

# Fusion for Occult Posttraumatic Cervical Facet Injury

Donlin M. Long, MD, PhD,\*†‡§ R. F. Davis, MD,\*†‡§ William G. Speed, III, MD,\*†‡§  
and Nelson H. Hendler, MD, MS\*†‡§

**Abstract:** Persisting neck pain and headache is a common complication of acceleration/deceleration injury. Seventy patients with normal imaging studies and persisting pain after injury (median 1.7y), who had failed all usual conservative forms of care were offered a diagnostic block protocol to determine the origins of the persisting pain. Blocks included C-2-3 roots bilaterally; C-2-3-4 zygapophyseal joints, and provocative discography at C-3-4, 4-5, 5-6, 6-7. Seventy patients entered the study; 67 completed the block protocol. On the basis of response to blocks, 44 patient were chosen for posterior cervical fusion of C-1, 2, 3, 4 in several combinations. Seventy-nine percent of patients achieved complete pain relief; 14% received satisfactory pain relief; fusion was achieved in 95%. These data support the hypothesis of Bogduk and associates that upper cervical facet injury is a common consequence of acceleration/deceleration accidents. The symptoms can be relieved by upper cervical fusion in some patients selected by concordant blocks.

**Key Words:** facet injury, fusion, whiplash injury, neck pain, headache, pain relief

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Persisting neck pain and headache is a frustrating complication of acceleration/deceleration injury which has been difficult to diagnose and treat.<sup>1-4</sup> These injuries are common worldwide.<sup>5,6</sup> Although persisting symptoms have been linked to litigation in some societies, there is evidence that a significant number of patients have residual disabling symptoms, even in societies where litigation is not a factor.<sup>7-11</sup> These data suggest that patients with symptoms that do not relent within 6 months may have permanently persisting painful sequellae of the injury which are often incapacitating.<sup>12</sup>

Diagnostic information of several kinds has been used to create an extensive list of probable injuries sustained by such patients.<sup>13</sup> However, little has been

done to clarify which injuries occur in specific patients, because most of the potential injuries are not definable by current imaging studies.<sup>14</sup> For this reason, many have thought the most likely diagnosis for persisting symptoms was psychomatic.<sup>15-17</sup> Causative structural possibilities, most commonly invoked, include injuries to muscles and their ligamentous attachments, facet joint disruption, disc fracture, rupture of the longitudinal ligaments, and rupture of the stabilizing ligaments of the odontoid process.<sup>18-20</sup> Bogduk and associates have examined patients with persisting symptoms extensively and have deduced, from the results of diagnostic blockade, that injury to upper cervical zygapophyseal joints and mediation of pain through the second or third upper cervical nerves is a common phenomenon occurring in about half of these patients with upper neck pain and headache.<sup>21-23</sup> Percutaneous blockade and denervation of the upper cervical joints in such patients produces temporary cessation of symptoms.<sup>24-27</sup>

On the basis of this information, a prospective evaluation and treatment of a group of patients with persisting upper cervical pain and headache after cervical flexion-extension trauma was begun. Evaluation and therapy was based on 3 testable hypotheses: upper cervical facet injury explains a significant number of the complaints of patients suffering from posttraumatic neck pain and suboccipital headache; these patients can be identified by diagnostic cervical blockade; surgical stabilization of the disrupted joints will produce permanent relief of pain.

## The Clinical Protocol

To evaluate and test these hypotheses and their null, we developed a prospective paradigm to examine the effectiveness of upper cervical posterior fusion for upper cervical and suboccipital pain with C2-3 dermatomal radiation, and the predictive power of diagnostic blocks to choose patients for the procedure. Adult patients were referred after failure of conservative medical management from either 1 of 2 headache specialists participating in the study. All patients had a history of cervical trauma with complaints of intractable upper neck pain and suboccipital occipital headache with radiation into the second or third cervical dermatomes as described by Bogduk.<sup>28-30</sup> In 2 patients, there was an associated but separate upper extremity radicular complaint. No patients were entered into the study until at least 6 months had elapsed

From the \*Departments of Orthopedic Surgery and Neurosurgery Crain Tower, Glen Burnie; †Department of Medicine-Internal Medicine, Speed Headache Association; §The Johns Hopkins Hospital, Baltimore; and ‡Departments of Neurosurgery and Psychiatry, Stevenson, MD.

This protocol was reviewed and approved by the Johns Hopkins Joint Committee on Clinical Investigation.

Reprints: Donlin M. Long, MD, PhD, The Johns Hopkins Hospital, Baltimore, MD 21287-7709 (e-mail: dmlong@jhmi.edu).

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