Penetrating Trauma Overview

DEFINITIONS

- Kinematics is defined as energy change.
- Accident is defined as event of chance or unknown.
- Collision results from carelessness. Thus we call a vehicle crash a “motor vehicle collision” not a “motor vehicle accident”
- Velocity is speed.
- Cavitation is such speed that body tissue is “knocked out of place”, “shattered”.
- Stared windshield – head hits glass.

THE NUMBERS

- Unexpected traumatic injuries are 140,000 deaths per year.
- Automobile account for 40,000 deaths per year.
- Penetrating trauma accounts for 40,000 deaths per year.
- Injuries by vehicle trauma totaled 3, 125,000 per year.

THREE PHASES OF A CRASH

- 1st Car metal hits tree.
- 2nd Skeletal system hits car metal.
- 3rd Organs hit skeletal.
- 4th If unlucky person gets struck by flying items not secured.
- For testing in an MVC there is always a minimum of first three collisions. On a fall it may only be the first

NEWTON'S 3 LAWS

- Body at rest stays at rest, a body at motion stays in motion unless acted upon by outside force.
- Energy cannot be created nor destroyed, just changes form.
- For every reaction there is an equal and opposite reactions. (example, when a marble hits another the moving marble will recoil back once hitting the stationary marble).

KINETIC ENERGY

- Velocity versus weight.
- Speed will always do more damage than size.
- What does more damage a bus at 40MPH or a sports car at 90MPH? The answer is the sports car - always.

TWO TYPES OF TRAUMA

- Penetrating.
- Blunt – most common form of trauma.

MOTOR VEHICLE COLLISIONS

- Frontal – sudden deceleration.
- Rear impact – sudden acceleration – cause for whiplash.
- Lateral – most fatal– the body does not bend sideways.
- Rotations – clipped in corner and sent spinning.
- Rollover – most fatal if ejected or not restrained. If no visible signs of injury, must always suspect internal injury and should be evaluated.
- Note: Ejections almost always fetal.

PATHWAYS OF FRONTAL COLLISION

- Up and over – more head and chest trauma.
- Down and under – more leg, pelvis trauma.

AIRBAGS

- Hurt but better than hitting the car.

- Can cause facial fractures, abrasions, broken hands.
- Deploys at greater than 200MHP.
- Powder is not hazardous.
- If frontal impact and airbag not deployed be careful, it may go off at any time.
- If person is within 10 inches of airbag when deployed it is fatal.

PEDESTRIAN INJURY

- Kids face the car like a dear.
- Adults try to turn away.
- Kids likely to go down and under.
- Adults up and over.

FALLS

- Falls from 2 to 3 times the person height are considered dangerous. Most humans can fall out 2 and 3 story windows and live.
- Must consider on all falls; what part hit first, how hard was the surface they landed on, and how high.
- If head or feet hit first the spine is compressed. Axial compression's.

BLAST INJURIES

- First wave is pressure/shock wave, Second wave is flying stuff, and third is when victim is thrown from blast.
- Eardrum rupture, lung damage from heat, eyes blood shot.

WEAPONS

- Low velocity weapons are hand held – ice pick, knife, fist.
- Medium velocity weapons are hand guns, shotguns, (tumble).
- High velocity weapons are hunting rifles (cavitations, shock wave).

GUN SHOT WOUNDS

- Exit is larger than entrance.
- Most gunshot wounds to chest do not bleed externally. All bleeding is internal.
- Bullets do not follow a straight line through the body in many cases. They are more likely to go straight through if only soft tissue is hit.