

FireFighters

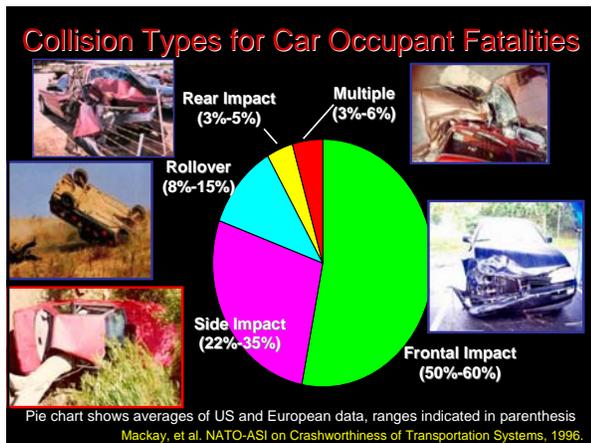
Clinically Relevant Anatomy

What Drives Us

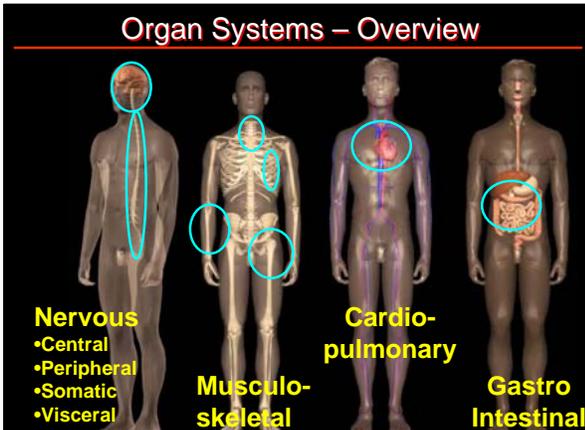


Dr. Craig Goodmurphy  
EVMS Anatomy & Pathology

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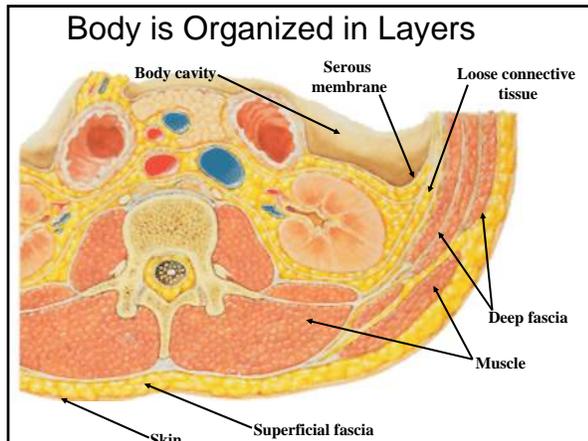


**Organ Systems – Overview**



- Nervous**
  - Central
  - Peripheral
  - Somatic
  - Visceral
- Musculo-skeletal**
- Cardio-pulmonary**
- Gastro Intestinal**

- 5 Things You Need To Know About Anatomy**
1. Bones
  2. Muscles
  3. Tubes
    - arterial
    - venous
    - lymphatic
  4. Cords
    - tendon
    - ligament
    - nerves\*
  5. Organs



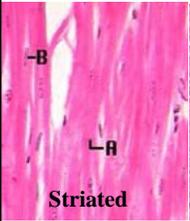
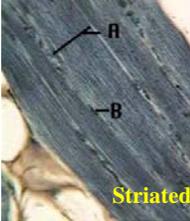

**Axial Skeleton**

- skull
- vertebrae
- ribs
- sternum
- hyoid

**Appendicular Skeleton**

- limb girdles - clavicle, scapula; os coxae
- limbs

### How Many Types of Muscle?

<b>Cardiac</b>	<b>Smooth</b>	<b>Voluntary</b>
		
<b>Striated</b>	<b>Non-Striated</b>	<b>Skeletal</b>
<b>Involuntary</b>		
Striated VS Non Striated ?		<b>Striated</b>

### Functions of Muscle Tissue

- Producing body movements
- Stabilizing body positions
- Regulating organ volumes
  - bands of smooth muscle called sphincters
- Movement of substances within the body
  - blood, lymph, urine, air, food and fluids, sperm
- Producing heat
  - involuntary contractions of skeletal muscle (shivering)

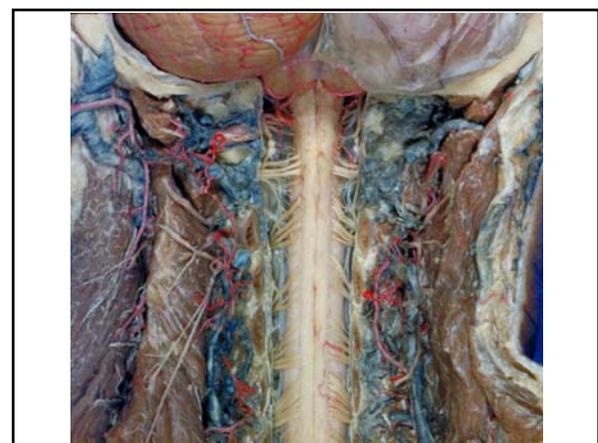
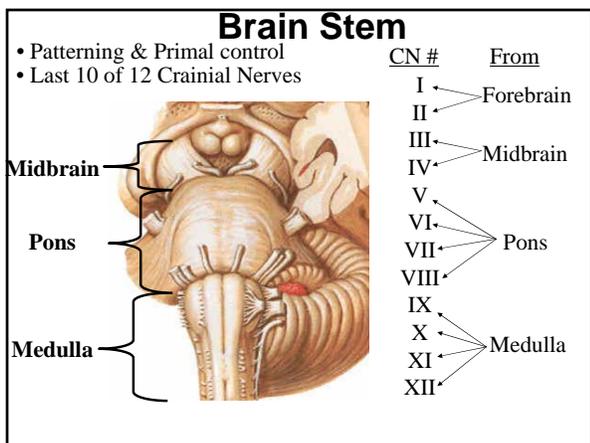
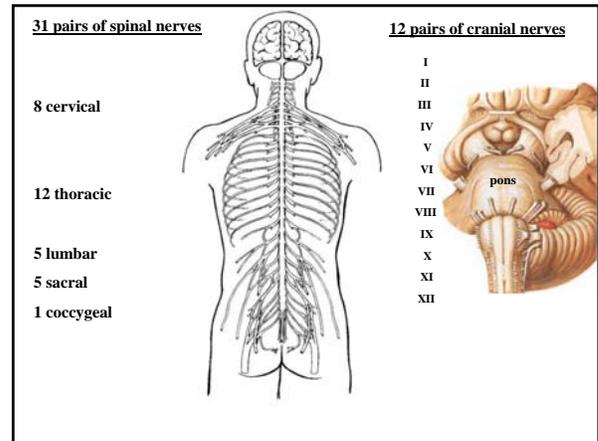
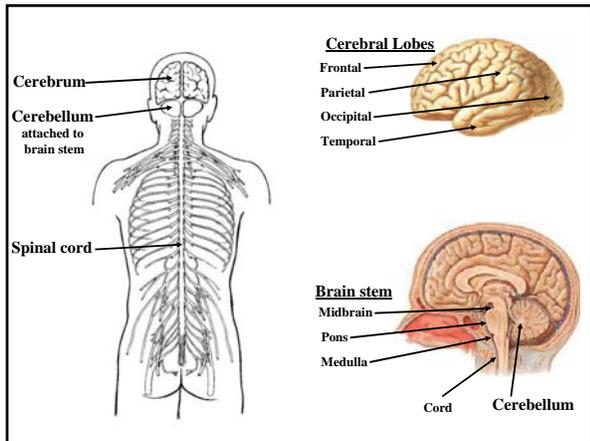
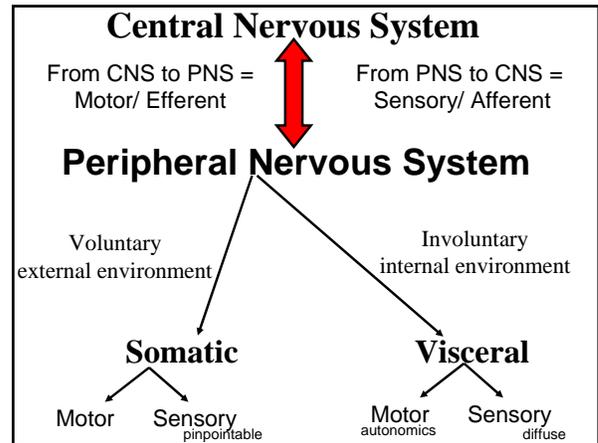
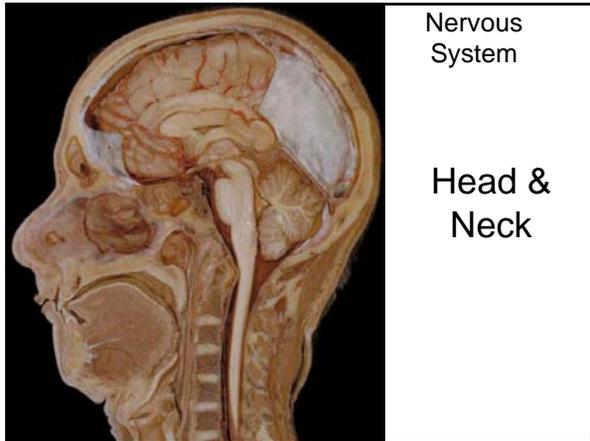
### Principles to Consider

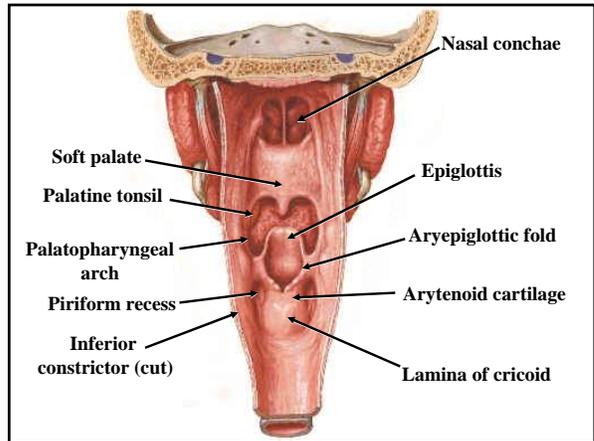
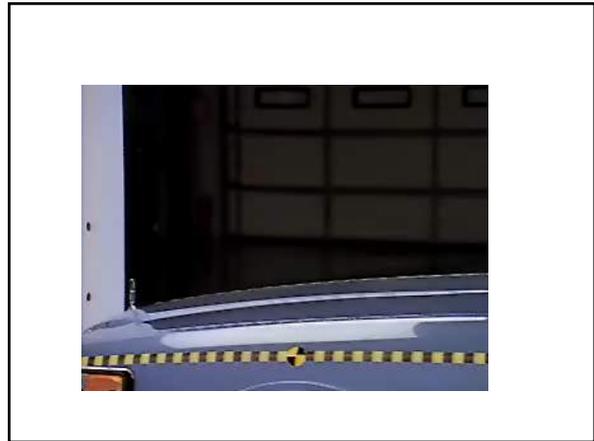
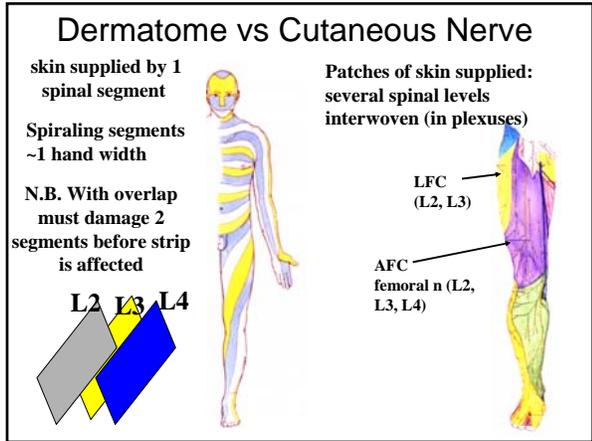
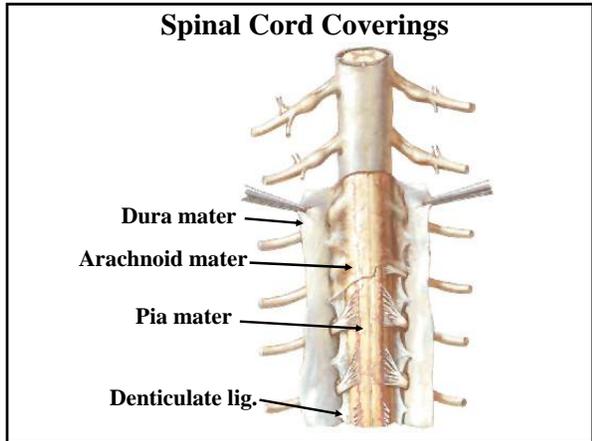
1. Short muscles strong / long muscles weak
  - pennation/ fiber architecture/ organization
2. Can't move it if you don't cross it
3. ↑ mobility = ↓ stability (vice versa)
4. ↑ mobility = ↑ complexity of control

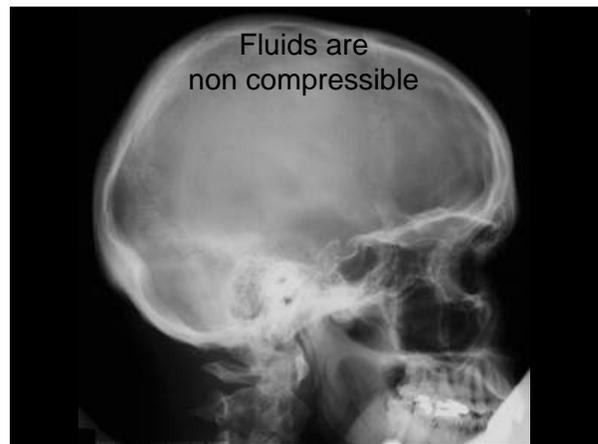
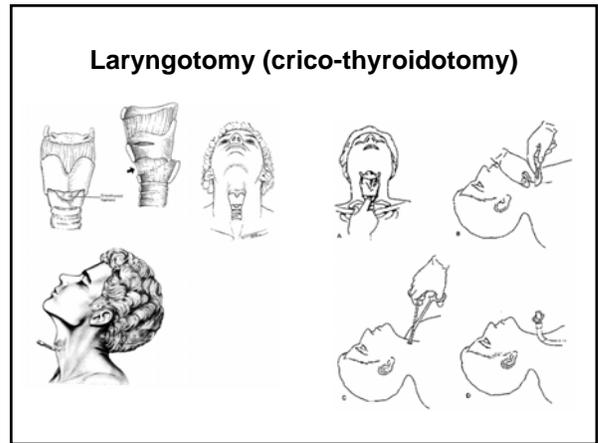
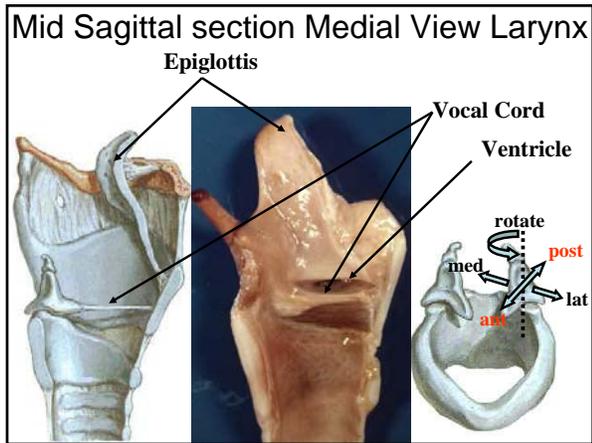
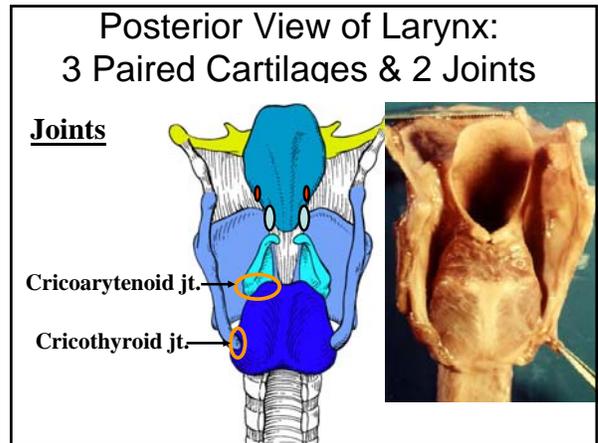
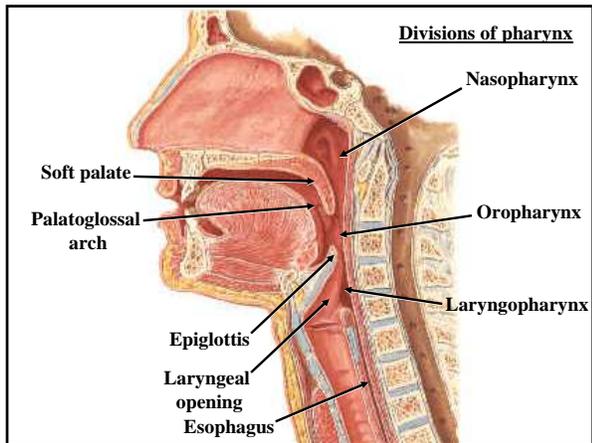
### Naming Muscles

•Shape	Quadratus / Rhomboids
•Location	Subclavius
•Number of Heads	Biceps / Quadriceps
•Primary Action	Flexor Digitorum
•Relative Names	Major/minor / Longus/brevis

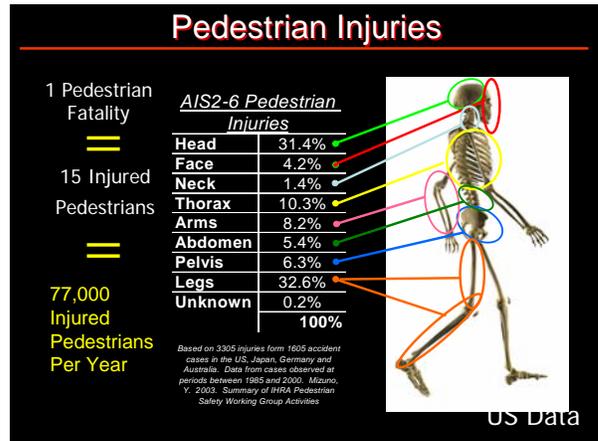
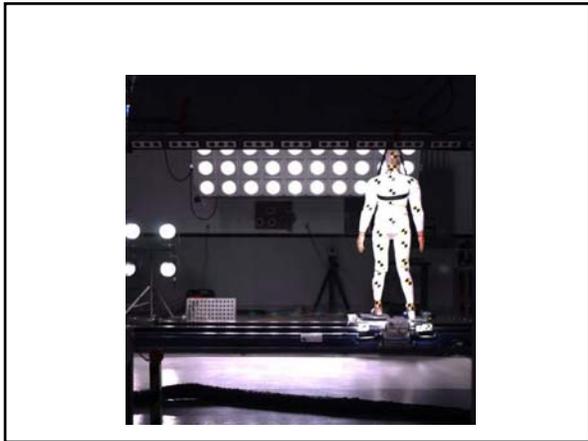
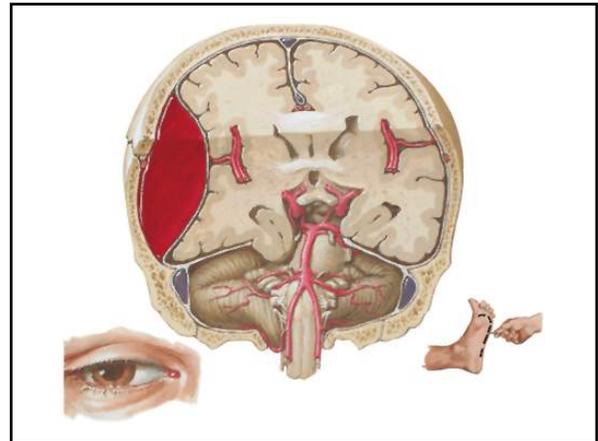
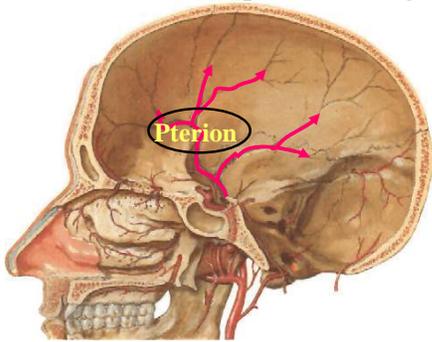
Regionalization – flexor, extensor, anterior, posterior  
Deep or Superficial



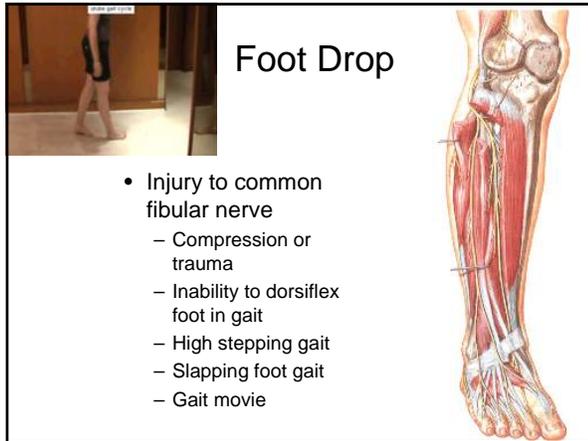




## Middle Meningeal Artery



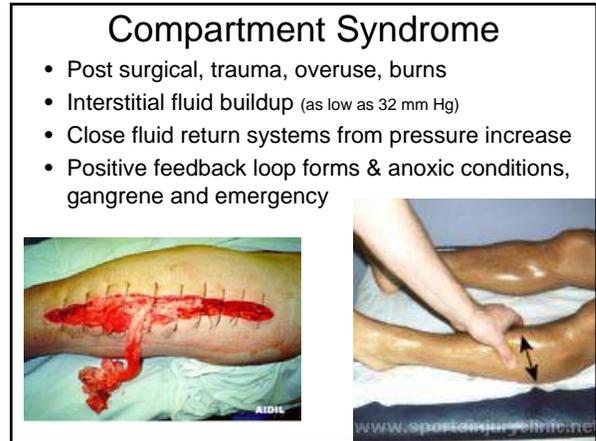
## Foot Drop



- Injury to common fibular nerve
  - Compression or trauma
  - Inability to dorsiflex foot in gait
  - High stepping gait
  - Slapping foot gait
  - Gait movie

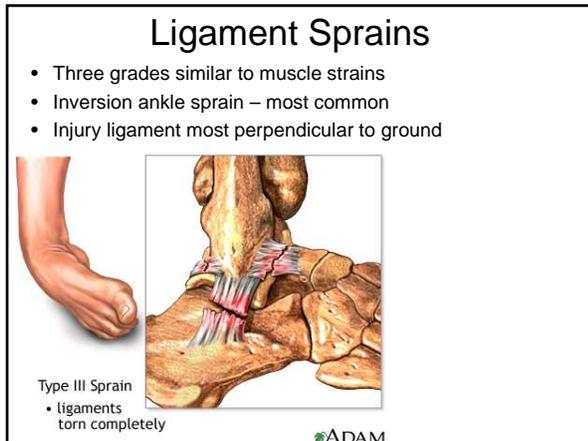
## Compartment Syndrome

- Post surgical, trauma, overuse, burns
- Interstitial fluid buildup (as low as 32 mm Hg)
- Close fluid return systems from pressure increase
- Positive feedback loop forms & anoxic conditions, gangrene and emergency



## Ligament Sprains

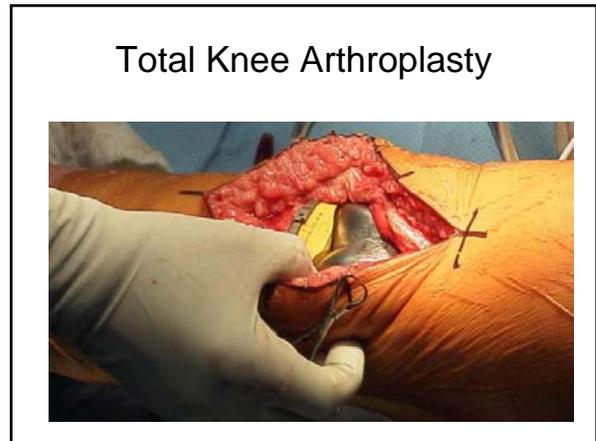
- Three grades similar to muscle strains
- Inversion ankle sprain – most common
- Injury ligament most perpendicular to ground



Type III Sprain

- ligaments torn completely

## Total Knee Arthroplasty



## Types of Pelvic Fractures

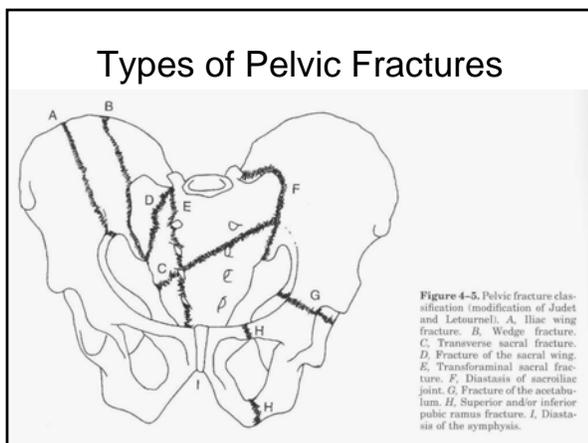
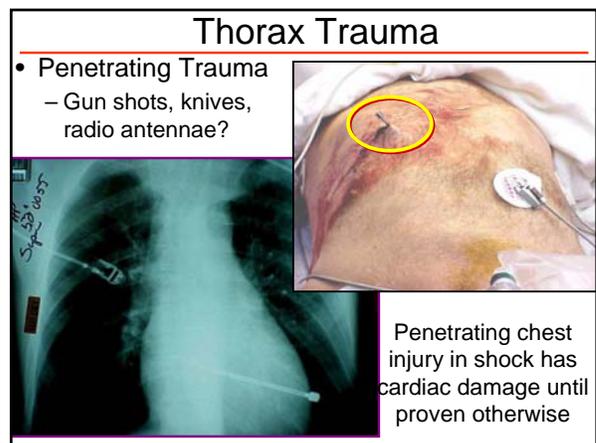


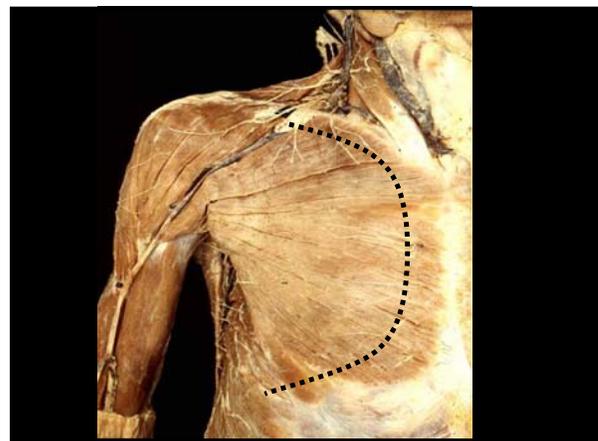
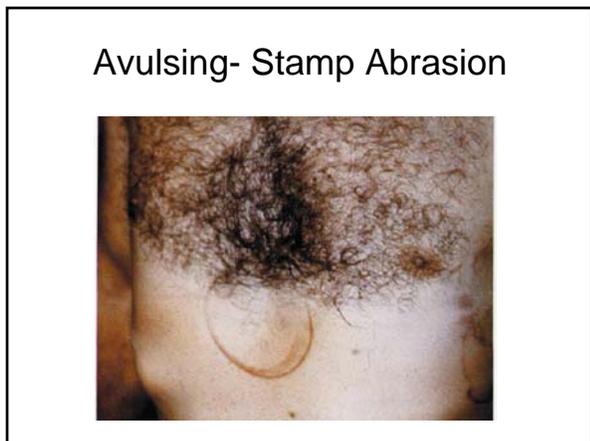
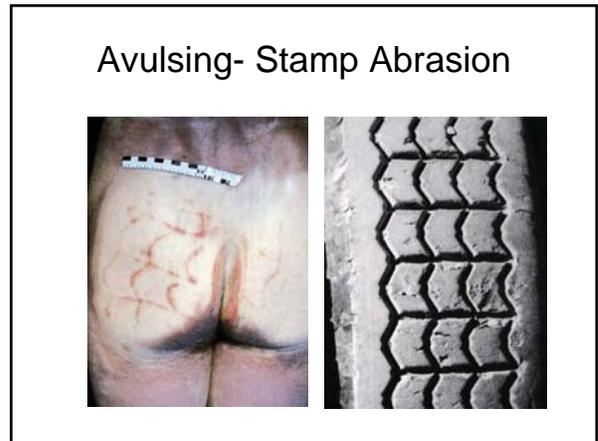
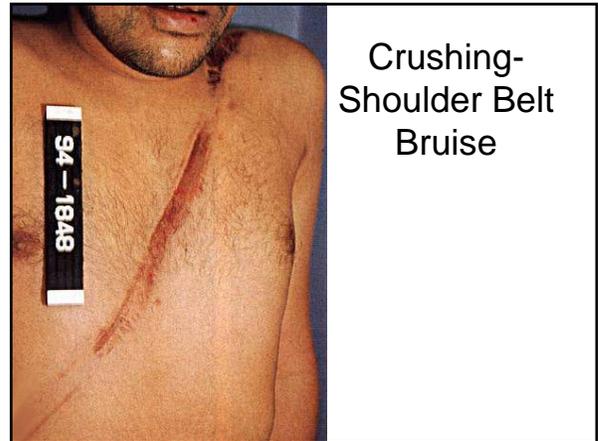
Figure 4-5. Pelvic fracture classification (modification of Judet and Letournel). A, Iliac wing fracture. B, Wedge fracture. C, Transverse sacral fracture. D, Fracture of the sacral wing. E, Transforaminal sacral fracture. F, Diastasis of sacroiliac joint. G, Fracture of the acetabulum. H, Superior and/or inferior pubic ramus fracture. I, Diastasis of the symphysis.

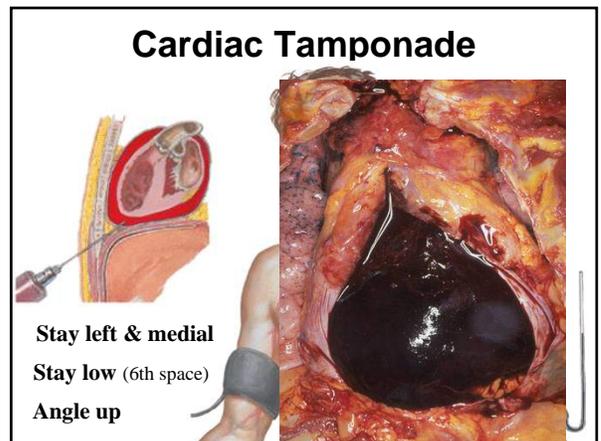
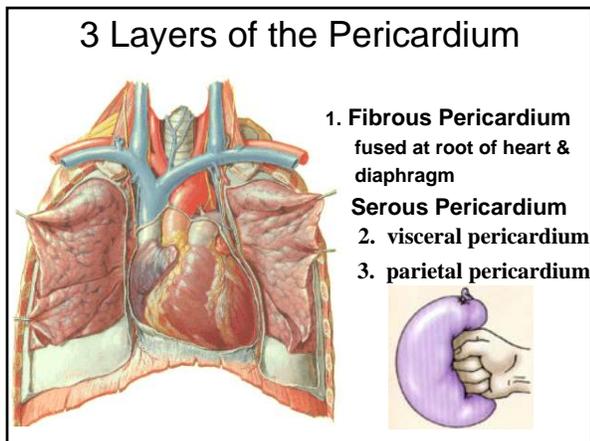
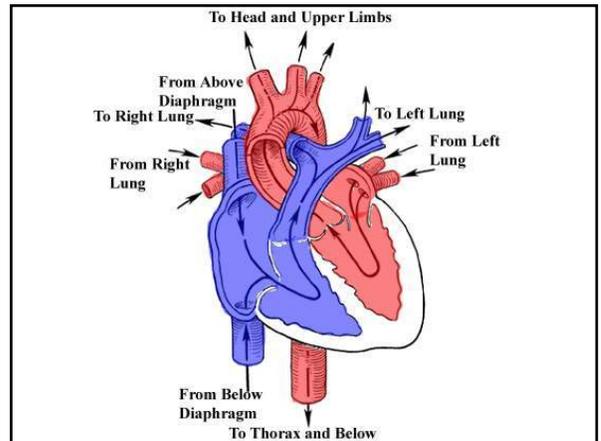
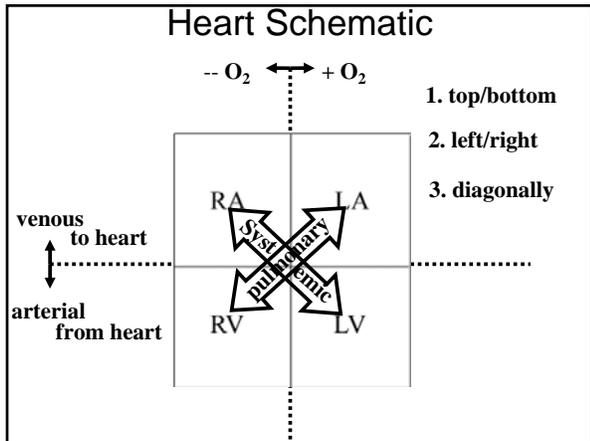
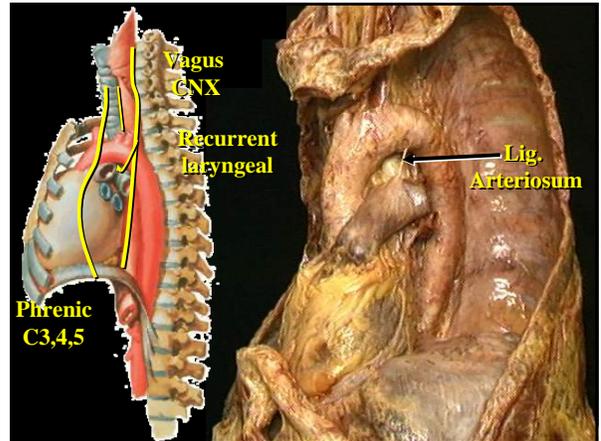
## Thorax Trauma

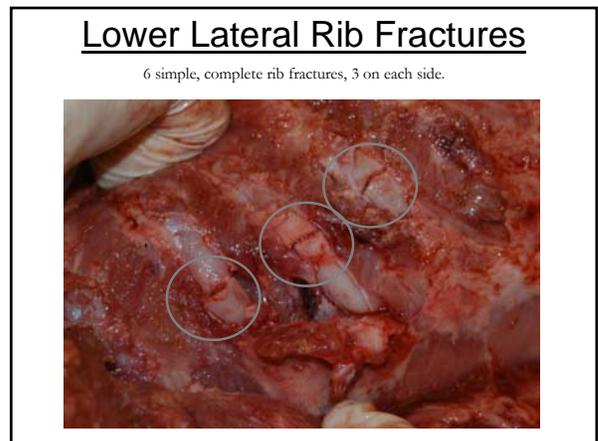
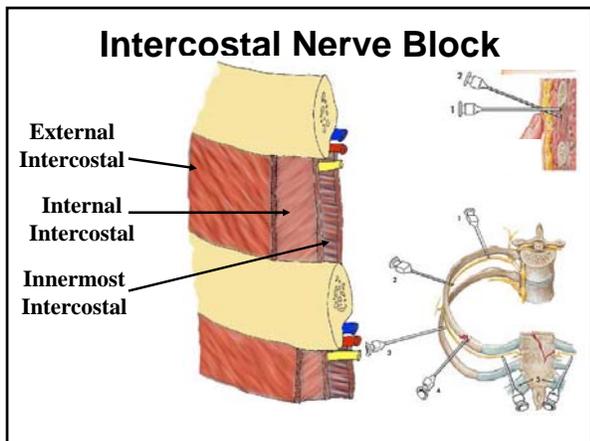
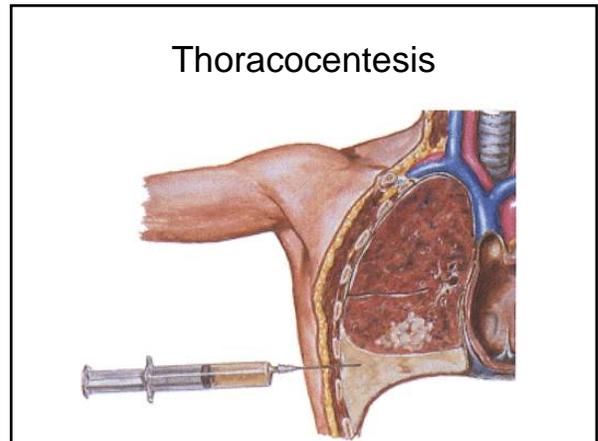
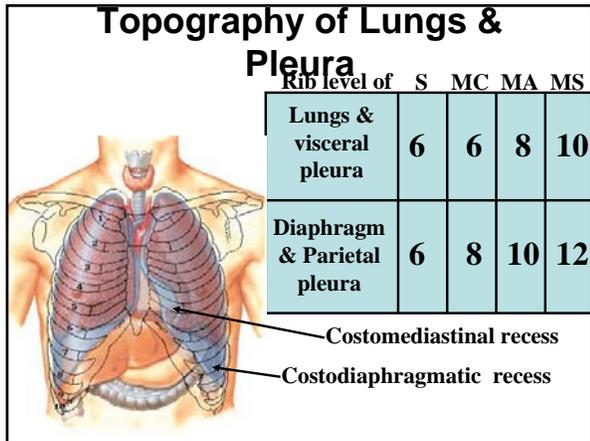
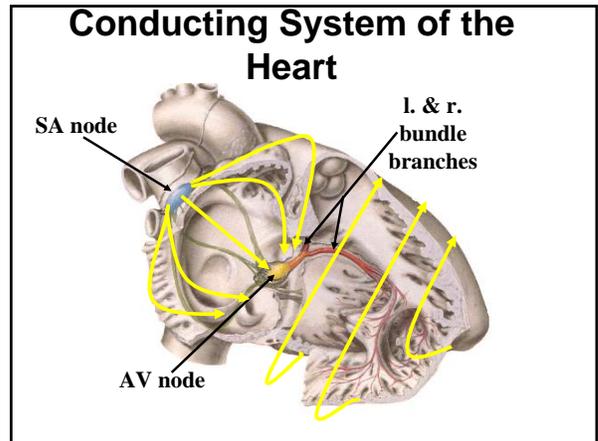
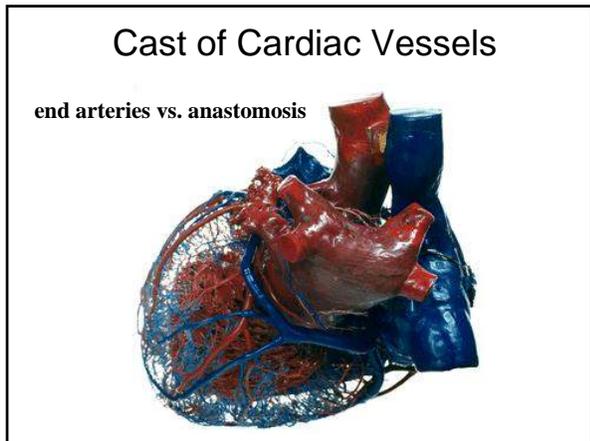
- Penetrating Trauma
  - Gun shots, knives, radio antennae?

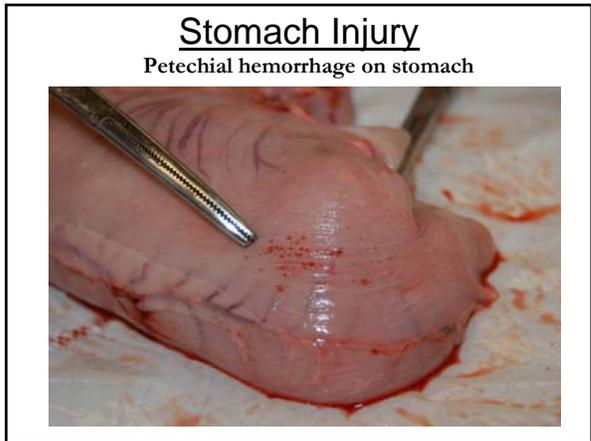
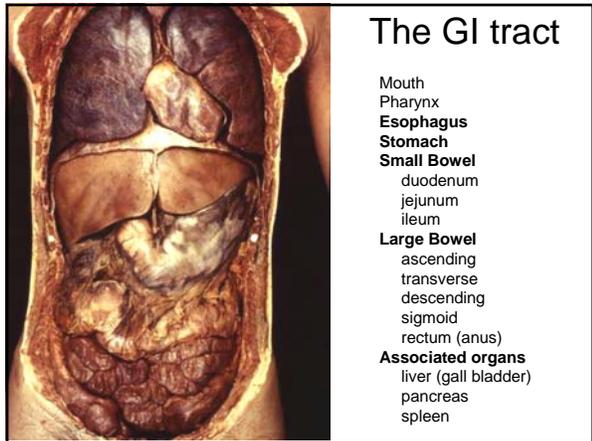
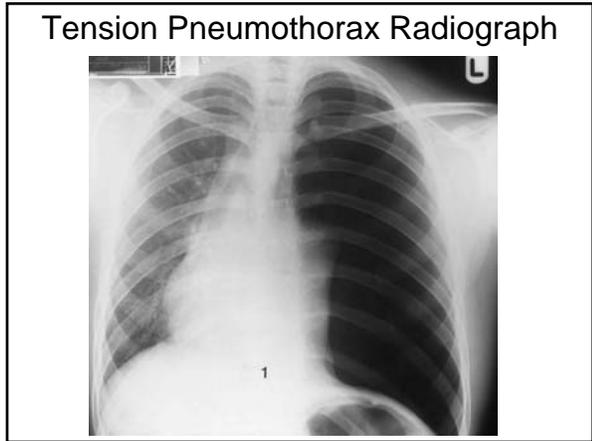
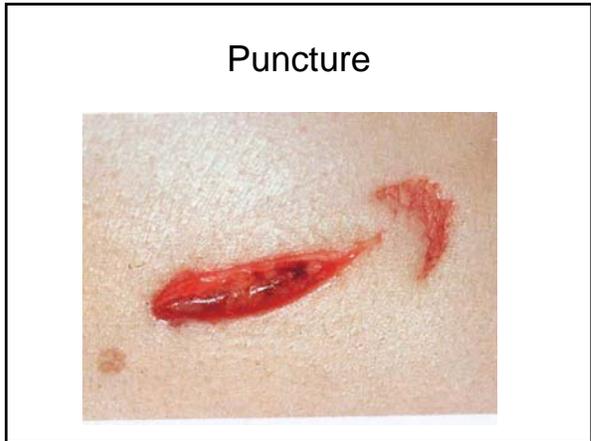
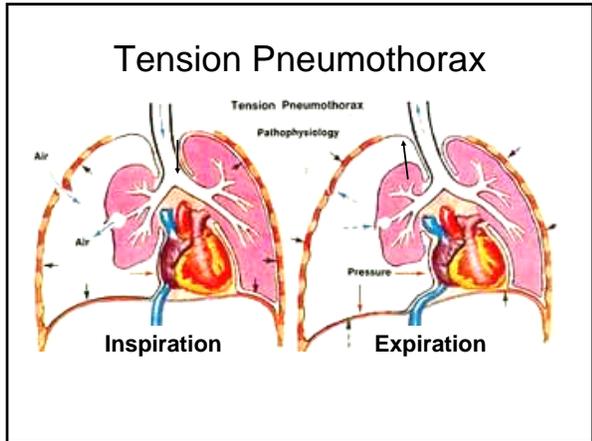


Penetrating chest injury in shock has cardiac damage until proven otherwise









## Stomach Laceration

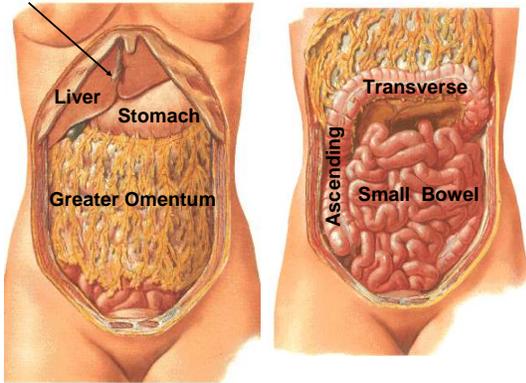
Possibly pressure induced.  
Mucosal lining pushed through serosa.



## Stomach Rupture



### Round Ligament (umb vein)



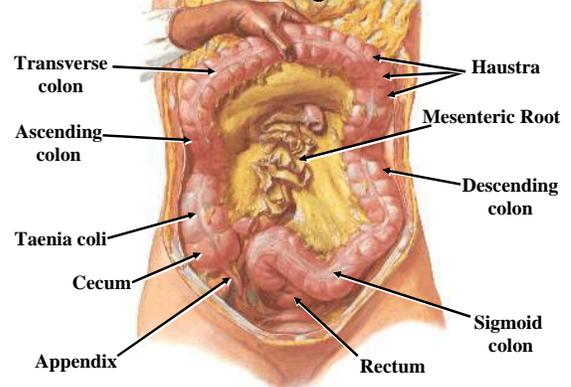
## Large Bowel Contusion



## Gross Fecal Contamination

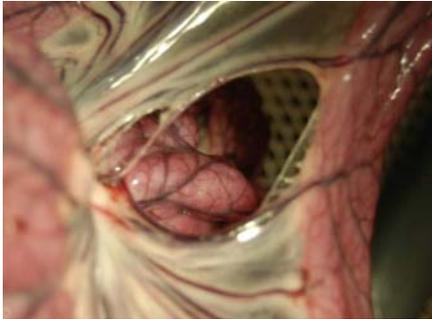


## The Adult Large Intestine



## Mesenteric Laceration

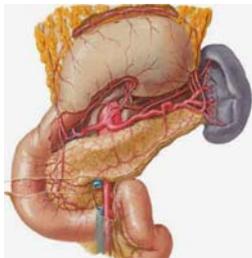
Full Thickness - 4 cm x 2.5 cm



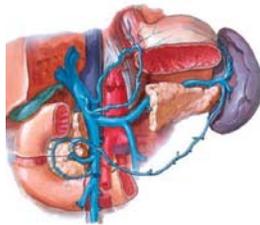
## Blood in Peritoneum



## Blood Supply of the Pancreas & Spleen

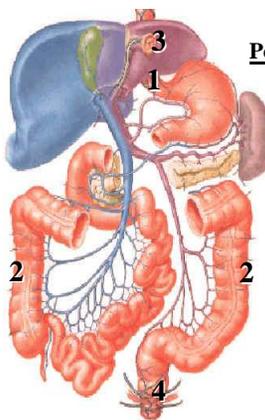


Pancreaticoduodenal arcade  
Splenic artery



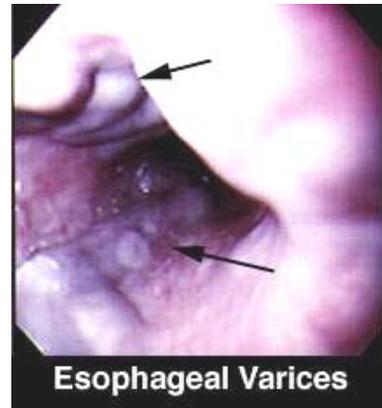
Splenic vein    Portal vein

## Splenic Laceration

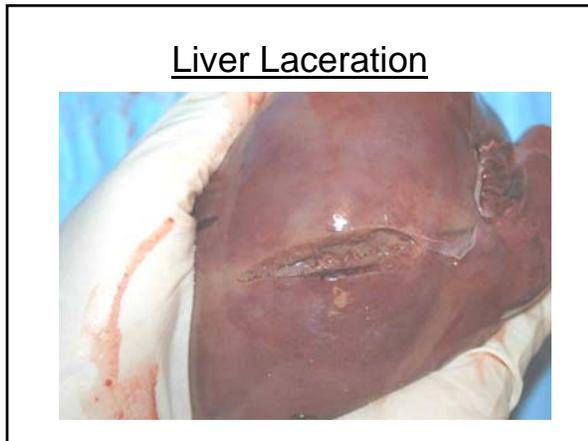
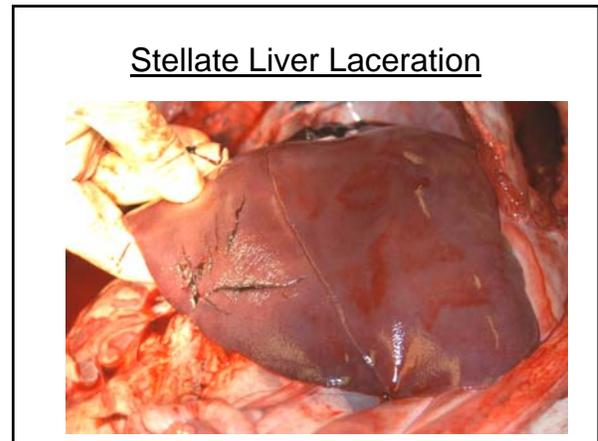
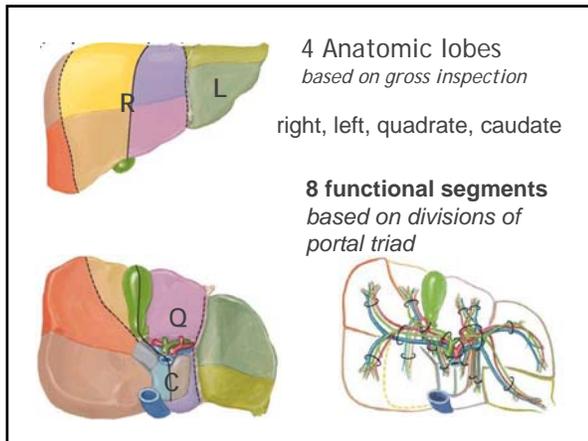


## Portal-caval anastomosis

- 1) esophagus
- 2) retroperitoneal
- 3) umbilical
- 4) rectal



Esophageal Varices



Let's Get Gloves On & Learn