

Dogma in EMS

Aka Shit your patients tell you.

Jamie Syrett, MD.

“Every Year I Get a Flu Shot”

- “every year I get a flu shot, and I get the flu”
- “I always feel sick for 2 days after the flu shot”
- “how can they make me get the flu shot”
- “it doesn’t do anything”

“Every Year I Get a Flu Shot”

- The vaccine strains approved for the 2016-2017 season in the United States are as follows:
- Trivalent influenza vaccines will contain an A/California/7/2009 (H1N1)pdm09-like virus, an A/Hong Kong/4801/2014 (H3N2)-like virus, and a B/Brisbane/60/2008-like virus (B/Victoria lineage).
- Quadrivalent vaccines will include an additional vaccine virus, a B/Phuket/3073/2013-like virus (B/Yamagata lineage).
- These strains are similar to the 2015-2016 season vaccine, but patients who received the previous year vaccine still need to be vaccinated due to the limited duration of protection provided.

“Every Year I Get a Flu Shot”

- Types of flu
 - **type A flu virus** – this is usually the more serious type. The virus is most likely to mutate into a new version that people are not resistant to. The H1N1 (swine flu) strain is a type A virus, and flu pandemics in the past were type A viruses.
 - **type B flu virus** – this generally causes a less severe illness and is responsible for smaller outbreaks. It mainly affects young children.
 - **type C flu virus** – this usually causes a mild illness similar to the common cold.

“Every Year I Get a Flu Shot”

- Types of vaccine
 - Inactivated
 - Live attenuated
 - Recombinant

“Every Year I Get a Flu Shot”

- The injected flu vaccine stimulates your body's immune system to make antibodies to attack the flu virus.
- Antibodies are proteins that recognise and fight off infections, such as viruses, that have invaded your blood.
- If you're exposed to the flu virus after you've had the flu vaccine, your immune system will recognise the virus and immediately produce antibodies to fight it.
- It may take 10 to 14 days for your immunity to build up fully after you have had the flu shot.

“Every Year I Get a Flu Shot”

- The injected flu vaccine that is given to adults contains inactivated flu viruses, so it can't give you flu.
- Your arm may feel a bit sore where you were injected, and some people get a slight temperature and aching muscles for a couple of days afterwards, but other reactions are very rare

“Every Year I Get a Flu Shot”

- Adult flu vaccine – deactivated virus
 - This process destroys the viruses' ability to replicate in the body and cause illness, but keeps it intact enough so that, when it's given in a vaccine, a person's immune system can still recognize it and make a protective antibody response.
 - Killed vaccines generally produce a weaker immune response, so it often takes several doses or a "booster" to maintain your immunity.

“Every Year I Get a Flu Shot”

- Nasal Flu Vaccine – Live attenuated
 - Contain viruses that have been weakened
 - The viruses within live vaccines cannot cause disease in healthy people, but can still replicate to produce a strong immune response.
 - They cannot be given to people who are immunosuppressed
 - Because a live vaccine is the closest thing to a natural infection, it typically produces a strong immune response and often gives lifelong protection.

“Every Year I Get a Flu Shot”

- Does it work?
 - Historically CDC claimed 70-90% effectiveness
 - In 2013 CDC released their study data showing a maximum of 62% effectiveness
 - Far less effective in at risk populations
 - CDC now quote a 50-70% effectiveness
 - Standard is that the shot prevented you seeking healthcare.

“.....so that is a fever for me”

- “I took my temperature and it was in the normal range but I always run low, so that is a fever for me”
- 30% of pediatric and 5% of all ER visits are due to fever
- If “running low” was beneficial to life then natural selection would have made it a normal.

“.....so that is a fever for me”

- Why do we need/get a fever?
 - When WBC contact an infection they release pyrogens that go to the hypothalamus in the brain and cause it to raise body temperature.
 - The hypothalamus increases body temperature by generating heat (shivering, increasing sympathetic tone) and reducing heat loss (vasoconstriction)

“.....so that is a fever for me”

- Fact – Patients that develop a fever have a significantly higher survival rate when infected compared to patients that do not.
- The 98.6° F "normal" benchmark for body temperature comes to us from Dr. Carl Wunderlich, a 19th-century German physician who collected and analyzed over a million armpit temperatures for 25,000 patients.

“.....so that is a fever for me”

- JAMA 1992
 - 36.8°C (98.2°F) rather than 37.0°C (98.6°F) was the mean oral temperature of our subjects
 - 37.7°C (99.9°F) rather than 38.0°C (100.4°F) was the upper limit of the normal temperature range
 - maximum temperatures, like mean temperatures, varied with time of day; and men and women exhibited comparable thermal variability.
 - mean temperature varied diurnally, with a 6 AM nadir, a 4 to 6 PM zenith, and a mean amplitude of variability of 0.5°C (0.9°F); women had slightly higher normal temperatures than men; and there was a trend toward higher temperatures among black than among white subjects.

“.....so that is a fever for me”

- Growing consensus is that while in the past, the advice has been to treat all fevers, this has now changed to the milder advice to treat only those fevers that cause a patient (or their parents) distress in some way.

“.....so that is a fever for me”

- *"Fever ... is not the primary illness but is a physiologic mechanism that has beneficial effects in fighting infection"*
- *"There is no evidence that fever itself worsens the course of an illness or that it causes long-term neurologic complications"*
- *"antipyretic use does not prevent febrile seizures"*
- *"the real goal of antipyretic therapy is ... to improve the overall comfort and well-being of the child"*

“I got walking pneumonia”

- “I got walking pneumonia”
- “I got double pneumonia”
- “I had pneumonia for 3 months until someone diagnosed it”

“I got walking pneumonia”

- Pneumonia is generally split into 3 categories
 - CAP
 - HAP
 - HCAP

“I got walking pneumonia”

- CAP
 - Rate is 8-15 cases per 1000 people per year
 - Rate is increasing
 - Rate is higher in
 - Males>Females
 - Black>White
 - Older>Younger
 - Winter>Summer
 - 8th commonest cause of death in the US

“I got walking pneumonia”

- CAP
 - The 30d mortality for PNA admissions is 12%
 - The 1y all cause mortality for PNA admissions is 28%

“I got walking pneumonia”

- PNA protective factors
 - Innate
 - Acquired

- PNA infection caused when
 - Defect in host defenses
 - Infection by a virulent organism
 - Overwhelming inoculum

“I got walking pneumonia”

- *Chlamydia pneumoniae* produces a ciliostatic factor.
- *Mycoplasma pneumoniae* can shear off cilia.
- Influenza virus markedly reduces tracheal mucus velocity within hours of onset of infection and for up to 12 weeks postinfection.
- *S. pneumoniae* and *Neisseria meningitidis* produce proteases that can split secretory immunoglobulin (Ig)A and other virulence factors, including the capsule that inhibits phagocytosis, pneumolysin, a thiol-activated cytolysin that interacts with cholesterol in host cell membranes, neuraminidase, and hyaluronidase.
- *Mycobacterium* spp, *Nocardia* spp, and *Legionella* spp are resistant to the microbicidal activity of phagocytes.

“I got walking pneumonia”

- There are over 100 pathogens that can cause CAP, however the majority of cases are caused by 5
 - Strep Pneumonia (5.1% of admitted cases) is the commonest bacterial cause, but is reducing due to vaccination
 - Respiratory viruses are the commonest cause of CAP
 - 3 groups – bacterial, viral and atypical

“I got walking pneumonia”

- Atypical causes – basically harder to diagnose and symptoms are milder, so more likely to be treated at home
- The commonest atypical cause is mycoplasma (15% of ambulatory cases)
- Some people refer to atypical pneumonias as “walking pneumonia”

“I got walking pneumonia”

- The term “walking pneumonia” does not really tell you anything
- Just means a pneumonia that was treated in an ambulatory setting
 - At different ages this means different things
 - Majority of CAP in under 65s is treated in an ambulatory setting
 - Probably more a marker of pre-existing health

“I got walking pneumonia”

- Don't underestimate viral causes
 - SARS – A coronavirus (Case fatality 11%)
 - Varicella – “Chickenpox” – 10-30 case fatality rate

“I got double pneumonia”

- Double pneumonia can mean
 - Bacterial infection of a viral pneumonia
 - Multi-lobar pneumonia
 - Primary infection with a less common pathogen with more serious health impact
 - Multiple infecting sources (complication rate 39% vs 19%)

“They had to re-break my bone”

- “I broke mybut it didn’t heal right so they had to re-break it”

“They had to re-break my bone”



Inflammation

Soon after a fracture occurs, a hematoma forms at the injury site. Macrophages and inflammatory leukocytes move into the damaged area to scavenge debris and begin producing the pro-inflammatory agents that initiate healing.



Soft callus

Inflammation triggers cell division and the growth of new blood vessels. Among the new cells, chondrocytes secrete collagen and proteoglycans, creating fibrocartilage that forms the soft callus.



Hard callus

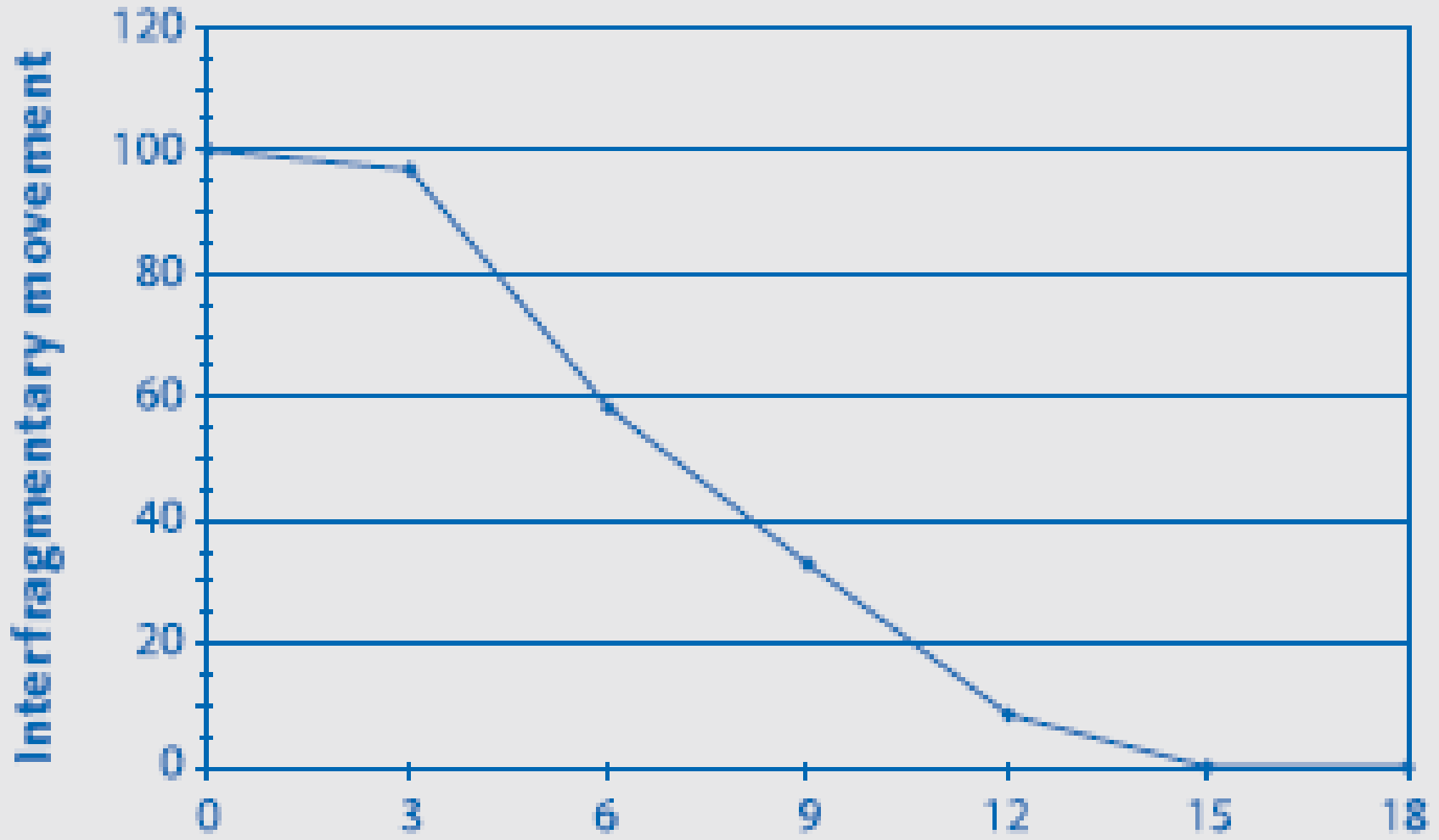
Through endochondral ossification and direct bone formation, woven bone replaces the soft callus to create a hard callus around the broken fragments of bone.



Remodeling

Over time, mechanically strong, highly organized cortical bone replaces the weaker, disorganized woven bone. Because it is continually remodeled, bone is the only tissue to heal without a scar.

“They had to re-break my bone”



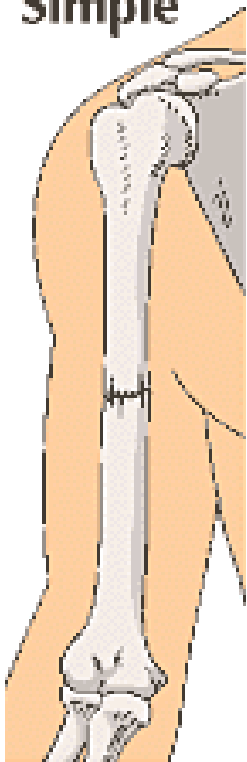
“They had to re-break my bone”

- Typical fracture management
 - ER – Diagnosis, evaluation, reduction, refer to ortho
 - Ortho – reevaluate once swelling less, *reduction if needed, immobilization.
- At the end of soft callus formation (2-3w), stability is adequate to prevent shortening, although angulation at the fracture site may still occur (and allow repositioning thru re-reduction)

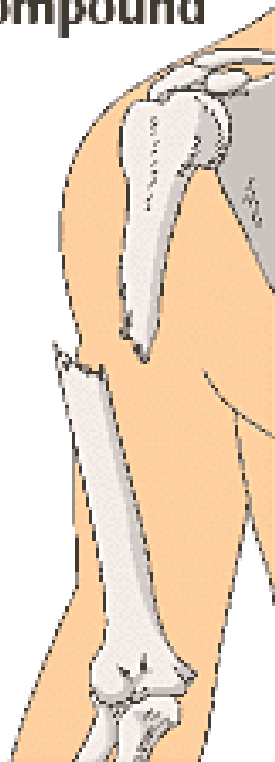
“I broke my bone in x places”

Types of Fractures

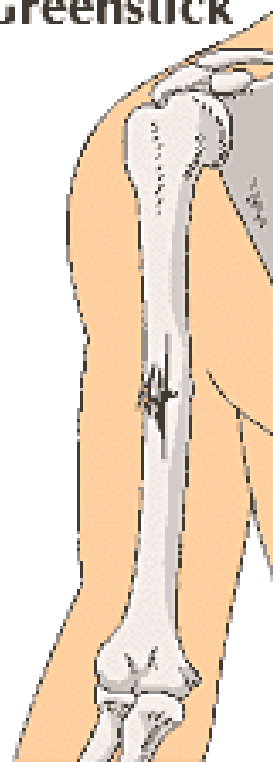
Simple



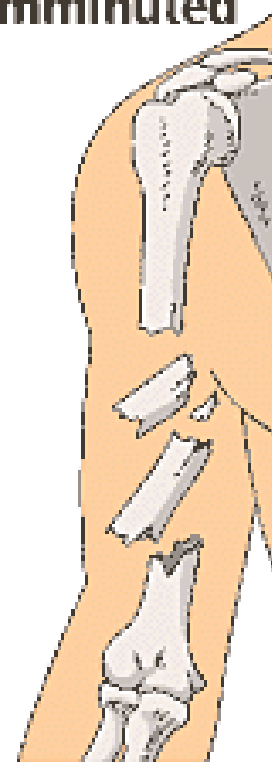
Compound



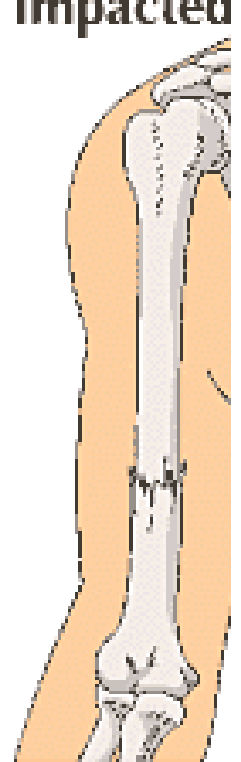
Greenstick



Comminuted



Impacted



“I broke my bone in x places”

- Patient – “I broke my leg in 78 places”
- Doctor – “You should stop going to those places”

“I’m allergic to

- Stated antibiotic allergies lead to selection of more expensive, less effective antibiotic regimens. An estimated \$60M per year.
- Studies show that 92% of patients that stated they were allergic to PCN, actually are not.
10% of patients state allergy to PCN.

“I’m allergic to

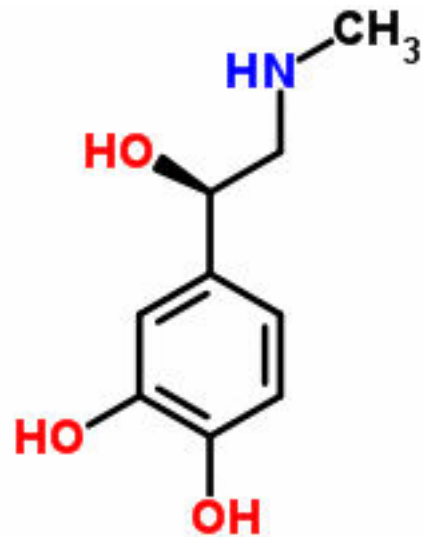
- An allergic reaction occurs when the immune system begins to recognize a drug as something "foreign."
- Several different symptoms can indicate that a person is allergic to penicillin. These include hives (raised, intensely itchy spots that come and go over hours), angioedema, throat tightening, wheezing and asthma-like reactions.

“I’m allergic to



“I’m allergic to epi”

- Epinephrine is a naturally occurring hormone
- Your body is constantly making and breaking it down – so you can’t be allergic to it



“I’m allergic to epi”

- flushing
- apprehension
- syncope
- tachycardia
- thready or unobtainable pulse associated with a fall in blood pressure
- convulsions
- vomiting
- diarrhea and abdominal cramps
- involuntary voiding
- wheezing and dyspnoea due to laryngeal spasm
- pruritus, rashes

“I’m allergic to epi”

- The adrenaline solution contains sodium metabisulfite, a sulfite that may in other products cause allergic-type reactions
- The alternatives to using adrenaline in a life-threatening situation may not be satisfactory.
- The presence of a sulfite in this product should not deter administration of the drug for treatment of serious allergic or other emergency situations.

“I have a high pain threshold”

-“but this is the worst pain I’ve ever had”
-“and I need pain meds”

“I have a high pain threshold”

- An individual's tolerance to pain is unique to the patient and is influenced by biological and psychological factors
- There are 2 steps to feeling pain
 - Biological – sensation at the point of pain
 - Brain perception of pain
- Chronic pain actually changes the way the spinal cord, nerves, and brain process unpleasant stimuli causing hypersensitization

“I have a high pain threshold”

- Persistent pain is reported by
 - 30% of adults aged 45 to 64
 - 25% of adults aged 20 to 44
 - 21% of adults aged 65 and older
- More women than men report pain (27.1% compared with 24.4%), although whether women actually tolerate pain better than men remains up for scientific debate

“I have a high pain threshold”

- A study published in the December 2009 issue of *Neuroscience Letters* showed that right-handed study participants could tolerate more pain in their right hands than in their left hands.
- Redheads have a mutation in a gene called melanocortin-1 receptor (MC1R), which is what helps make their hair red. That gene codes a group of pain receptors in the brain and appears to influence sensitivity to pain.

“I have a high pain threshold”

- In studies of healthy volunteers that had a painful stimuli applied while in a functional MRI showed increased brain activity in the “daydreaming” center of the brain that highly correlates to visual scale self reporting of pain

“I have a high pain threshold”

- Pain tolerance – the maximum amount of pain a person can tolerate
- Pain threshold – the level at which a person starts to feel pain

“I need a blood preg test”

-“I was pregnant before but the urine test was negative, I need a blood test”

“I need a blood preg test”

- Pregnancy tests are designed to tell if your urine or blood contains a hormone called human chorionic gonadotropin (hCG).
- This hormone is produced right after a fertilized egg attaches to the wall of a woman's uterus.
- This usually happens -- but not always -- about six days after fertilization.

“I need a blood preg test”

- Assuming a 28 day menstrual cycle, a pregnancy test will be positive 6-8 days before menses
- Average hCG level at time of predicted menses was 250
- The blood serum and the urine test is the same test
- Difference is “ultra-sensitive” vs “normal” test

“I didn’t wear my seatbelt”

- “I want to be thrown clear of the wreck”
- “My car has airbags”

“I didn’t wear my seatbelt”

- What happens in a vehicle impact?
 - First the car hits the object
 - Then the driver hits the car
- For any impact you are trying to reduce the impulse of the wreck
- Impulse is force over time
- The higher the impulse the worse the wreck

“I didn’t wear my seatbelt”

- 2 examples
 - Car hits cement wall
 - Car hits bungee cord
- Cement wall – car slows from 100mph to 0 over 0.1 secs.
- Bungee – car slows from 100mph to 0 over 1 second

“I didn’t wear my seatbelt”

- Lots of bungees in the car aiming to decelerate the driver
 - Seatbelt – traction control and designed to stretch
 - Airbag – designed to deflate
 - Steering wheel
 - Crumple zones in the car
 - Force deflectors

“I didn’t wear my seatbelt”

- Thrown free – primarily seen in x-axis rotations with side window open
- Only deceleration occurs when the driver hits an object – tree, house or earth
- Physics predict that impulse will be less utilizing systems that are designed to reduce the impulse of the collision

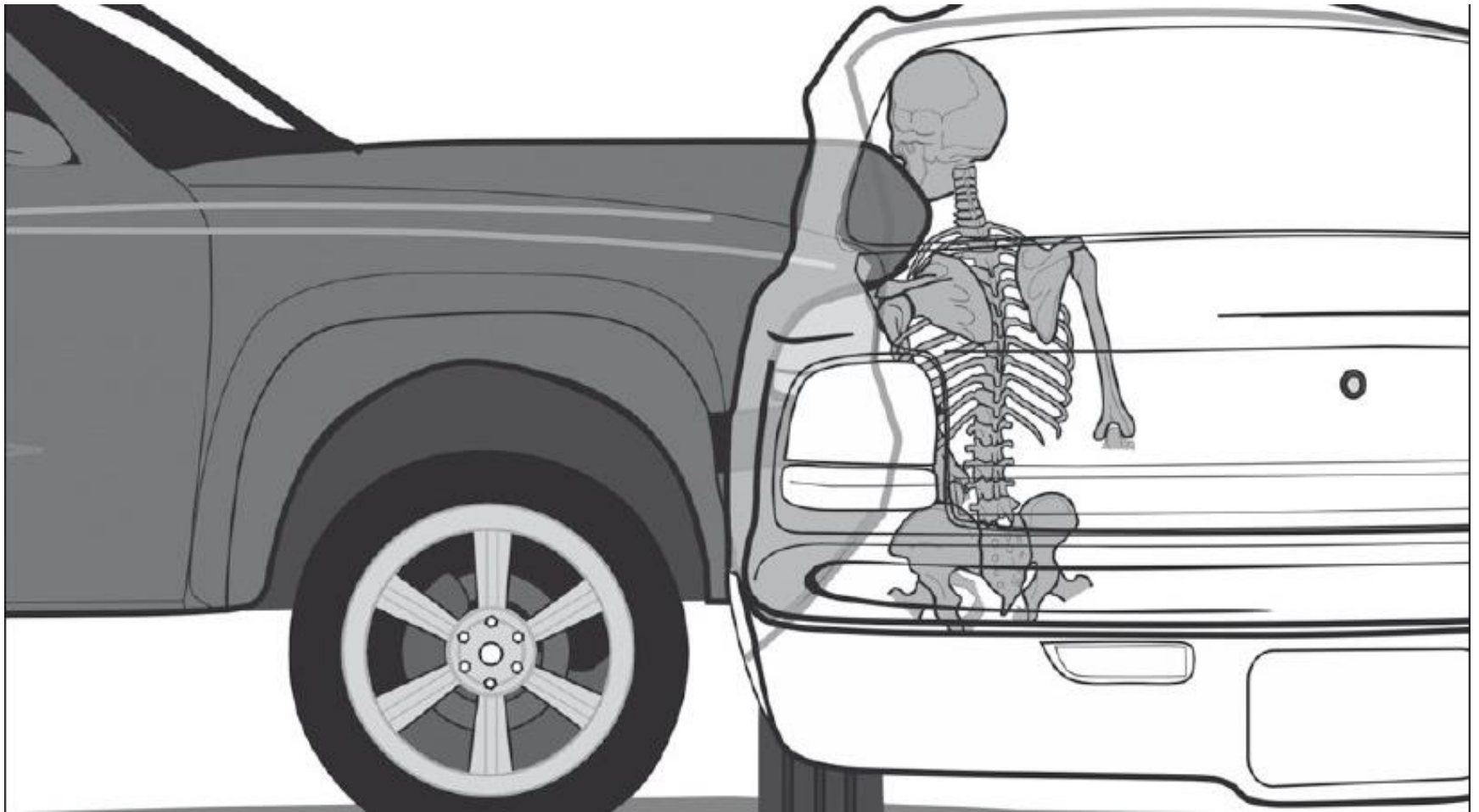
“I broke my neck”

- “I had an internal decapitation”
- “Only the skin in my neck held my head on”

“I broke my neck”

- Yes – it is possible
- Officially called an atlanto-occipital dislocation
- 70% death rate

“I broke my neck”



“I broke my neck”

- 3 times more common in children
- Important to know mechanism and “read the scene”
- This is a hyperflexion followed by traction injury

“All they did was give me aspirin”

- “I was having chest pain and all they did was give me an aspirin”

“All they did was give me aspirin”

- Aspirin has been shown to have benefit in many cardiovascular conditions including AMI and ischemic stroke
- NNT for ASA in MI is 42

....I can't take aspirin....

- Because I am on coumadin
 - Nope – Aspirin works to stop platelets aggregating
- Because I had a bleeding stomach ulcer
 - Nope – Single dose ASA won't impact that
- Because I have had gastric bypass surgery
 - Nope – ASA is absorbed in the small bowel (not stomach as previously thought)
- Because I am allergic to it
 - Dig further, ibuprofen us linked to wheezing

....I can't take Aspirin....

- NNT – 42 (to save a life)
- NNH – 162 (to cause any bad outcome)

....I already took aspirin....

- Double/Triple check
 - Studies have shown there is a significant error rate with patients taking ibuprofen or tylenol
- In the original studies – doses of ASA was anywhere from 81mg to 600mg

“Oxygen will kill you”

- “I was told is I’m given oxygen I’ll die”

“Oxygen will kill you”

- Actually almost true
 - Too much oxygen is probably bad
 - Aim for sats >92% and titrate accordingly
- Worse outcomes in
 - Trauma
 - Strokes
 - MI

“I haven’t slept in

- “I need something to sleep or I’ll go mad”

“I haven’t slept in

- Longest documented awake period – 11 days (in a dance competition in 1964)
- There is a condition called FFI (fatal familial insomnia) – 40 families worldwide, 100 patients

“I haven’t slept in

- Consistently sleeping less than six hours a night has been linked to impairments in cognitive functioning, specifically a loss of concentration, memory and hand-eye coordination.
- Patients with chronic insomnia report problems performing daily tasks and often have increased absenteeism from work and school, and poor sleep has been linked to increased motor vehicle and workplace accidents.

“I haven’t slept in

- Studies have shown that people with insomnia also have a greater risk of developing depression or anxiety disorders.
- Insomnia is likewise linked to increased risks for heart disease and hypertension, as well as increases the risk for obesity, diabetes, colon cancer, breast cancer and headaches.

The Art of Communication

- What a patient tells you, allows you to know something about how they perceive their world
- Often finding out why the person made the statement will provide insight into their opinions and views

Jsyrett@rochester.rr.com