

“Whiplash” Injury of the 2nd Cervical Ganglion and Nerve

**Canadian Journal of Neurological Sciences
1986, Vol. 13, pp. 133-137**

William S Keith

From the Department of Neurosurgery, Toronto Western Hospital

FROM ABSTRACT:

Amongst the many patients with persisting neck pain and headache following cervical injuries are a small number in whom the mechanism is compression of the second cervical nerve root and ganglion.

The main features are unilateral pain in the upper cervical and occipital region, tenderness in the suboccipital region, and diminished sensation in the C2 dermatome.

KEY CONCEPTS FROM THIS AUTHOR:

- 1) Extension injuries of the neck following motor vehicle accidents are common even with the universal extension of the seat back to protect the neck.
- 2) 10-15% of whiplash extension injured patients “continue to have persisting symptoms after time intervals which should be sufficient for recovery and after litigation settlements have been completed.”
- 3) It has been known since 1949 that the C2 nerve root is vulnerable to compression between the lamina of the atlas and the axis, especially in extension.
- 4) Crushing injury of the C2 nerve and/or ganglion is a common cause of persisting occipital and posterior cervical pain following neck injuries.
- 5) In reviewing 14 patients with this syndrome, this author reports:
 - On average, it takes 20 months after injury before the correct diagnosis made.
 - 14% of patients with this injury will be permanently disabled.
 - The pain is confined to the ipsilateral upper neck and occipital region.
 - Some patients may additionally have pain around the eye and face.
 - Pain is often aggravated by unguarded or sudden movements of the head.

- Described sensations at the time of injury include dazed, shaken up, disoriented, dizzy, and a blinding or explosive feeling.
- All patients had marked tenderness on deep palpation of the suboccipital region.
- All patients had diminished sensation to pin prick and touch in the C2 dermatome. [A paradox: decreased superficial sensation in the same area that has increased pain to deep digital pressure]
- Patients rarely complain of numbness.

6) The author reviews dissections from clinical anatomist (and physician) Nikoli Bogduk, and includes his own photographs of dry specimens of articulated C1-C2, to make these points:

- The C2 dorsal root ganglion (DRG) and nerve root lie against the C1-C2 joint capsule.
- The most vulnerable part of the C2 nerve root to compression is the dorsal root ganglion because it is the "thickest neural structure."
- It is nearly impossible to compress the C2 DRG in extension unless there is also rotation.
- It is impossible to compress the LEFT C2 DRG if the head is rotated to the LEFT prior to extension mechanism. When the head is rotated LEFT, the space between the lamina of C1 and the lamina of C2 on the LEFT is actually increased, offering more protection for the C2 DRG and root.
- Consequently, when the head is rotated LEFT, the vulnerable C2 DRG and nerve root is on the RIGHT. In LEFT rotation, "with sudden unexpected hyperextension in this position of the head on the neck, the C2 ganglion and nerve may be crushed on the right side, but not on the left."

7) This C2 DRG or root compression syndrome has been called:

- Occipital neuralgia
- Occipital neuritis
- Cervical migraine
- Occipital migraine

8) A review of 200 whiplash injury cases showed:

- Women have more whiplash neck symptoms than men.
- Many patients continue to have symptoms after their legal cases have ended.

- 9) "If the C2 ganglion [DRG] is contused there may be sufficient scarring to account for continuing symptoms over a longer period of time." **[Important: post-traumatic scar tissue to a nerve root can cause chronic symptoms]**
- 10) If the injury to the C2 DRG is slight, "there are no symptoms during quiescent periods, but pain is provoked by the slightest insult." **[Important]**
- 11) The anatomical studies of Bogduk "showing the relationship of the atlas to axis in various positions, clearly demonstrates the vulnerability of the C2 nerve root and ganglion to hyperextension injury."
- 12) Some patients with this syndrome will require a surgical decompression by root avulsion or laminectomy or adhesion resection.

COMMENT FROM DAN MURPHY:

In my experience, many patients with this syndrome are completely or greatly improved with upper cervical chiropractic care.