

The Pain Journal

A Medical Newsletter Providing Current and Cutting-Edge Information Regarding the Treatment of Pain and Spine Disorders

Whiplash Associated Disorders and their Treatment

Jeff S. Berger, D.O.

Whiplash is a mechanism of injury involving acceleration-deceleration forces on the cervical spine and is almost universally associated with injury after motor vehicle collisions. The impact may result in bony or soft tissue injuries, which in turn may lead to a variety of clinical manifestations termed whiplash associated disorders (WAD). Neck pain occurs in 62%-100% of whiplash injuries and is a hallmark symptom. Pain commonly radiates to the occiput, shoulder and midscapular region. Suboccipital headaches occur in 82% of cases. Thoracolumbar back pain (35%-42%), upper extremity parasthesias (45%), dysphagia (7%-18%), dizziness (25%-50%), vertigo, visual and auditory disturbances and cognitive impairment have also been reported.

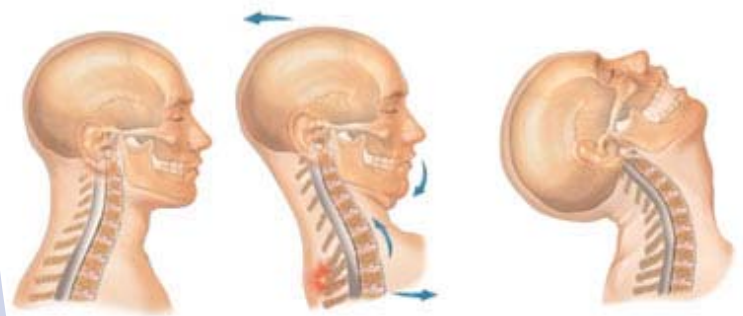
Studies of the natural history of whiplash-associated disorders have suggested that chronic pain with continued symptoms develops in 6% to 33% of acutely injured victims. Management of these injuries, including diagnosis, treatment and litigation costs has been estimated to cost \$29 billion annually. Females have a 2:1 predilection for whiplash, potentially due to decreased neck muscle mass and lower driver and head position relative to the headrest. The symptoms associated with WAD typically are not noted immediately after the precipitating event. Symptoms generally arise over a few hours, manifesting as decreased neck motion, tightness, swelling, tenderness and spasm. The delay in symptoms may be related to progressive soft tissue edema or bleeding.

WAD is thought to result from cervical sprain or strain with soft

tissue damage to the ligaments and muscles of the neck, often in association with zygapophysial joint or intervertebral disc related pain. Many cervical muscles do not terminate in tendons but rather attach directly to the periosteum, increasing their susceptibility to injury. Muscles respond to injury by contracting and recruiting surrounding musculature in attempt to splint the injured muscle or joint. Myofascial pain syndrome may be a secondary tissue response to disc or facet joint injury.

The sequence of events leading to whiplash associated disorders begins with rear end collision with sudden acceleration of the occupant's vehicle. This is followed immediately by seat-back contact with the torso of the occupant. Simultaneous forward and upward acceleration of the torso leads to ascending energy transfer causing lower cervical extension and compression with flexion/compression of the upper cervical spine segments leading to an 'S' shaped curve. (Figure 1) As the torso continues in flexion, the relatively large head lags behind with resultant hyperextension of the lower cervical segments beyond the physiologic barrier with resultant injury. Peak horizontal backward acceleration of the head occurs just before contact with the head restraint. Finally, the head accelerates forward with complete flexion of the upper and lower cervical spine within the physiologic barrier.

The treatment for WAD is based on the stage and extent of injury. Wearing a soft cervical collar has been studied and has demonstrated little to no efficacy. Use of soft cervical collars beyond the first 72 hours may even prolong disability. Ice and electrical stimulation



treatments are commonly used early in the recovery process. Range of motion exercises should be performed early with close monitoring for symptom exacerbation. Electrical stimulation and cervical traction may also be useful in improving muscle spasm and pain. Patients can perform active treatments within comfortable range of motion with emphasis on cervical stabilization. Short term chiropractic or osteopathic manipulation may also be beneficial. Therapy is guided toward returning the patient back to occupational related duties.

Most mild whiplash injuries resolve with conservative treatment within several weeks. However, persistent pain after four to six months may be due to deeper pain generators with nociceptive innervations such as the cervical zygapophysial joints, cervical ligaments, or the outer margin of the intervertebral discs. Several mechanisms for whiplash related facet-joint injury have been

proposed, including facet-joint impingement, synovial fold pinching, and facet-joint capsule strain injury. Studies on humans, animals and cadavers has demonstrated that damage can occur to the zygapophysial joint, often in the absence of definitive radiographic findings on x-ray, computerized tomography or magnetic resonance imaging.

Provocative intra-articular zygapophysial joint injections in healthy volunteers have demonstrated pain referral patterns characteristic of common whiplash related pain complaints. Diagnostic injections in chronically symptomatic whiplash patients have demonstrated a 54-60% incidence of zygapophysial joint mediated pain. Percutaneous radiofrequency neurotomy of the dorsal rami branches innervating these joints offers a solution for long-term pain relief by denaturing the nerves that innervate the facet joint at the painful segment. §

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Office Locations:

100 Becks Woods Drive, Ste 102, Bear, DE ■ 302-392-6501

126 East High Street, Elkton, Maryland ■ 410-392-3385

101 Chesapeake Blvd., Suite D, Elkton, Maryland ■ 410-392-3385

For immediate help, physicians and patients should call 302-494-5080.

For additional information, visit www.midatlanticspine.com

Self-Help Pain Relief

At Mid Atlantic Spine, we want to help not only relieve your pain but provide you with the information and resources to stay informed about your condition and for a better quality of life.

Condition: Whiplash

Did you know?

You may be suffering from whiplash if you experience any of the following symptoms. If you have any of the following please schedule an appointment with one of our board-certified doctors. Most people experience neck pain either immediately after the injury or several days later. Other symptoms of whiplash may include the following:

- Neck stiffness
- Injuries to the muscles and ligaments (myofascial injuries)
- Headache and dizziness (symptoms of a concussion)
- Difficulty swallowing and chewing and hoarseness (could indicate injury to the esophagus and larynx)
- Abnormal sensations such as burning or prickling (this is called paresthesias)
- Shoulder pain
- Back pain

For More Information:

- Whiplash & Whiplash Associated Disorders -North American Spine Society (2006)
www.spine.org/Documents/whiplash_2006.pdf
- Mayo Clinic
www.mayoclinic.com/health/whiplash/DS01037
- E-Medicine Health
www.emedicinehealth.com/whiplash/article_em.htm
- Blumenfeld, Fred. *Advanced Whiplash Care: a manual for patients and professionals*. Center Path Publishing; 2005.
- Betancourt, Marian. *Say Goodbye to Back Pain*. Simon & Schuster; 2004.

Questions:

Email your questions to the medical librarian at Mid Atlantic Spine, Stephanie Erhart, MLIS: serhart@midatlanticspine.com.

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About Mid Atlantic Spine

Mid Atlantic Spine is a well-recognized physical medicine and rehabilitation group practice specializing in the treatment of spine and pain related disorders since 1995. The practice is staffed with a team of board certified physiatrists, chiropractors, and licensed practitioners who provide individualized treatment for patients in a very compassionate and caring setting. The group is the main training site for a large metropolitan university teaching hospital ACGME accredited pain medicine fellowship and is actively involved in ongoing clinically oriented research. The group has office locations in Delaware and Maryland, provides radiology imaging services, and has a separate ambulatory surgery center.

Conditions we treat include:

- Neck Pain
- Sports Injuries
- Migraine Headaches
- Radiculopathy
- Facet Syndrome
- Arthritis
- Sciatica
- Low Back Pain
- Disc Herniations
- Sacroiliac Joint Syndrome
- Spasticity
- Osteoporosis
- Facial Pain
- Trigeminal Neuralgia
- Carpal Tunnel Syndrome
- Peripheral Neuropathy
- Reflex Sympathetic Dystrophy
- Osteoarthritis
- TMJ Syndrome
- Interstitial Cystitis
- Cancer Pain
- Fibromyalgia
- Other Painful Disorders

Services we offer include:

- Pain Management
- Rehabilitation
- Spine Injections
- Kyphoplasty
- Discography
- Imaging (CAT Scan, MRI, X-Ray)
- Radiofrequency
- Cryoablation
- Botox Injections
- IDET
- Nucleoplasty
- Electrodiagnostics
- Nerve Conduction Studies
- EMG
- Tumor Ablation
- Percutaneous Discectomy
- Vertebroplasty
- Osteoplasty
- Spinal Cord Stimulation
- Intrathecal Pump Therapy
- Physical Therapy
- Chiropractry
- Other Interventional Treatments

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