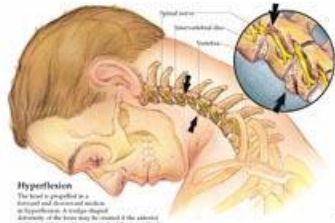
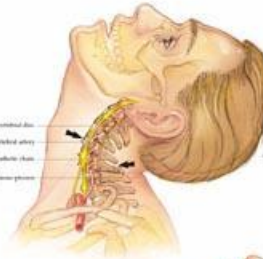


WHIPLASH INJURIES OF THE HEAD AND NECK



Hyperflexion
The head is propped up in a forward and downward motion. In hyperflexion, a sudden upward displacement of the lower neck is resisted if the anterior portion of the vertebrae are weakened. Intervertebral discs may be damaged. The anterior bridge of ligament, including spinal nerves.

Whiplash injury of the head and neck is caused by a sudden exaggerated flexion of the head backward, forward, and sometimes sideways. Abrasive forces are applied to vertebrae, ligaments, and discs. Intervertebral discs, blood vessels, and eyes on the head receive forward and/or lateral displacement. There may be no visible trauma or abrasions from this type of injury, but victims report these symptoms. These symptoms result from damage to vertebrae and to soft tissues of the head and neck.

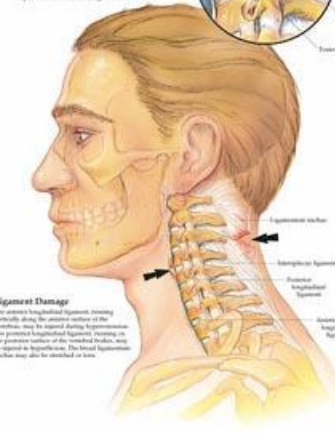
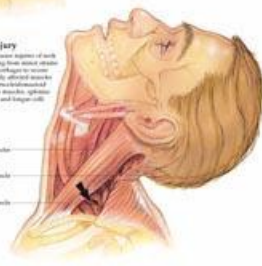


Hyperextension
The head is thrown backward in hyperextension. Flexion of the neck is a result of the cervical spine. Spinal processes of the vertebrae may be fractured. Intervertebral discs may be compressed posteriorly and torn anteriorly. Vertebral arteries may be displaced, physical trauma, causing internal blood flow in the brain. Spines of the cervical vertebrae may also be injured.

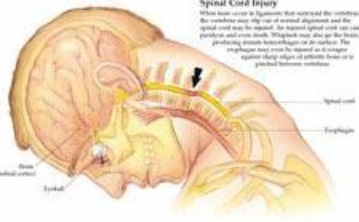


Spinal Ligaments
Vertebrae are held in place by a complex arrangement of ligaments. Some of the ligaments are fairly a resistance long, and all are with a clear resistance back. In a whiplash injury, ligaments may be badly stretched, partially torn, or completely ruptured or dislocated or damaged before.

Muscle Injury
Whiplash can cause injury of neck muscles, ranging from minor strains and sore muscles to severe tears. Commonly injured muscles include the sternocleidomastoid muscle, trapezius muscle, splenius muscle, and longus colli muscle.



Ligament Damage
The anterior longitudinal ligament, running vertically along the anterior surface of the vertebrae, may be injured during hyperextension. The posterior longitudinal ligament, running on the posterior surface of the vertebrae, may be injured in hyperflexion. The transverse ligament surface may also be stretched or torn.



Spinal Cord Injury
When force is exerted on ligaments that surround the vertebrae, the vertebrae may be forced out of normal alignment and the spinal cord may be injured. In extreme cases, the spinal cord may be torn, producing severe paralysis or even death. Whiplash may also be the cause of a fracture of the vertebrae, which may injure the spinal cord. The vertebrae may even be displaced or dislocated, causing spinal cord injury or vertebrae fracture or a fracture between vertebrae.