

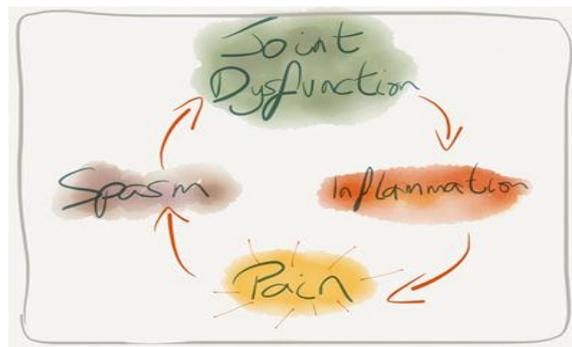
March 2014 Article

THE MECHANISMS OF FACET JOINTS FOLLOWING WHIPLASH

By Matthew J. DeGaetano, DC and Steve Baek, DC

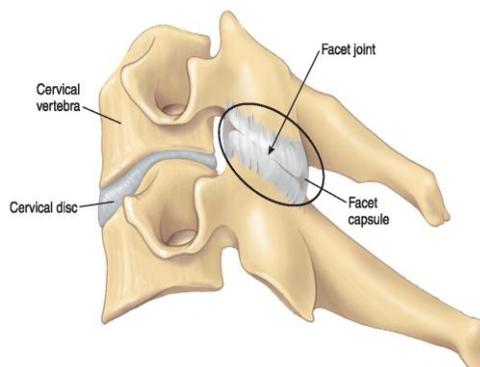
Certified in Personal Injury

Facet Joint Injury



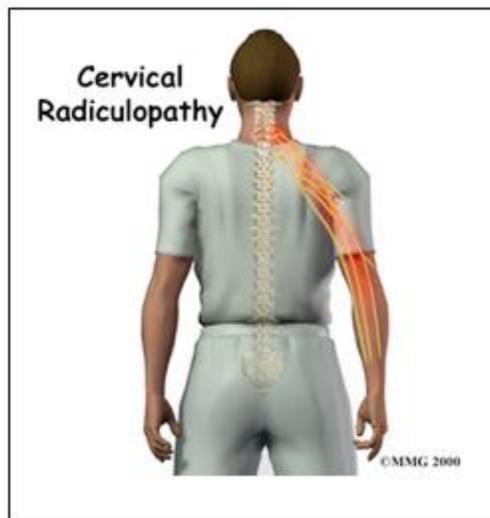
Facet Joints

The cervical facet joints are a common source of neck pain, particularly in chronic whiplash patients. There is strong clinical evidence of facet joint related neck pain which has led to the development of medical diagnostic tests (e.g., facet blocks) and treatment procedures (e.g., radiofrequency neurotomies) that can reduce or eliminate pain for a period of time.



There are two facet joints between each pair of cervical vertebra from C2 to C7. The facet joint is a synovial joint enclosed by a thin, loose ligament known as the facet capsule. A synovial fold on the inner capsule extends between the margins of the articulating bony surfaces. The facet capsule itself lacks the stiffness to alter motion and instead follows the motions of its surrounding bony vertebrae.

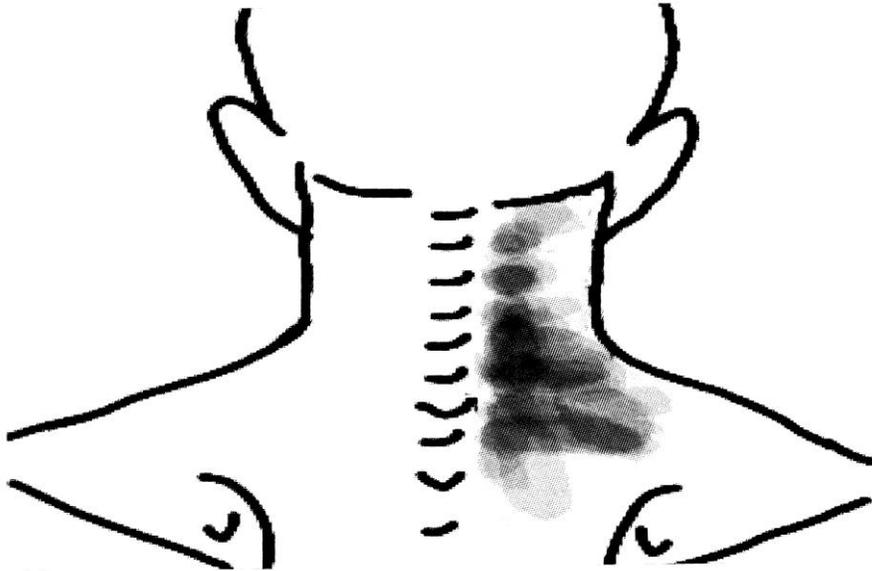
Some people in addition to the facet joint injury have neck pain that may radiate into the shoulder and arm. This type of pain is often caused by an injury near the root of a spinal nerve. A nerve root injury is sometimes referred to as a "pinched" nerve. The medical term for this condition is cervical radiculopathy.



The cervical facet joints have the necessary anatomical features to initiate and potentially modulate more widespread neck pain caused by facet joint syndrome. The motion of the facet joint and capsule during whiplash like impacts have been characterized in both human volunteers and cadaveric specimens. Based on documented joint motion, two mechanisms of facet joint injury have been proposed: pinching of the synovial fold and excessive strain of the capsule. It has been observed that the abnormal motion during a whiplash exposure compresses the posterior facet surfaces together, pinching the synovial fold.

Excessive facet capsule strain during whiplash has been demonstrated by numerous groups. Peak strains of 29 to 40 percent have been measured in the C6/C7 capsule of cadaveric specimens exposed to whiplash dynamics, whereas peak strains experienced during normal bending are only 6 ± 5 percent. Head-turned postures can double peak capsule strain during simulated whiplash loading. Partial ruptures of the facet capsule have been observed in both tension and shear loading of this joint along with capsule elongation during whiplash is a potential mechanism of injury in some individuals.

Their induction, persistence, and relationship to joint/capsule mechanics in painful whiplash loading supports the facet joint's involvement in whiplash pain.



This is an illustration of part of the cervical spine (black portion of inset). Part is cut in half for better viewing. This illustrates all of the lesions that have been reported to occur in whiplash trauma.

Excessive facet capsule strain during whiplash has been demonstrated by numerous groups. Peak strains of 29 to 40 percent have been measured in the C6/C7 capsule of cadaveric specimens exposed to whiplash dynamics, whereas peak strains experienced during normal bending are only 6 ± 5 percent. Head-turned postures can double peak capsule strain during simulated whiplash loading. Partial ruptures of the facet capsule have been observed in both tension and shear loading of this joint along with capsule elongation during whiplash is a potential mechanism of injury in some individuals.

Their induction, persistence, and relationship to joint/capsule mechanics in painful whiplash loading supports the facet joint's involvement in whiplash pain.