



WHIPLASH

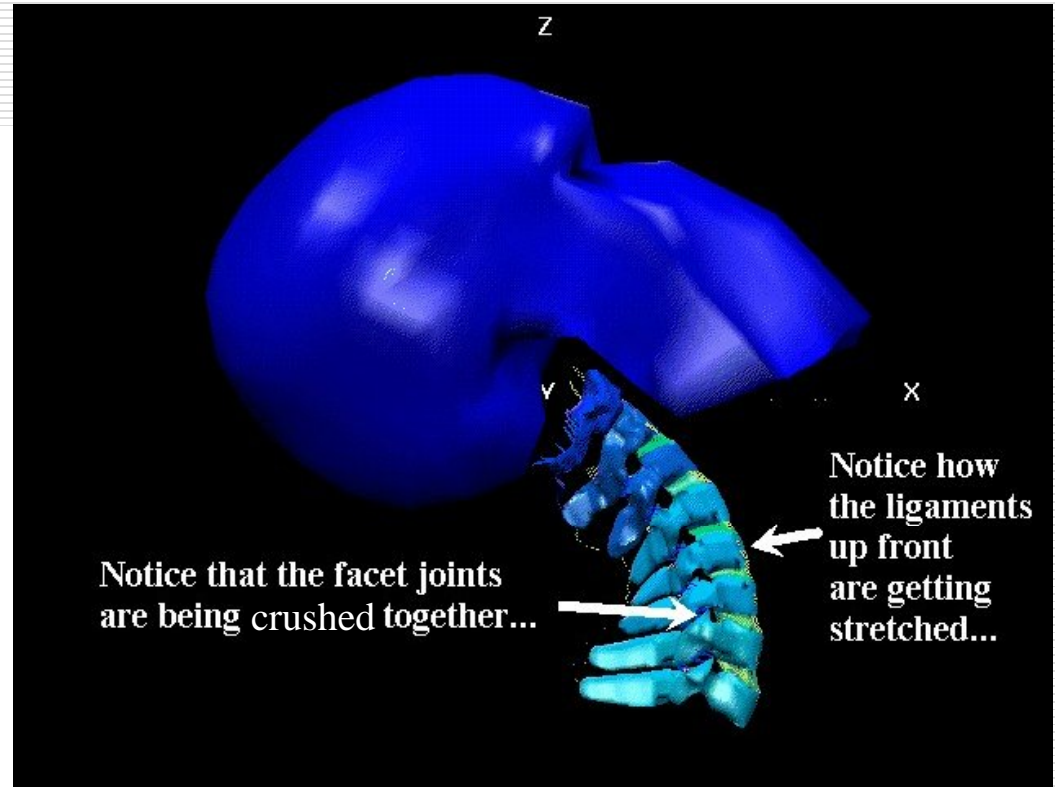
Adapted from BP digital services presentation

July 2008

What is Whiplash Injury?

Definition:

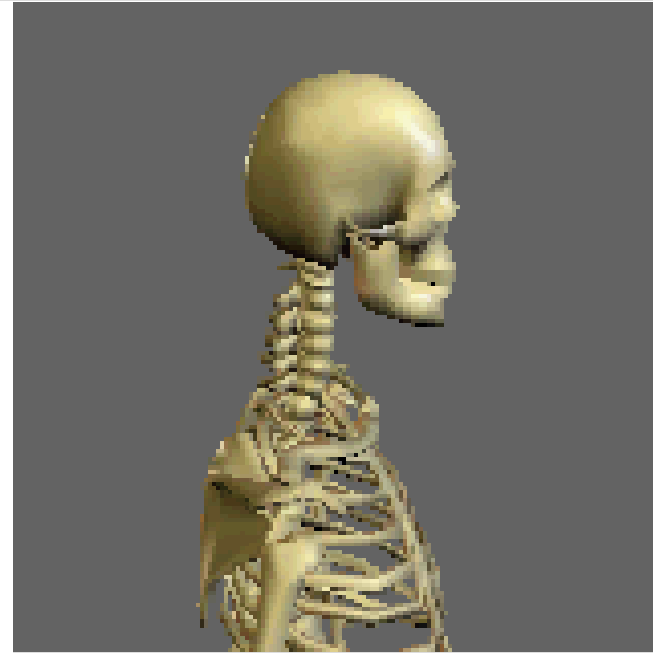
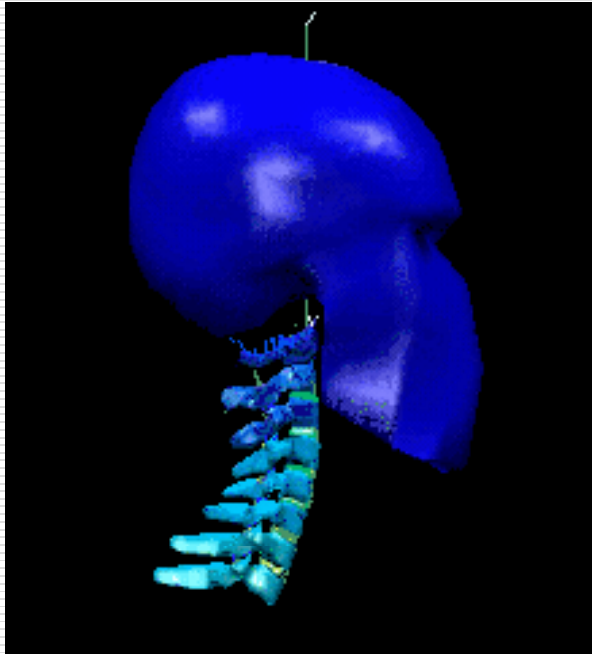
Whiplash is an acute injury of at least moderate intensity which causes a strain to the bones, muscles, nerves, tendons, and vertebral discs of the neck region. It is caused by a sudden, unexpected impact which jerks the head back causing it to snap forward with resultant injuries to ligaments and other anatomical structures



HIGH RISK SCENARIOS

- 1) Traffic/stop light ('traffic light disease')
 - 2) End of traffic jam/queue
 - 3) Sport (Boxing, Karate, Judo.....)
 - 4) Roller coaster
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SYMPTOMS



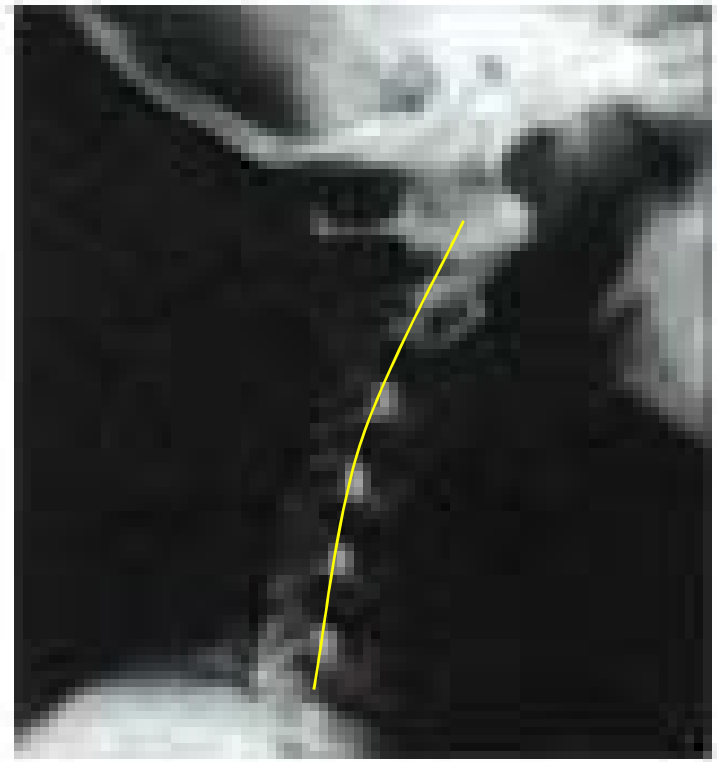
Symptoms are:

Headaches/migraines, neck stiffness, neck pain, dizziness (nausea/vomiting), numbness and tingling (arms, face, shoulders), jaw pain, low back pain, hip pain, impaired vision

RESULT OF INJURY



Before



After

Note abnormal curve after suffering from a whiplash injury.

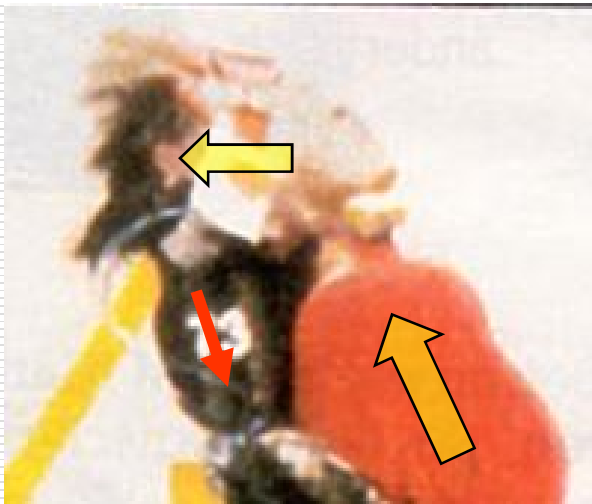
RISKS TO THE DRIVER



What happens during a rear end collision if:

- head restraint
- seat position
- seat belt height

are not adjusted correctly?



1) Body moves up – depending on angle of backrest and position of seat belt adjustor.....

2)head jerks back.....

3)pushing the head restraint down

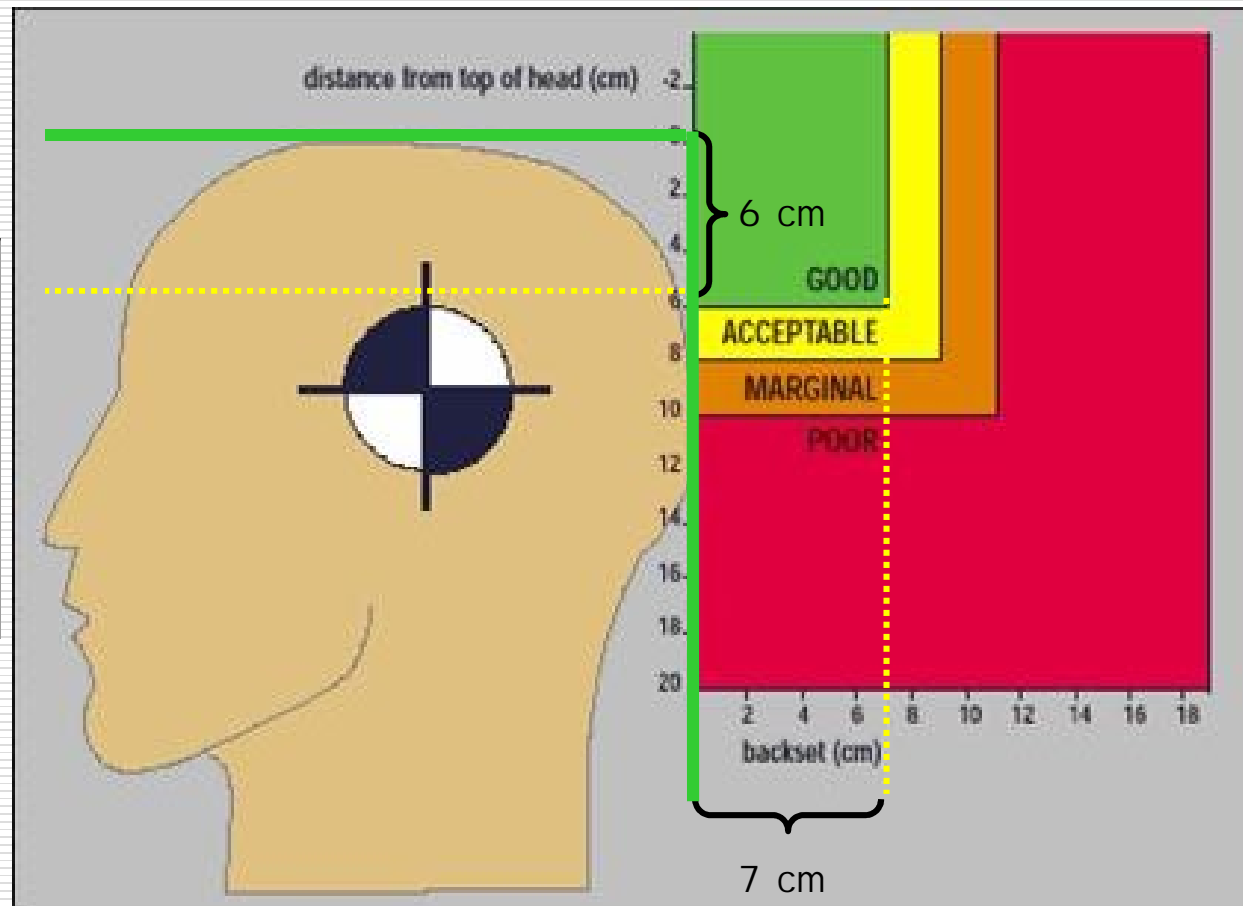
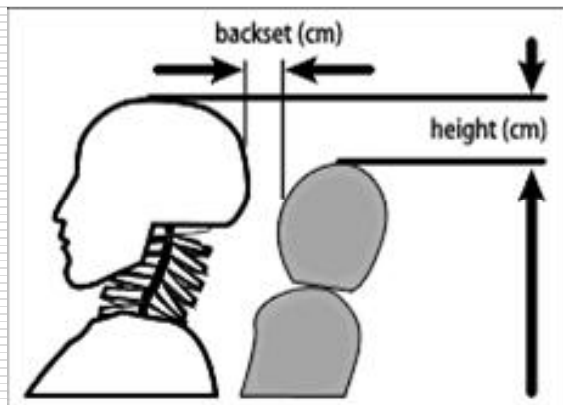
FACTS

- even **low speed accidents** can cause significant injuries depending on where and how hard your car got hit, your position in the car, the position of your head, type of seat, **position of the headrest**, your pre-accident medical condition, and other things
- **only 12%** of persons who suffer from whiplash are **symptom-free after 10 years**
- **Saab was the first** to introduce an active protection system (SAHR); Volvo's "Whiplash Protection Seating System" **reduces acceleration/deceleration forces on the neck by up to 50 %**
- A study by Young et al. (2005) showed that **93%** of all head restraints observed were **sub-optimally positioned**

A L Young, B T Ragel, E Su, C N Mann, E H Frank: Assessing automobile head restraint positioning in Portland, Oregon; Injury Prevention 2005; 11: 97-101.

PREVENTION

Adjust your head restraint



- 1) Ensure that the top of the head restraint is as high as the top of your head.
- 2) Position the head restraint as close to the rear of your head as possible.

Sources: http://www.iihs.org/ratings/head_restraints/head_restraint_info.html
http://www.rospa.co.uk/roadsafety/info/adjust_head_restraints.pdf

PREVENTION (2)

Examples of Properly and Poorly Adjusted Head Restraints



Picture 1

This picture shows a well-adjusted head restraint, which will reduce the risk of suffering a whiplash injury.

The seat back angle is relatively upright, and this allows the head restraint to be positioned close to the back of the head.

The top of the head restraint is level with the top of the occupant's head, which will also help to prevent injury.



Picture 2

This picture shows a poorly adjusted head restraint.

Even though the top of the head restraint is level with the top of the occupant's head, a large gap exists between the back of the occupant's head and the head restraint.

This gap – which is marked using the yellow arrow – means that the head can move and tilt further back, increasing the risk of injury.

Source: http://www.rospa.co.uk/roadsafety/info/adjust_head_restraints.pdf

PREVENTION (3)

Examples of Properly and Poorly Adjusted Head Restraints



Picture 3

This picture shows another example of a properly adjusted head restraint.

As in Picture 1, the two main points to note are that the head restraint is as high as the top of the occupant's head, and the restraint is close to the back of the head.



Picture 4

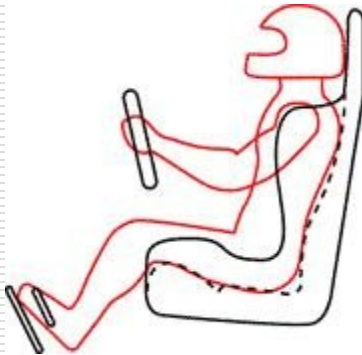
This picture is an example of a poorly adjusted head restraint.

The yellow arrow shows the distance between the top of the occupant's head and the top of the head restraint, which would increase the risk of an injury.

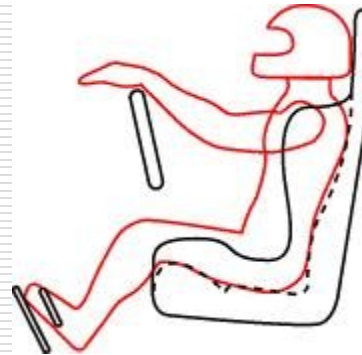
The head restraint should be moved higher in order to adjust it correctly, as shown in picture 3.

PREVENTION (4)

Adjust your seat position



First, the **driver's back should be flat against the back of the seat** with the buttocks squarely tucked into the corner created at the intersection of the seat back and bottom. The **underside of the legs should be in contact with the seat bottom**. The purpose of this position is to provide as much surface contact between the driver's body and the seat. This has safety benefits as well as providing the driver with the most tactile feedback as possible



Second is the arm position. **The arms when fully extended should allow the wrists to rest at the top of the steering wheel**. This allows the arms to be slightly bent at the elbow when fully extended for a turn. The purpose of this position is to prevent the arms from being overextended during turns (the shoulders should not need to lift from the seat back even to do a full arm crossover). Overextending the arms will cause them to tire quickly, and will cause the driver to lose sensitivity to the vibrations in the steering wheel



Third is the leg position. **When any of the pedals are fully depressed with the ball of the foot on the pedal (not the toes), the leg should still be bent at the knee**. This is to prevent overextension as described for the arms. Be sure that the knees are not against the underdash or steering column. In fact, there should be several inches room to prevent injury in event of a collision.

PREVENTION (5)

- 1) **Adjust head restraint** – not only in your own car!
 - 2) **Adjust seat position**
 - 3) Check seat belt adjustor position
 - 4) Leave plenty of space between your car and the next (escape route) if you are the last car in a traffic jam – closely observe oncoming traffic in rear view mirror
 - 5) Look up safety ratings before buying your next new or used car
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USEFUL LINKS

- <http://www.euroncap.com/> (European New Car Assessment Programme)
 - <http://www.hwysafety.org/> (Insurance institute for highway safety – USA)
 - <http://www.aap.org/family/carseatguide.htm> (American Academy of Pediatrics – Infant Car Seats)
 - <http://www.thinkroadsafety.gov.uk/> (Department for Transport (UK) - Multiple Topics)
 - <http://www-nrd.nhtsa.dot.gov/pdf/nrd-51/MiscBio/headpos.pdf> (Head restraint related info)
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