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When Dr. Seletz wrote this article, he had treated more than 20,000 injury patients at the Los Angeles General Hospital.

THIS AUTHOR NOTES:

Human corticospinal reflexes are inadequate to prevent injuries from motor vehicle collisions.

Motor vehicles are “actually potentially lethal weapons, comparable to pearl-handled machine guns.”

Motor vehicles cause “40,000 deaths and 1,000,000 disablements in the US every year.”

“It is well known that the death rate from accidental injuries during times of alleged peace exceeds, to appalling proportions, the death rate from modern catastrophic war.”

Many patients with brain injury but without loss of consciousness are “neglected by the general practitioner and the specialist alike.”

“As a result, many a patient in whose case only the diagnosis of cerebral concussion has been made remains incapacitated by severe headaches for months or even years.”

The purpose of this article is to the symptom complex associated with “the post-concussion cerebral syndrome.”

Patients with the post-concussion cerebral syndrome may have normal examinations weeks after injury, but still complain of “severe headaches and exhaustion, as well as inability to return to normal [work] duties.”

These persons are often accused of malingering or having litigation neurosis.

“The symptom complex following many cerebral concussions consists of two major factors:
1) Bouts of severe headache or hemicrania
2) The syndrome of vasomotor (neurocirculatory) exhaustion.”
The headaches, often severe may begin in the suboccipital area and radiate to the vertex or to behind one eye; or they may be frontal or temporal.

“Analysis of the symptoms of several thousands of such patients will reveal that headaches persisting for months or years after a cerebral concussion are real and that they are extracranial in origin.” [Very Important]

“The headaches stem primarily from two sources:
1) The upper cervical spinal nerve roots.
2) Elements of the trigeminal nerve.”

“Alternatively, a combination of the two may exist.”

A new term that describes and encompasses the complex symptoms that follow injuries to the head and neck is craniocervical syndrome.

“A patient who incurs concussion while riding in a moving vehicle always undergoes some degree of cervical sprain, and the vast majority of those with whiplash injuries of the neck have some degree of cerebral concussion.”

In every whiplash injury, the head is involved in sudden acceleration or deceleration, causing some unnatural movement, rotation of strain by the upper cervical spinal roots and muscles. [Important]

The 2\(^{nd}\) cervical nerve root becomes the greater occipital nerve and supplies the major portion of the scalp, the upper portion of the neck and portions of the face. [PICTURE #1]

“The 2\(^{nd}\) cervical nerve root is more vulnerable to trauma than other nerve roots because it is not protected by pedicles and facets.”

The spinal accessory nerve takes its origin from the entire length of the cervical cord, “always as low as the fifth and often as low as the seventh cervical level.”

“Any acute flexion, extension or torsion of the neck will exert traction on the delicate filaments of the spinal accessory nerve, resulting in spasm of the trapezius and sternocleidomastoid muscles.”

When the trapezius and suboccipital muscles (especially the inferior oblique muscle) are in spasm, “traction is produced upon the greater occipital nerve as it pierces the fascial attachment of these muscles.” [PICTURE #2] The 2\(^{nd}\) cervical nerve root leaves the interspace between C1-C2, courses down and winds under the inferior oblique muscle, then proceeds upward as the greater occipital nerve, and pierces the tendon of the trapezius muscle.
Problems with the 2nd cervical nerve root include giddiness, unsteadiness, occasional nausea, and disturbances in focusing the eye.

Sensory changes extending over the trigeminal innervation area following whiplash injury to the neck are explained by the communication between the 2nd and 3rd cervical nerve roots and the greater occipital nerve with the trigeminal nerve in the spinal fifth tract in the medulla. [PICTURE #3] This has been called the greater occipital/trigeminus syndrome, and is a cause of post-whiplash headache.

As the ophthalmic fibers descend the deepest into the cervical spine, the headaches are often in the distribution of the ophthalmic branch [around and behind the eye].

Contusion of any part of the scalp may result in scars that “give rise to bouts of severe and persistent headache.” Pressure on the minute palpable scar may “initiate the entire migraine-like syndrome.” Treatment is to the scar.

KEY POINTS FROM DAN MURPHY

1) Human muscle reflexes are inadequate to prevent injuries from motor vehicle collisions.

2) Motor vehicles cause “40,000 deaths and 1,000,000 disablements in the US every year.”

3) Patients with cerebral concussion may remain incapacitated by severe headaches and exhaustion for months or even years.

4) Headaches that persist for months or years after a cerebral concussion are real and are extracranial in origin, from:
   A)) The upper cervical spinal nerve roots.
   B)) Elements of the trigeminal nerve.

5) The symptom complex that follows injuries to the head and neck is the craniocervical syndrome.

6) The vast majority of those with whiplash injuries have some degree of cerebral concussion.

7) In every whiplash injury there is strain to the upper cervical spinal roots and muscles.

8) The 2nd cervical nerve root is the most vulnerable to trauma because it is not protected by pedicles and facets.
9) “Any acute flexion, extension or torsion of the neck will exert traction on the
delicate filaments of the spinal accessory nerve, resulting in spasm of the trapezius
and sternocleidomastoid muscles.”

10) When the trapezius and the inferior oblique muscle are in spasm, “traction is
produced upon the greater occipital nerve as it pierces the fascial attachment of
these muscles,” giving rise to headaches at the base of the skull that radiates
toward the vertex of the head.

11) There is a communication between the greater occipital nerve and a
communication between the 2\textsuperscript{nd} and 3\textsuperscript{rd} cervical nerve roots and the trigeminal
nerve in the spinal fifth tract in the medulla, which gives rise to headaches in the
distribution of the trigeminal nerve, especially the ophthalmic branch.

12) Contusion of any part of the scalp may result in scars that “may give rise to
bouts of severe and persistent headache.” Pressure on the minute palpable scar
may “initiate the entire migraine-like syndrome.” Treatment is to the scar.
Picture #1: Sensory C2-C3
Greater Occipital Nerve

Trapezius Tendon

Superior Oblique

Inferior Oblique

C-2 Nerve Root