

First Aid for Cyclists

New York Cycle Club SIGs

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- **Basic info:** trauma, first aid, first responder, communicating effectively with 911
- **Take Home Tips:** To prevent road injuries
- **How to maximize the chance of full recovery after an accident**
- **Your personal cyclist's first aid kit**

- Definition of Trauma:
 - *Serious injury or shock to the body resulting from violence or accident*
- # 1 cause of death under 40
- Only cancer & heart disease more deadly
- Trauma deadliest under 35
- 50 million serious injuries in U.S. annually
- 10 million are disabled from trauma
- 80,000 disabled from brain and spine trauma

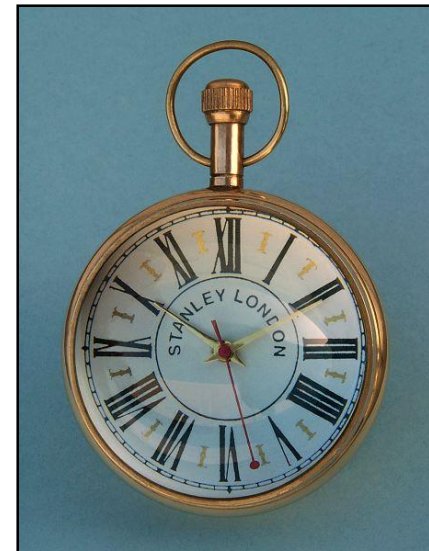
- Trauma patients fill 12% of hospital beds
- A perspective:
 - Lung cancer: 70,000 deaths
 - Breast cancer: 70,000 deaths
 - Colon cancer: 55,000 deaths
 - Trauma:

140,000 deaths

-Trauma mortality is Increasing!

- >100,200,000 bicycles in U.S.A. in 2016
- 80% of American riders still don't use helmets
- 600,000 ER visits from bike accidents
 - Williamsburg: 10-15 per week
- 20,000 cyclists hospitalized annually
- 80% deaths: from injuries to head, neck, spinal cord
- Most cycling deaths preventable
- Cycling injuries cost > \$1 billion per year
- Car Bike Collisions: 20% of serious crashes
 - But 80% of fatalities
 - Rear enders rare (7%), but about 50% fatal

- **Distributed over 3 peak times**
 - **1st peak:** within seconds to minutes of injury
 - Little can be done for these serious injuries
 - **2nd peak: within minutes to 1 hour (or so)**
 - The **GOLDEN HOUR OF OPPORTUNITY**
 - Deaths preventable with rapid, appropriate care
 - You can have the greatest impact here!
 - **3rd peak:** within days or weeks
 - Infection/failure of vital organs



- First Aid team forms immediately
- One to the victim
- One directs traffic away
- One clears the roadway
- One prepares to call 911 or flag a car
- To Leader: useful to practice team formation before ride departs
 - Rider responsibility to share potential medical risk
 - Allergies, Asthma, Diabetes, Heart Disease, Impl. Defibrillator, Seizures

PRIMUM NON NOCERE!

YOU CAN KEEP THE SITUATION SAFE!

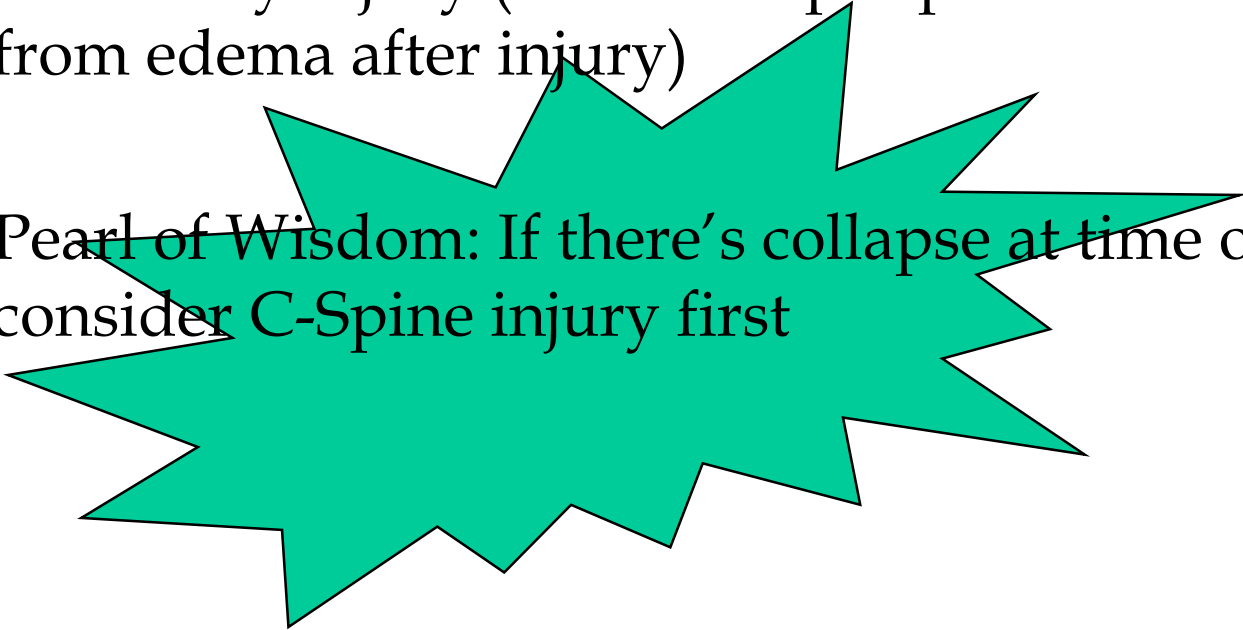
- Two bikes go down
- Crowd forms feeling helpless
- Good Samaritan removes victim's helmet
- Someone helps rider up, gives Power Bar and water
- Someone checks the bike; it's OK to ride

- WHAT DID THEY DO WRONG?

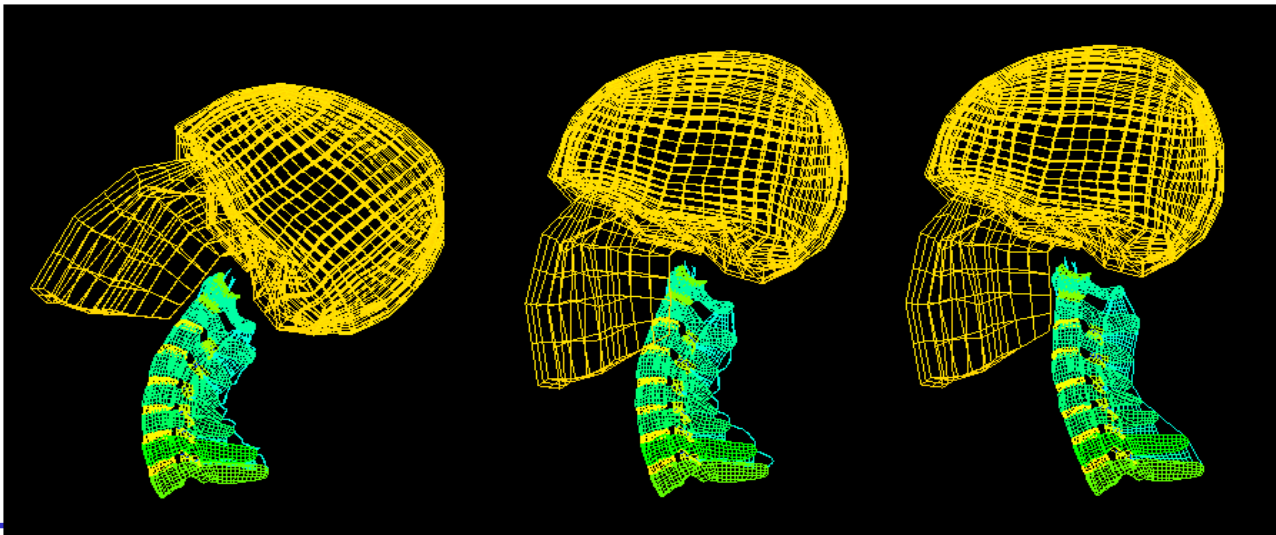
- WHAT CAN YOU DO TO MAINTAIN SAFETY?

- Stay calm: Take a few deep breaths
 - Plan what to say before dialing
 - Know what you'll be asked:
 - **Where is the emergency:** try to be precise (nearest intersection)
 - **Nature of the emergency:** "Need medical assistance"
 - **Describe what happened:** be detailed, but precise
 - **Your phone number:** Don't presume 911 knows your cell #
 - Listen to the Operator and follow orders (help is on the way)
 - Don't hang up till instructed to
 - MINIMUM: Know the accident's location
 - Be Patient; especially if you're far from town
 - Don't presume someone else will call 911
-
- *Edwin Roberts: Paramedic, triathlete, NYCC member

- **“Mechanism of Injury” (crucial concept)**
 - Direct compression of spine or spinal cord
 - Excessive flexion or extension of the neck
 - Primary injury (tear or laceration of the cord itself)
 - Secondary injury (at level of peripheral nerve cells or from edema after injury)
 - Pearl of Wisdom: If there's collapse at time of injury consider C-Spine injury first



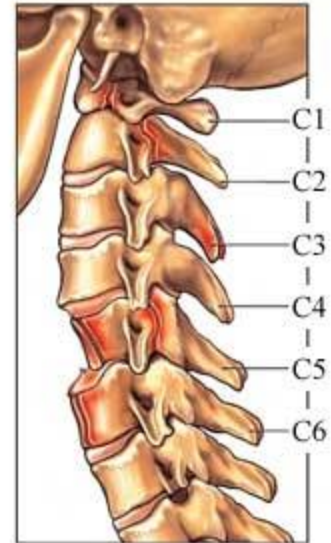
- Mechanism of Injury (CRUCIAL CONCEPT)
 - Accurate recounting to medical professionals
- Brain, Neck, Spinal Cord & Spine injuries can be catastrophic
- Sometimes effects are delayed
- A trivial injury may become lethal
- MAYNARD SWITZER





Information

- Point 1
- Point 2



- Collision sport neck injuries down

The Football Experience*

- 1976: 110 C-spine injuries/34 quadriplegia
- 1990: 42 C-spine injuries/ 5 quadriplegia
- Rules, helmets, changed tackling techniques

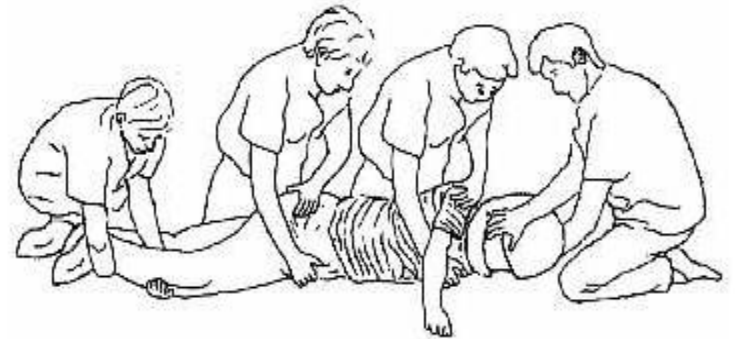
The Cycling Experience

- Race rules changed, safety promoted, helmets improved, lighter, more fashionable

- *Torg, 1987, 1988, Haldemann, 1999



- **Team Springs to Action to protect victims and others**
- **CALL 911**
- **Maintain stable head and neck**
- **Try to clarify and don't ignore mechanism of injury (even if rider says, "I'm O.K.")**
- **Don't remove helmet**
- **Don't move rider if at all possible; keep same position**
- **Use logrolling technique only if rider must be moved**
 - Demonstration of technique
- **Use "YES" or "NO" questions**

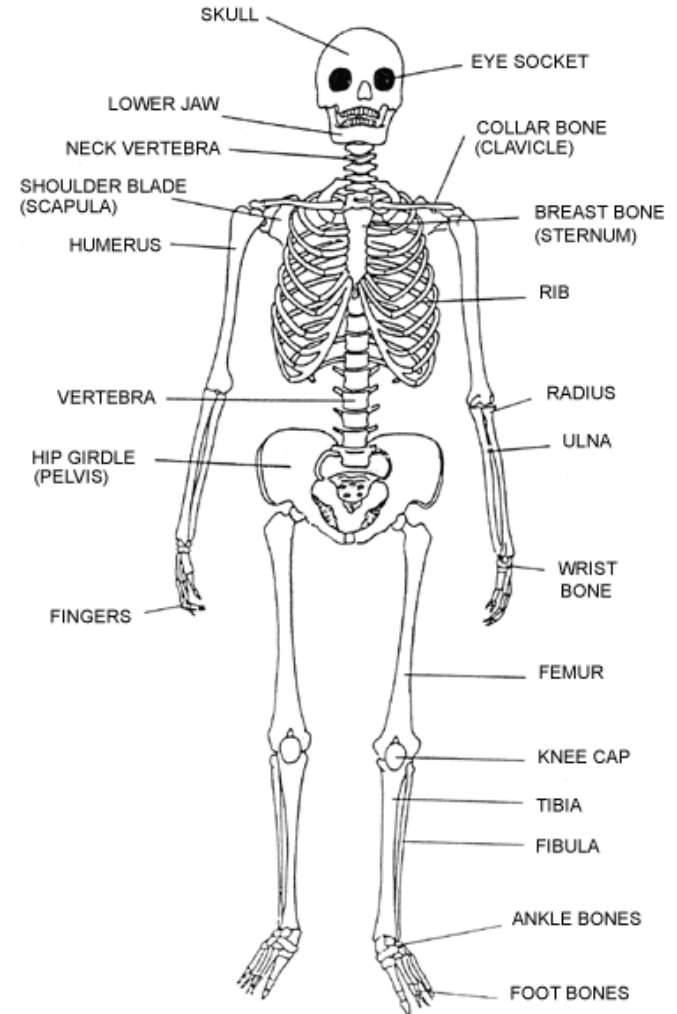


- Check A,B,C's after protecting spine
 - Airway, Breathing, Circulation

- Simple **neurological assessment**
 - Orientation (time, place, person)
 - Memory (What happened?)
 - Ask if head or neck hurts?
 - **Don't touch head or neck if there's pain**
 - If no pain, gently palpate neck w/o moving it
 - Can you move fingers and toes?

The Primary Survey - Skeletal system

- Primum Non Nocere!
- 206 bones in the human skeleton
- Long Bones and Flat Bones
 - Long bones fracture with loading or twisting forces
 - Flat bones fracture with high energy impact - DANGER
- You can check for fractures reliably with your own two hands
- PALPATE long bones gently and note areas of tenderness
- COMMUNICATE this information to EMS or ER docs





Information

- Point 1
- Point 2

Surgical Neck Fracture Humerus



Wrist Fracture



- When EMS arrives: share accident and first few minutes
 - Crucial to guiding injury classification & medical care
 - Make sure you clearly describe:
 - Mechanism of injury
 - Time of injury
 - Any loss of consciousness (even fleeting)
 - Any change in mental status (orientation, memory, level of consciousness, mood)
 - What's happened since injury



- **Very common:** 250,000 in football alone
- **Definition:** Traumatic brain injury causing a change in mental status with or without loss of consciousness
- **Mechanism of Injury:** (brain hits skull)
 - Acceleration injury
 - Deceleration injury

- Loss of consciousness if force great
- May have significant concussion WITHOUT loss of consciousness
- First aider takes control (patient can't) and makes decisions from objective info.
- Grading concussion is useful for the decision maker
 - **Guides workup, disposition and followup**

- **Colorado Coma Grading Scale**
- simple and easy to use in the field

Evaluates 3 things:

- a) Confusion, b) presence of amnesia, and c) loss of consciousness
1. **Grade I:** mild: Confusion w/o Amnesia, no Loss of Consciousness
2. **Grade II:** moderate: Confusion with retrograde or anterograde amnesia
3. **Grade III:** severe: Loss of consciousness (regardless of duration; even 1 second)

- **Grade I:** Confusion alone
- Triage to Urgent Care Area
- Frequent reevaluation (signs of amnesia, irritability, dizziness, hyperexcitability)
- May signal incorrect initial grading
- Rider may cycle carefully if no symptoms at rest and exertion after 45 min. of observation.

- **Grade II:** Confusion with amnesia
- No more cycling today
- Triage to trauma, detailed neuro assessment; may need CT and X-Rays
- Observe often for worsening headache, nausea, vomiting, change in vision, changing neurologic signs and mental status (fall asleep easily, drowsiness, etc.).
- Admit to hospital if symptoms worsen or don't improve

- Symptoms normally clear in hours to days
- May return to cycling after 1 week of no symptoms (may be a month after injury though).

- KNOW ABOUT:
- THE SECOND IMPACT SYNDROME

- **Grade III (severe):** E.R. evaluation needed
- **First Aid Team forms** (all done simultaneously)
 - One secures field/roadway & diverts traffic
 - One calls “911” and decides who will accompany patient to Emergency Room
 - One begins c-spine precautions (don’t remove helmet!)
 - EMS will stabilize and immobilize
 - A,B,C’s, “Are you OK, Are you OK?”
 - Airway, Breathing, Circulation
 - Do you need to begin CPR?, No smelling salts (EVER)
Never, ever use smelling salts to speed return of consciousness
 - Mental Status: level of consciousness, orientation, memory: **POSSIBLE CONCUSSION!**

- You're the patient's advocate: Make sure:
- Triage to Trauma Immediately (not waiting room)
- Will have a THOROUGH neuro assessment and:
 - CT Scan
 - Head and/or spine films, urine/blood tests
 - Should be monitored at least several hours with frequent reassessments
 - Hospitalize overnight if no improvement or abnormal tests.

- Cyclist may ride after no less than 4 weeks
- Need time for brain to heal
- May be new symptoms with healing process
 - Dizziness, ringing in ear, headache, dysequilibrium
- But at least 2 weeks symptom free before active riding?
- Why ???

- **Heat Cramps, Heat Exhaustion, Heat Stroke**
- Heat Stroke: the #3 cause of death in high school athletes after neck trauma and heart disorders

- Cycling produces a lot of heat
- Heat must be dissipated (body = 98.6 deg)
- If heat remains & core temperature rises:
 - Metabolic abnormalities
 - Blood clotting disorders and hemolysis
 - Vital organ dysfunction
 - Organs fail
 - Seizures and DEATH are not uncommon

- Four ways:
 - Evaporation
 - Convection
 - Conduction
 - Radiation

- **< 68 deg F**: heat loss via conduction & radiation
- **>68 deg F**: heat loss via evaporation (up to 85% excess heat lost by sweating)

- **Risk Factors for Heat Stroke**

- High ambient temperature (>95 deg)
- High humidity + high temperature
- Excessive exertion
- Dehydration
- Heart disease, diabetes, hypertension, anorexia, bulimia, hyperthyroidism, fever, prior heat stroke, prescription medication, illicit drugs, advanced age

- **Progression of bodily changes first**
 - Dizziness, weakness, headache, malaise
 - May last very short time (if very hot and if exercise is intense)
 - May be missed, first sign: delirium and brink of collapse!
 - Skin may be moist or dry (it's a myth about not sweating)

- Body's heat production outstrips ability to cool down.
- Cooling system then shuts down and temperature rises precipitously
- Core temperature >105.8 deg.
- Skin feels very hot
- Heart races, breathing quickens, blood pressure drops (shock).
- This is a **MEDICAL EMERGENCY**

- Team forms simultaneously (rider probably fell off bike)
- One secures roadway and diverts traffic.
- One moves people, bikes & stuff off road
- One calls 911
- If collapsed, take neck precautions, do the A, B, C's,
rapid cooling imperative, fanning
 - If no obvious trauma (ie did not fall off bike) raise legs to improve blood flow to the heart

- You're the patient advocate again:
- To E.R. immediately; Triage to ICU area. There is a significant chance of death.
- Expect treatment to be with rapid cooling, EKG's, frequent BP monitoring, IV fluids, correction of metabolic abnormalities, search for infection or toxicities, lots of blood tests, X-rays, urinary catheter.
- Should be admitted to ICU in hospital for aggressive treatment and monitoring.

- **Heat Cramps** (severe muscle cramping from muscle dehydration, loss of sodium)
- **Heat Exhaustion:** Same mechanism as heat stroke, temperature < 104.9 deg F.
 - Serious metabolic consequences rare
 - Heat dissipation continues (still sweating)
 - Headache, cramps, nausea, vomiting
 - Death quite rare, but not impossible

- Treatment:
 - Stop exercising immediately
 - Get out of the heat (or in shade)
 - Remove excess clothing (not all)
 - Aggressive re-hydration and cooling
 - Wet down and fanning
 - Get to hospital
 - Doesn't need intensive care

- Adequate Hydration before the ride if it's hot out (especially if you perspire a lot)
- Fill your tank: “total clarity of urine.”
- Wear protective clothing, use sun block,
- Drink often
- If it's really hot ($>95^{\circ}\text{F}$), just go bowling!

- Why TV cameras at mile 22 of Marathons
- Glucose as the body's fuel (glucose and glycogen)
 - Sites: blood, muscles, liver – WHILE EXERCISING:
 - Blood: <3 min of fuel in your blood stream (6 gm = 24 calories)
 - About 90 min of fuel in your liver (150gm = 600 calories)
 - Muscles: 10 min. fuel / pound of muscle
 - Why, even with normal blood sugar, muscles depleted of glycogen will fail and brain starts having lousy judgment
- Role of training, judicious sprinting and **refueling**
- Easy to confuse bonking with dehydration

• $70 \text{ mg glycogen / gm hepatic tissue} \quad 15 \text{ mg glycogen / gm muscle tissue} \quad 100 \text{ mg glucose / 100 cc blood} \times 6 \text{ L} = 6 \text{ gm glucose} \times 4 \text{ cal / gm} = 24 \text{ cal. Energy in circ. Blood volume}$

- Prevention
 - Inform leader if diabetic, wear medic-alert bracelet
 - Prepare with proper fuel (hearty breakfast), refuel frequently.
 - Stop cycling and eat if developing symptoms: don't be afraid to ask the leader to stop the ride!!!
- Treatment of Hypoglycemia:
 - Call 911 (even if symptoms seem to resolve)
 - **DO NOT INJECT INSULIN**
 - **Useful to have: glucagon (by injection)**
 - If fully conscious immediately provide sugary food or drink, follow this with 'complex' carbohydrate
 - Do not attempt to feed or provide drink to an unconscious person

- **ABRASION: superficial injury skin and possibly some underlying soft tissue is scraped off after impact with roadway**
- Team forms, secure roadway, divert traffic
- Check if mechanism of injury could cause head or neck injury
- If so, treat like concussion and protect head and spine (don't remove helmet), call 911
- Use Examination Glove: Obvious bruises?, ripped clothes? Wet spots? Blood?
Perform a brief skeletal survey:
 - Palpate limbs: Any tenderness, anything look funny?

- If I can walk on it, it's not broken (**WRONG**)
- If mechanism of injury can break a bone, get X-ray
 - Common fracture sites: clavicle, shoulder, hands, wrist, ribs, ankles, pelvis
- Common injury sites: POINTS & TIPS: elbows, hips, shoulders, hands, knees, forearms.

- Remove dirt, glass, sand with water
- If no water, whoever has the cleanest hands (use examination glove if you have one)
- Clean again with plain water and apply antibiotic ointment or cream
- Cover loosely if you have bandage, if not, leave open to air
- Wash and scrub with soap & water at first rest stop. Reapply antibiotic and bandage

- Change dressings 1-2 times a day till scab
- Tetanus toxoid if last shot 10 years
- Tylenol, aspirin or ibuprofen
- Expect to feel achy all over for a few days
- Shave your legs ????????

- Definition: Cut, gash in skin; may involve muscle, nerve, bone, arteries and veins
- If gushing: Direct Pressure (no tourniquet); 5 minutes, if no suggestion of spinal injury, raise affected limb
- Will need suture if large and deep
- Clean with water; may need antibiotics
- Get plastic surgeon if on face
- Tetanus toxoid

- Health Insurance Card + MD name/phone
- Cell Phone
- Emergency contacts and personal list of meds, diagnoses and allergies
- Aspirin (or Tylenol, or Ibuprofen or Aleve)
- Bacitracin ointment
- Chapstick
- Water in at least one bottle

- Band Aids (a few sizes) or 4X4 or 2X2 gauze and tape
- Personal emergency meds (Epipen, asthma MDI, glucagon, hard candy)
- Examination gloves
- Train Pass
- Money and credit card

- “He’s an accident waiting to happen”
- Pre Ride:
 - Plenty of sleep the night before (no EtOH)
 - Drink fluids and bring 2 bottles
 - Eat a good breakfast (don’t diet on your ride)
 - Fever? Feel crummy?: think twice about ride
 - Wear appropriate clothing
 - Sun block and eye protection
 - Pack pocket food

- Pre-Ride (Bike):
 - Bring 2 tubes, appropriate tools and pump
 - Do the one minute bike check, especially:
 - Check tires, fill with air, no bald spots
 - Check brakes
 - Leader: permit only bikes with two brakes
 - Bars tight?
 - Shoes clip in and out; cleats not worn
 - Nothing hanging or loose on you or bike?
 - Front and rear lights if you might ride after dark
 - You Want To Be seen rear and front
 - Dress in bright clothing; reflective is best
 - Avoid the flashing/blinking settings

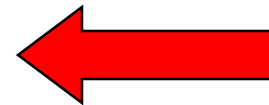
- On the ride
 - Know your riding partners, especially for pace lines
 - Make sure all ride predictably and safely
 - Don't say "clear" at intersections
 - Watch out for end of ride pre-bonkers

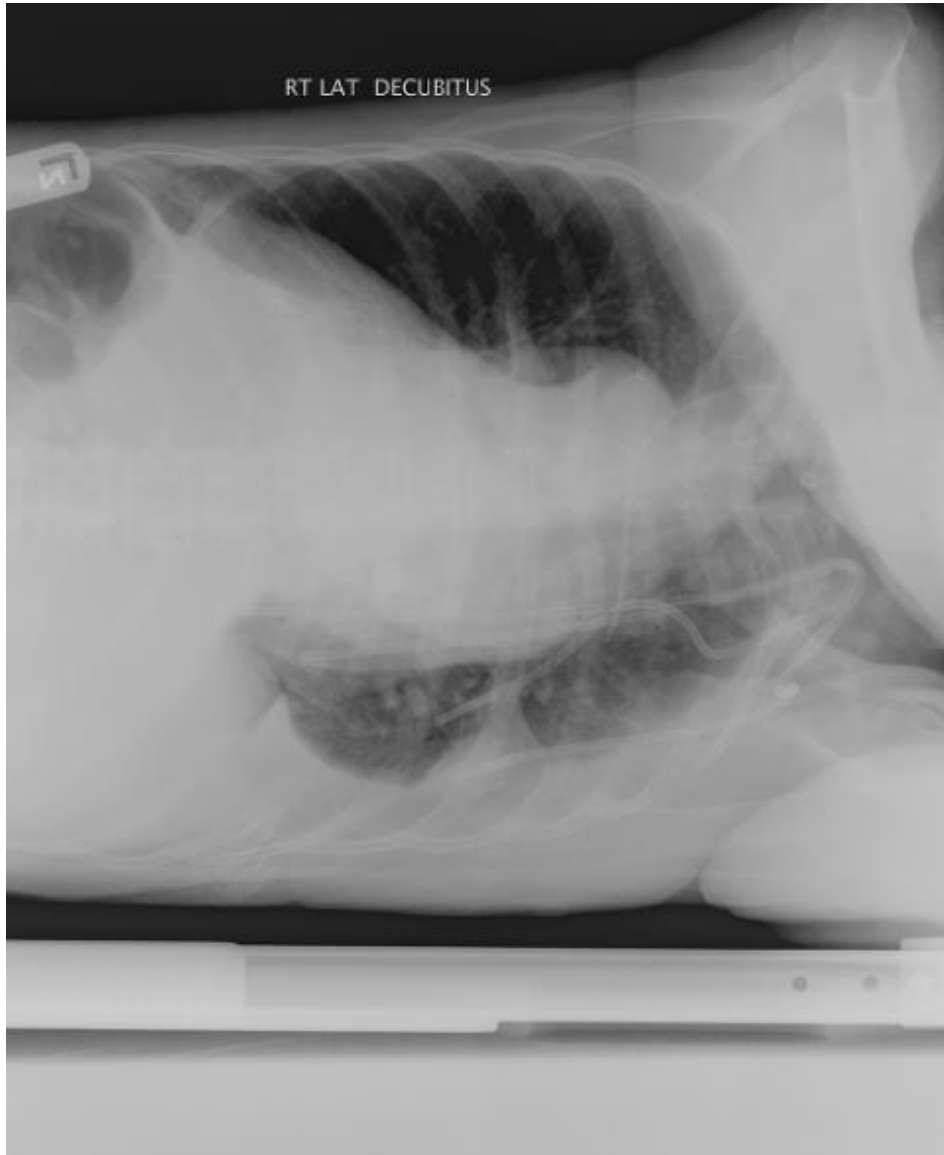
- **DON'T BE THE CAUSE OR RESULT OF A SLOPPY RIDER CAUSING AN ACCIDENT**



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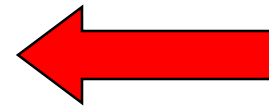
- Point 1
- Point 2





Information

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Thank You!

