

Cervicogenic Headache: A Review of Diagnostic and Treatment Strategies

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FROM ABSTRACT:

Cervicogenic headache is a syndrome characterized by chronic hemicranial pain that is referred to the head from either bony structures or soft tissues of the neck.

The trigeminocervical nucleus is a region of the upper cervical spinal cord where sensory nerve fibers in the descending tract of the trigeminal nerve (trigeminal nucleus caudalis) interact with sensory fibers from the upper cervical roots.

This functional convergence of upper cervical and trigeminal sensory pathways allows the bidirectional referral of painful sensations between the neck and trigeminal sensory receptive fields of the face and head.

A functional convergence of sensorimotor fibers in the spinal accessory nerve (CN XI) and upper cervical nerve roots ultimately converge with the descending tract of the trigeminal nerve and might also be responsible for the referral of cervical pain to the head.

This article reviews the clinical presentation of cervicogenic headache, proposed diagnostic criteria, pathophysiologic mechanisms, and methods of diagnostic evaluation.

THIS AUTHOR ALSO NOTES:

A primary headache will commonly give a person neck muscle tenderness and neck pain.

"Head pain may actually arise from bony structures or soft tissues of the neck, a condition known as cervicogenic headache."

[First officially described in 1983]

The trigeminocervical nucleus is a region of the upper cervical spinal cord where sensory nerve fibers from the trigeminal nerve interact with sensory fibers from the upper cervical nerve roots.

This convergence of upper cervical and trigeminal sensory neurons allows the "bidirectional referral of painful sensations between the neck and trigeminal sensory receptive fields of the face and head."

This author notes that a migraine will frequently cause neck pain, neck stiffness, muscle tension, occasionally cause shoulder pain, and rarely causes pain that extends from the neck into the low back region.

Unilateral neck pain without headache is an occasional variant of migraine.

Head pain that is referred from the tissues of the neck is called **cervicogenic headache**.

Cervicogenic headache is often a sequelae of head or neck injury but may occur in the absence of trauma. **[Important]**

In pain management clinics, the prevalence of cervicogenic headache is as high as 20% of patients with chronic headache.

Cervicogenic headache is four times more prevalent in women.

"Patients with cervicogenic headache will often have altered neck posture or restricted cervical range of motion."

Cervicogenic headache pain can be "triggered or reproduced by active neck movement, passive neck positioning especially in extension or extension with rotation toward the side of pain, or on applying digital pressure to the involved facet regions or over the ipsilateral greater occipital nerve."

Diagnostic imaging, including x-ray, magnetic resonance imaging (MRI), and computed tomography (CT) are non-diagnostic in cervicogenic headache patients. However, imaging is used to search for suspected secondary causes of pain that may require surgery or other more aggressive forms of treatment.

The following problems may present with symptoms similar to cervicogenic headache:

- 1) Posterior fossa tumor
- 2) Arnold-Chiari malformation
- 3) Cervical spondylosis
- 4) Herniated intervertebral disc
- 5) Nerve root compression
- 6) Arteriovenous malformation
- 7) Vertebral artery dissection
- 8) Intramedullary or extramedullary spinal tumors

Zygapophyseal joint, cervical nerve, or medial branch blockade is used to confirm the diagnosis of cervicogenic headache.

"The suboccipital nerve (dorsal ramus of C1) innervates the atlanto-occipital joint; therefore, a pathologic condition or injury affecting this joint is a potential source for head pain that is referred to the occipital region."

[Important, especially for upper cervical chiropractors]

The C2 spinal nerve root and its dorsal root ganglion are closely located to the lateral capsule of the atlantoaxial (C1–2) facet joint and innervate both the atlantoaxial and C2–C3 facet joints. Trauma to or pathologic changes around the C1-C2-C3 joints can cause head pain.

The pain of C2 nerve root is usually a deep or dull pain that usually radiates from the occipital to parietal, temporal, frontal, and periorbital regions, with occasional sharp or shocklike pain superimposed over the constant pain.

The third occipital nerve (dorsal ramus C3) innervates the C2–C3 facet joint; the C2-C3 facet joint and the third occipital nerve are the most vulnerable to trauma from acceleration-deceleration whiplash injuries of the neck. **[Important]**

Pain from the C2–C3 zygapophyseal joint is referred to the occipital region but is also referred to the frontotemporal and periorbital regions, and is therefore a common cause of cervicogenic headache.

“The majority of cervicogenic headaches occurring after whiplash resolve within a year of the trauma.” **[Important: Within One Year]**

Some chronic headache patients will experience substantial pain relief after discectomy at spinal levels as low as C5–C6. [Important: this indicates that problems in the lower cervical spine can manifest as chronic headache.

The diagnosis of cervicogenic headache can be confirmed with diagnostic anesthetic blockade to the following structures:

- 1) The greater occipital nerve (dorsal ramus C2)
- 2) The lesser occipital nerve
- 3) The atlanto-occipital joint
- 4) The atlantoaxial joint
- 5) The C2 or C3 spinal nerve
- 6) The third occipital nerve (dorsal ramus C3)
- 7) The zygapophyseal joint(s) as low as C5
- 8) The intervertebral discs as low as C5-C6

[This means that all of these structures can cause cervicogenic headache]

Occipital neuralgia is a pain disorder caused by irritation to the sensory fields of the greater or lesser occipital nerves.

Classic occipital neuralgia is a constant deep or burning pain with occasional shooting or shock-like pain and with paresthesia and numbness over the occipital scalp.

The pain of occipital neuralgia is believed to arise from trauma to or entrapment of the occipital nerve within the neck or scalp, but the pain may also arise from the C2 spinal root, C1–C2, or C2–C3 zygapophyseal joints.

Sensory afferent nerve fibers from upper cervical regions enter the spinal column by way of the spinal accessory nerve before entering the dorsal spinal cord. "The close association of sensorimotor fibers of the spinal accessory nerve with the spinal sensory nerves is believed to allow for a functional exchange of somatosensory, proprioceptive, and nociceptive information from the trapezius, sternocleidomastoid, and other cervical muscles to converge in the trigeminocervical nucleus and ultimately resulting in the referral of pain to trigeminal sensory fields of the head and face."

[Important]

This author [an osteopath] mentions 6 categories of drugs and lists 18 separate drugs that might help a patient with cervicogenic headache. He also notes:

- 1) For the treatment of cervicogenic headache, this author notes that manipulation of the upper cervical facet joints is usually required. **[Important]**
- 2) "Medications alone are often ineffective or provide only modest benefit" for cervicogenic headache." **[Important]**
- 3) "Many patients with cervicogenic headache overuse or become dependent on analgesics."
- 4) "Medication when used as the only mode of treatment for cervicogenic headache does not generally provide substantial pain relief in most cases."
- 5) "The selective serotonin reuptake inhibitors (SSRIs) are generally ineffective for pain control."
- 6) COX-2 inhibitors [Celebrex] cause both gastrointestinal toxicity and renal toxicity after long-term use.
- 7) COX-2 inhibitors [Celebrex] cause an increased risk of cardiovascular and cerebrovascular events.
- 8) Narcotic analgesics are not recommended for the long-term management of cervicogenic headache.
- 9) Migraine-specific abortive medications are not effective for the chronic head pain of cervicogenic headache.

"Physical and manual modes of therapy are important therapeutic modalities for the acute rehabilitation of cervicogenic headache."

"All patients with cervicogenic headache could benefit from manual modes of therapy and physical conditioning."

A study comparing an exercise program with manipulative therapy for cervicogenic headache reported substantial and sustained reductions of headache

frequency and intensity in both treatment groups, with a trend toward greater efficacy when the treatment modalities are combined.

Manipulative techniques are particularly well suited for the management of cervicogenic headache, including high velocity, low amplitude manipulation.

For patients with cervicogenic headache who do not improve as expected with spinal manipulation, physical therapy, or rehabilitation, this author recommends anesthetic blocks, neurolysis, or surgery, noting:

- 1) Cervical epidural steroid injections might help patients with multilevel disc or spine degeneration.
- 2) Greater and lesser occipital nerve blockade may provide temporary pain relief.
- 3) Trigger point injections may provide temporary pain relief.
- 4) If diagnostic blockade of cervical nerve, medial branch, or facet joint give pain relief, radiofrequency thermal neurolysis may give longer lasting [but not permanent] pain relief.
- 5) Surgical liberation of the occipital nerve from entrapment in the trapezius muscle or surrounding connective tissues may provide temporary pain relief in some patients.

"A course of physical therapy and rehabilitation is recommended after anesthetic blockade and neurolytic procedures to enhance functional restoration and effect a longer-lasting analgesic benefit." [I believe that it is reasonable to argue that a course of spinal adjusting should follow anesthetic blockade or neurolytic procedures to enhance functional restoration and effect a longer-lasting analgesic benefit.]

"Cervicogenic headache is a relatively common cause of chronic headache that is often misdiagnosed or unrecognized."

The footnotes to this article (found on the first page) note that Dr. Biondi is an osteopath, that he is an instructor in Neurology Harvard Medical School, and that he is financially affiliated with 9 different drug companies.

[Although this article mentions manipulation, physical therapy, and rehabilitation in the treatment of cervicogenic headache, the emphasis is clearly on drugs, injection, and surgery. Osteopathy has certainly changed from its founding principles.]

Diagnostic Criteria for Cervicogenic Headache

(Developed by the Cervicogenic Headache International Study Group)

THE PATIENT MUST HAVE AT LEAST ONE OF THE FOLLOWING:

- 1) **The head pain must be preceded by:**
 - Neck Movement**
or
 - Sustained Awkward Head Positioning**
or
 - External Pressure Over the Upper Cervical (C1-2-3-4) or Occipital Region on the Symptomatic Side**
- 2) **Restricted Cervical Spine Range of Motion (Active and Passive)**
- 3) **Ipsilateral Neck, Shoulder, or Arm Pain of a Vague Nonradicular Nature**
or
 - Occasional Arm Pain of a Radicular nature**

If All Three Criteria Are Present, One Is Essentially Assured of Cervicogenic Headache

CHARACTERISTICS OF CERVICOGENIC HEADACHE

- Frequently a History of Indirect Neck Trauma [Whiplash injury]**
- Unilateral Headache That Does Not Change Sides**
 - Occasionally the Pain May Be Bilateral**
- The Pain is Located Occipital, Frontal, Temporal, or Orbital Regions**
- The Pain Can Last Hours to Days**
- The Headache Usually Begins in the Neck**
- The Headache is Moderate to Severe**
- The Headache is Non-Throbbing**
- The Headache is Non-Lancinating**

THE FOLLOWING FEATURES MAY ALSO BE OCCASIONALLY NOTED

- | | | |
|--|---|--|
| <input type="checkbox"/> Nausea | <input type="checkbox"/> Phonophobia | <input type="checkbox"/> Photophobia |
| <input type="checkbox"/> Dizziness | <input type="checkbox"/> Difficult Swallowing | <input type="checkbox"/> Ipsilateral Blurred Vision |
| <input type="checkbox"/> Vomiting | <input type="checkbox"/> Ipsilateral Lacrimation | |
| <input type="checkbox"/> Ipsilateral Edema, Especially in the Periocular Region | | |

KEY POINTS FROM DAN MURPHY

- 1) "Cervicogenic headache is a relatively common cause of chronic headache that is often misdiagnosed or unrecognized."
- 2) Cervicogenic headache is chronic hemicranial pain that is referred to the head from tissues of the neck.
- 3) Head pain that is referred from the tissues of the neck is called **cervicogenic headache**.
- 4) Cervicogenic headache was not officially recognized until 1983.
- 5) The key neurological structure in cervicogenic headache is the trigeminocervical nucleus. The trigeminocervical nucleus is a region in the upper cervical spinal cord where sensory nerve fibers from the trigeminal nerve (cranial V) interact with sensory fibers from the upper cervical nerve roots.
- 6) The convergence of upper cervical and trigeminal sensory fibers is the basis for upper cervical problems causing pain in the face and head.
- 7) A primary headache will commonly give a person neck muscle tenderness and neck pain.
- 8) Cervicogenic headache is often a sequelae of head or neck injury but may occur in the absence of trauma. **[Important]**
- 9) The prevalence of cervicogenic headache is as high as 20% of patients with chronic headache.
- 10) Cervicogenic headache is four times more prevalent in women.
- 11) "Patients with cervicogenic headache will often have altered neck posture or restricted cervical range of motion."
- 12) Cervicogenic headache pain can be "triggered or reproduced by active neck movement, passive neck positioning especially in extension or extension with rotation toward the side of pain, or on applying digital pressure to the involved facet regions or over the ipsilateral greater occipital nerve."
- 13) X-ray, magnetic resonance imaging (MRI), and computed tomography (CT) are non-diagnostic in cervicogenic headache patients.
- 14) Zygapophyseal joint, cervical nerve, or medial branch blockade is used to confirm the diagnosis of cervicogenic headache.
- 15) Trauma to or pathologic changes to the C1-C2-C3 joints can cause head pain.

- 16) The third occipital nerve (dorsal ramus C3) innervates the C2–C3 facet joint; the C2-C3 facet joint and the third occipital nerve are the most vulnerable to trauma from acceleration-deceleration whiplash injuries of the neck. **[Important]**
- 17) It can take a year or longer for post-whiplash cervicogenic headache to resolve.
- 18) Disc problems as low as C5–C6 can cause chronic cervicogenic headache.
- 19) The following structures can cause cervicogenic headache:
- A) The greater occipital nerve (dorsal ramus C2)
 - B) The lesser occipital nerve
 - C) The atlanto-occipital joint
 - D) The atlantoaxial joint
 - E) The C2 or C3 spinal nerve
 - F) The third occipital nerve (dorsal ramus C3)
 - G) The zygapophyseal joint(s) as low as C5
 - H) The intervertebral discs as low as C5-C6
- 20) The treatment of cervicogenic headache usually requires manipulation of the upper cervical facet joints. **[Important]**
- 21) Drugs alone are often ineffective for cervicogenic headache treatment.
- 22) “Many patients with cervicogenic headache overuse or become dependent on analgesics.”
- 23) COX-2 inhibitors [Celebrex] cause both gastrointestinal and renal toxicity after long-term use.
- 24) COX-2 inhibitors [Celebrex] cause an increased risk of cardiovascular and cerebrovascular events.
- 25) “All patients with cervicogenic headache could benefit from manual modes of therapy and physical conditioning.”
- 26) Manipulative techniques are particularly well suited for the management of cervicogenic headache, including high velocity, low amplitude manipulation.