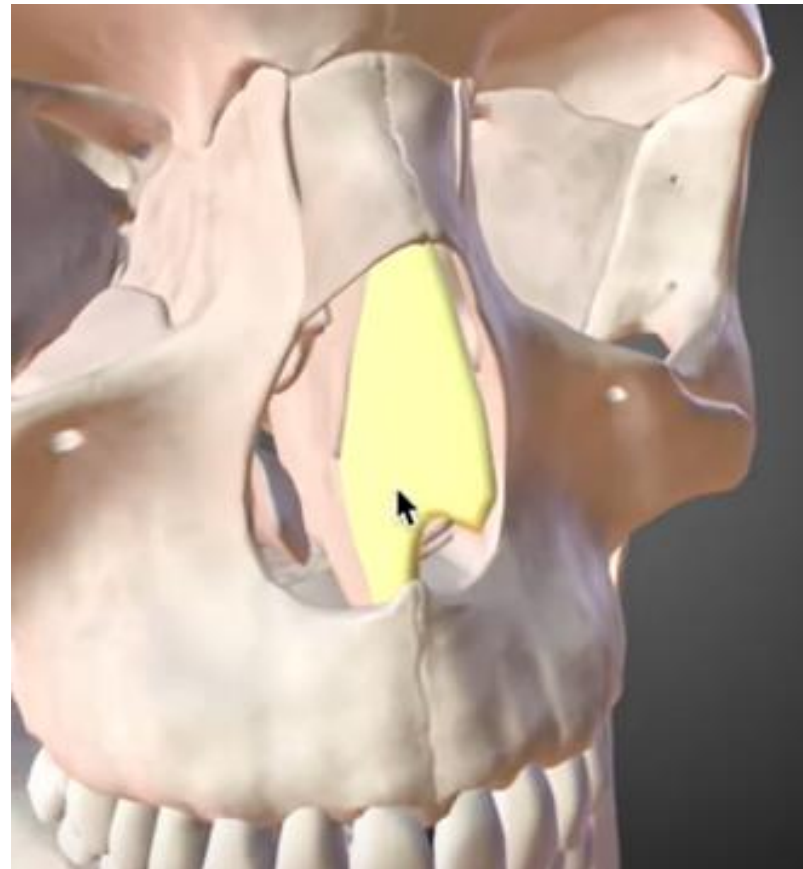
SOMETIMES IT'S A NO BRAINER



# WHY DID I STOP THIS BOUT?



# NASAL SEPTUM INFARCT



# How do we ALL protect our competitors?

## ▶ **UNDERSTAND THE KO/TKO**

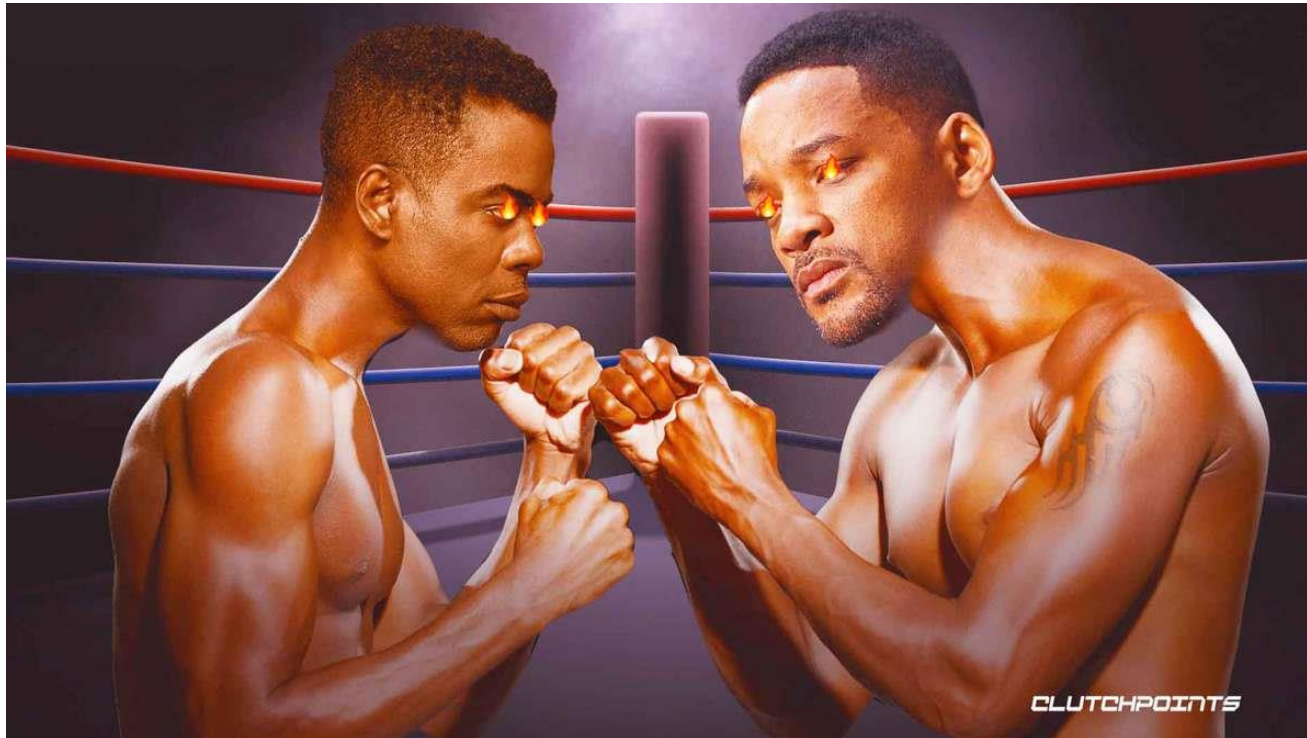
- ▶ Properly train our officials
- ▶ Utilizing experienced ring officials
- ▶ Seminars
- ▶ Education
- ▶ Resources (ABC medical advisory board, ARP, High risk committee)

## ▶ **WE ARE YOUR RESOURCE....DON'T FEEL EMBARRASSED TO ASK FOR HELP OR ASSISTANCE.**



NOW.....LET'S GET READY TO  
RUNBLEEEEEEEEE.....

## QUESTIONS?



WILL SMITH		CHRIS ROCK	
53	AGE	57	
PHILADELPHIA	BIRTHPLACE	SOUTH CAROLINA	
6FT 21IN	HEIGHT	5FT 10IN	
2001 FILM 'ALI'	BOXING EXPERIENCE	NONE	
£267M	NET WORTH	£46M	
THE FRESH PRINCE	NICKNAME	CHRISSY	
ACTOR, PRODUCER, RAPPER	DAY JOB(S)	COMEDIAN, ACTOR, WRITER, PRODUCER, DIRECTOR	
3	KIDS	2	
1	OSCAR(S)	0	
60.3M	INSTA FOLLOWERS	4.7M	