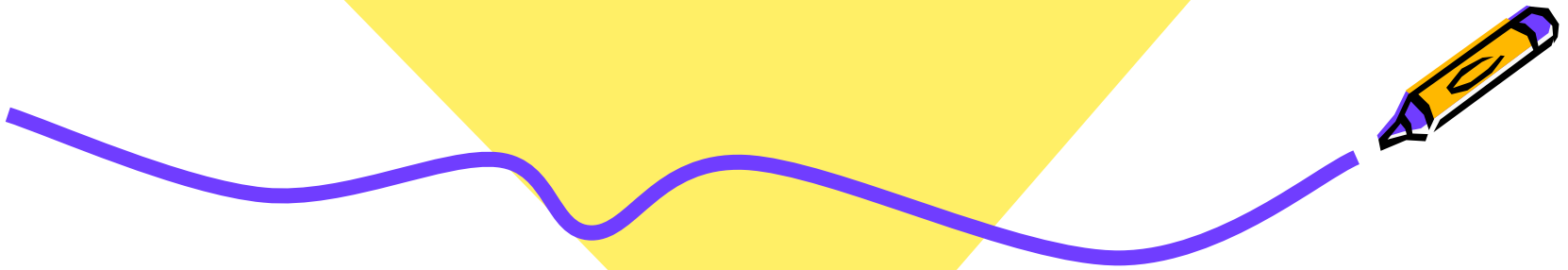


# Regional injuries



# **Transportation injuries**

1. Vehicular accidents
2. Railway accidents
3. Aircraft accidents

# Road traffic accident (RTA)

- RTAs accounts the great majority of accidental deaths world wide
- Forensic exam- to determine the nature and manner of causation of injuries on a pedestrian, or the occupant or rider of the vehicle
- At times it may be necessary to reconstruct the details of an accident on the basis of the pattern of injuries especially if there are no eyewitness



# Road traffic accident (RTA)

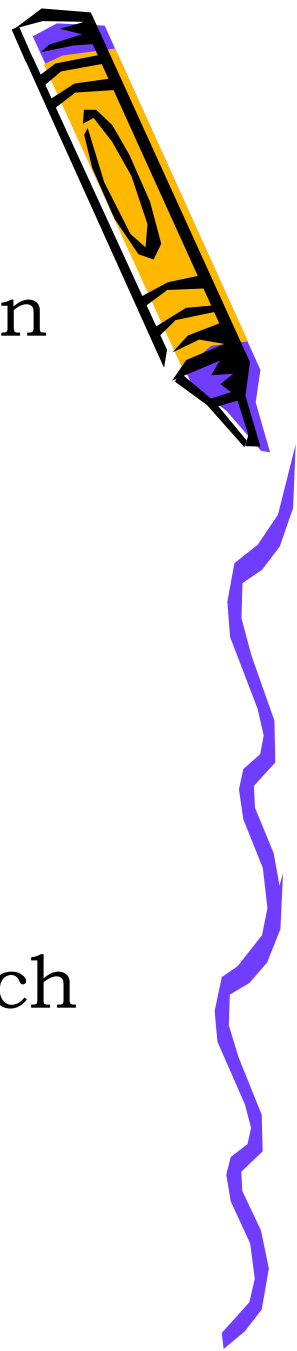


- Apart from injuries a doctor has to observe whether the driver or pedestrian was suffering from any disease or disability or if there is evidence of intoxication
- Identification of vehicle involved in a hit and run case may be assisted by looking for trace evidence that is likely to have been exchanged between victim and vehicle at the time of impact



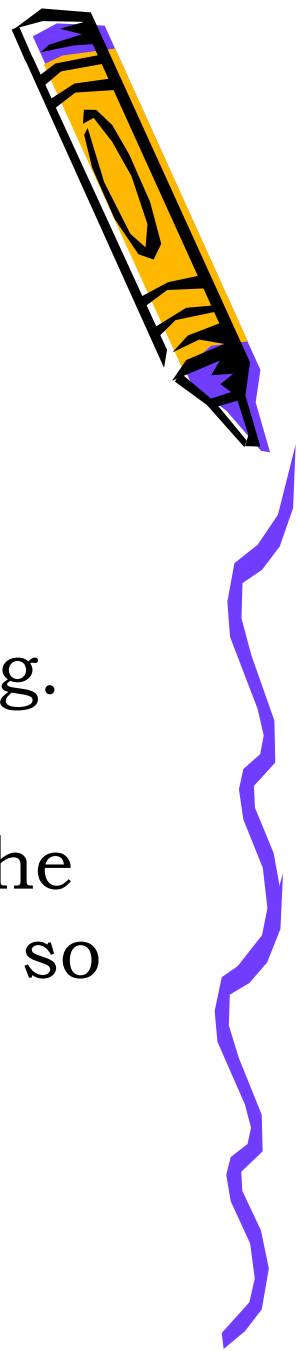
# Vehicular accidents

- **Injuries to Pedestrians:** **Three** pattern of injuries are often seen
  1. Primary impact injuries (the first part struck)
  2. Secondary impact injuries (further injuries caused by vehicles)
  3. Secondary injuries or tertiary injuries (injuries caused by striking objects such as ground)

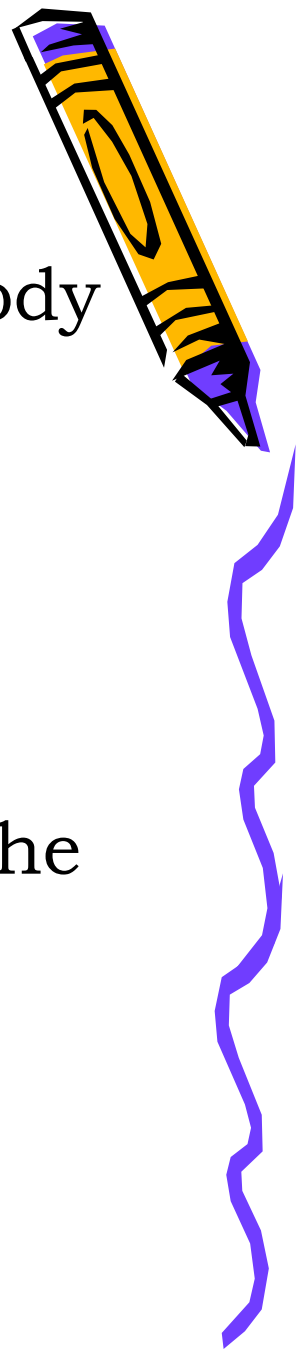


# Primary impact injuries

- Injuries depend upon position of the person in relation to the vehicle when struck
- Injuries also depend upon the relative height of various parts of the vehicles e.g. bumper, fender, radiator etc.
- In typical case, the victim is struck by the front of the vehicle and sustain fracture so called **bumper fracture** on legs



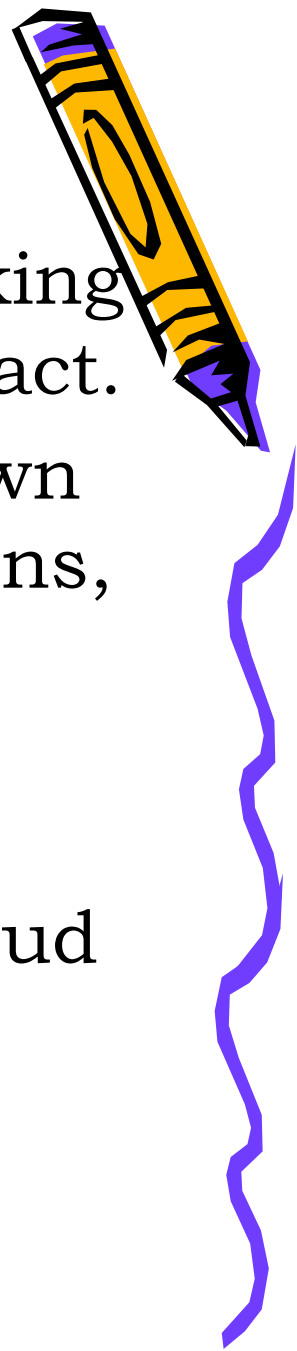
# Secondary impact injuries



- If the feet slides forward, the whole body will fall backward with a secondary impact of the head against the windshield or he may thrown into air and fall down on hood or on ground
- They may be abrasions, contusions, fractures of various bones including the skull.



# Secondary injuries



- These result from the body parts striking the ground following the primary impact.
- When the pedestrian is violently thrown to the ground, he can sustain abrasions, bruises and lacerations over the bony prominences such as elbows, knees, hips , face back or front of trunk
- The parts struck will be soiled with mud and dirt



## Speed of vehicle:-

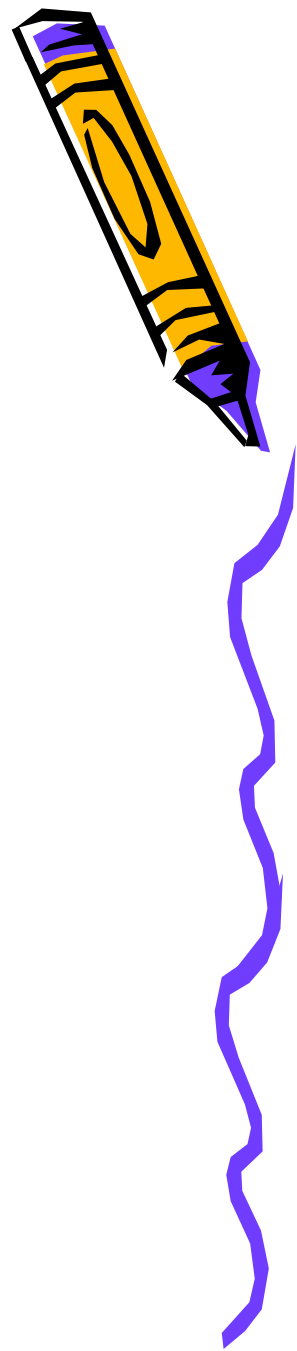
- At a speed of **20 kmph**, the person can be thrown away.
- At speed of **40 to 50 kmph** if the vehicle strikes a person below the center of gravity of his body, he is thrown upward and slides on the bonnet (scooping up)
- At speed **more than 80 to 100 kmph**, the pedestrian may be thrown higher and fall on the roof of vehicle
- In general higher the speed more severe the injuries.



# Injuries to occupants of the vehicle

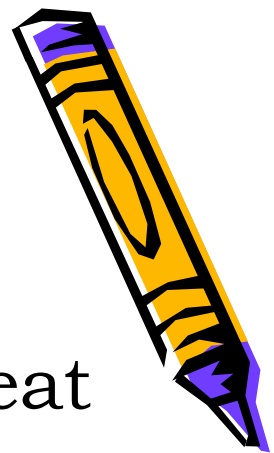
## Injuries to driver:

- These injuries are because of violent acceleration or deceleration force.
- Mechanism: forward movement–stop---backward movement
- There are fracture of patella, femur
- Steering wheel impact injury.



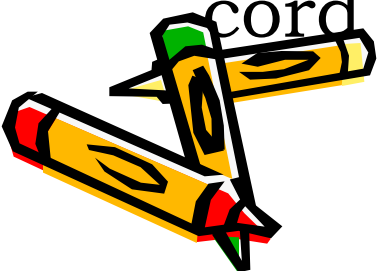
# Whiplash injury

- It is caused due to violent acceleration or deceleration force applied to front seat occupant
- **Mechanism:** vehicle sudden stop—heavy head continues to move forward (**acute hyper flexion**)----- when body comes to rest or the head strikes to obstruction in front----- **reactionary hyperextension** as the head is thrown backward
- This double movement is called as whiplash

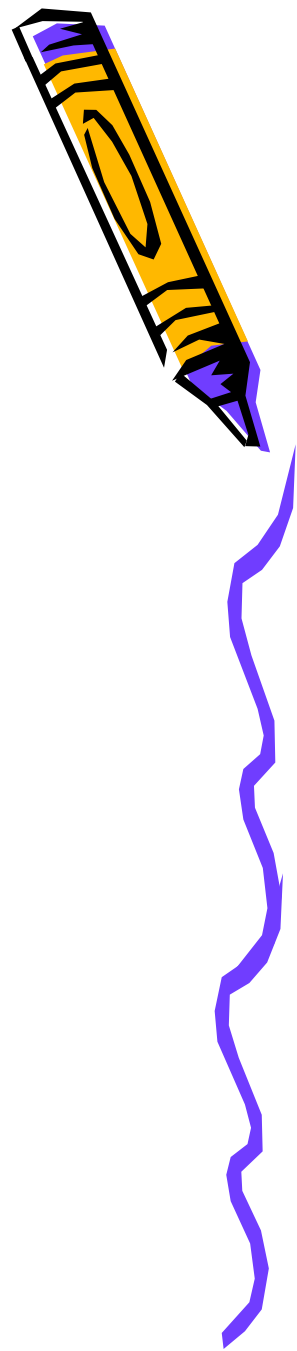


# Whiplash injury

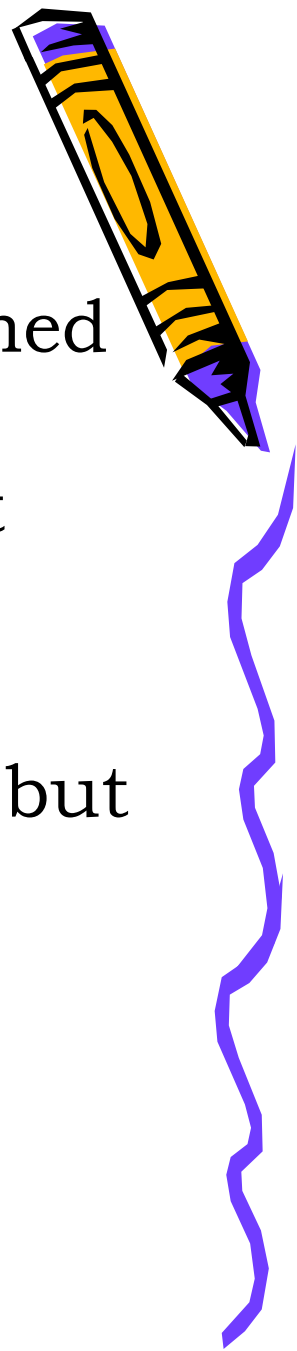
- Atlanto-occipital dislocation in one third cases
- Less commonly a fracture dislocation in lower part of spine at about C5 and C6
- Laceration of tendons and joint capsules, intra-articular haemorrhages and tears with separation of cartilaginous lining of articular surface may occur
- Fatal contusion or laceration of spinal cord may occurs without fracture of spine



# Injuries to back seat occupant



# Injuries to back seat occupant

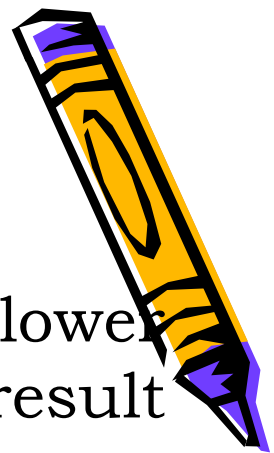


- During violent deceleration unrestrained back seat occupants are projected forwards and strikes the back of front seat including head rest and suffer injuries
- Facial , neck, pelvic and arm injuries but **more abdominal trauma**



# Seat belt injuries

- Abrasions, contusions and haematomas of lower abdomen and chest wall can occur as direct result of seat belt trauma.
- Small intestine avulsions, intestinal, omental, and mesenteric lacerations and intestinal contusions and perforation occurs , known as **seat belt syndrome** due to acute flexion over lap trap.
- Rupture of spleen, liver, pancreas, caecum and bladder occur due to compression between belt and vertebrae
- The abdominal aorta may be crushed



# Railway accidents

## Accidental railway injuries

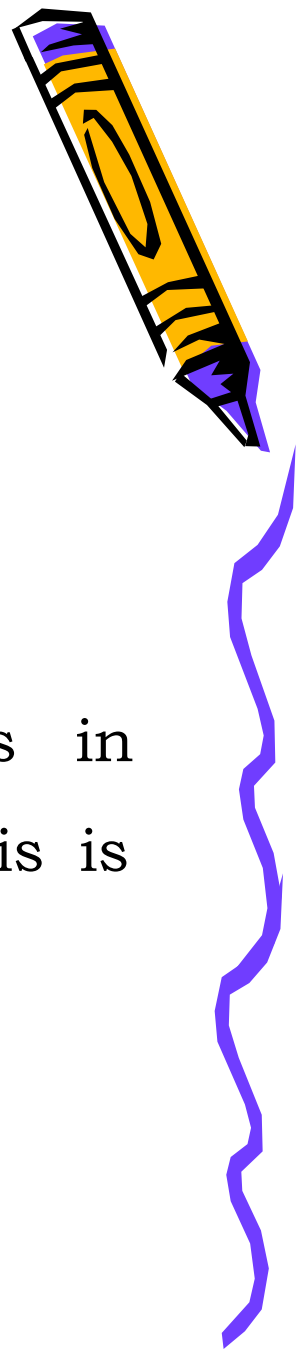
- When person **walks on the track**, primary injuries are seen on the front or the back due to contact with the protruding part of engine
- Secondary injuries are produced due to being thrown or run over which are soiled with oil and dust
- **Line crossing**- primary injuries seen on the side of the head and shoulders.
- When the person walks **at the side of the line**, the shoulder or head may be hit by some protruding part of train.
- If person **fall from the train**, multiple injuries are produced.
- **Boarding**- may thrown of or crushed between train and platform

# Suicidal railway injuries

- The injuries are extensive and due to primary impact.
- If person lie down on the track, extrusion of organs, traumatic amputations of the limbs or trunk or decapitation may occur.
- **MLI-** sometime person killed and the body placed on the railway track to simulate suicide or accident.
- In such cases, examination of crime scene and the body for marks of violence will often solve the problem.



# Railway Spine (Concussion of spinal cord)



## Cause

- Railway and motor accidents (*most common*)
- Severe blow to the back
- Fall from height.

## Symptoms

Headache, giddiness, restlessness, weakness in limbs, amnesia, loss of sexual power, paralysis is temporary, recovery occurs in 48 hours.



# Aircraft injuries

- Most of the aircraft accidents occur on landing (35%) or take-off (35%).
- Crash accident- both during landing and take-off the passengers are usually secured with lap type of safety belt
- Many types of injuries seen in relatively intact bodies.
- Fracture of spine- Thoracic spine common
- Fracture of base of skull- ring fracture
- Fracture of lower leg due to seat displacement typically during landing.

