

Acceleration Injuries of the Cervical Spine
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THIS AUTHOR NOTES:

"In acceleration injuries, the force applied to the neck is roughly equivalent to the weight of the head multiplied by the speed that the head is moving."

[$F = m \times a$]

In extension-acceleration injuries there is nothing to stop rearward head movement until the occiput hits the posterior chest wall. "This is way beyond the normally permitted range of movement. One might anticipate, therefore, that extension-acceleration injuries (so-called whiplash injuries) would be more prone to cause significant damage than lateral or forward acceleration."

In reviewing a series of 575 automobile accident injury patients, this author found "patients sustaining extension-acceleration injuries had much more prolonged symptoms."

Dr. Macnab followed 266 patients who had injured their cervical spines in motor vehicle accidents. Dr. Macnab was able to follow-up with 145 cases two or more years after "settlement of litigation" from injuries sustained in the accident and documented that 83% suffered from ongoing symptoms. Dr. Macnab also noted that if the remainder of the patients that he was not able to follow-up on were all completely cured [highly unlikely] following litigation settlement, then 45% of the original 266 patients still suffered from ongoing symptoms two or more years after settlement. Consequently, Dr. Macnab makes the following points to support his claim that these whiplash patients are unlikely to have chronic pain because they are hysterical, neurotic, or dishonest:

- 1) There is a significantly higher incidence of chronic symptoms in those who experience an extension mechanism rather than flexion or lateral flexion mechanisms of injury.
- 2) Patients who had injured their necks, plus broken their wrist or sprained their ankle, did not complain of chronic wrist or ankle pain, they only complained of chronic neck pain.

"It is difficult to understand why the patient's traumatic neurosis should be confined solely to their necks and not reflected in continuing disability in relation to other injuries [broken wrist / sprained ankle] sustained at the same time."

3) "If the symptoms resulting from an extension-acceleration injury of the neck are purely the result of litigation neurosis, it is difficult to explain why 45% [minimum, could be as high as 83%] of the patients should still have symptoms two years or more after settlement of their court action."

Dr. Macnab notes that his whiplash experiments on monkeys had shown the following:

1) "Muscle injuries were noted ranging in severity from minor tears of the sternocleidomastoid to partial avulsion of the longus colli."

2) "Any tear of the longus colli was associated with the development of a retropharyngeal hematoma."

Damage to the longus colli muscle was always associated with "damage to the cervical sympathetic nerves."

"These injuries [sympathetic nerves] in humans might explain some of the blurring of the vision and vertigo seen clinically."

3) Hemorrhages in the muscle layer of the esophagus.

"This type of esophageal damage and retropharyngeal hematoma could well account for the dysphagia so commonly complained of by victims of extension-acceleration injuries."

4) Concomitant spasm of the vertebral arteries might lead to "tinnitus, deafness and nystagmus."

5) One of the most reproducible lesions seen in these monkey experiments was "tearing of the anterior longitudinal ligament and separation of the disc from the associated vertebrae."

These lesions have been surgically documented in human subjects years after injury, and these lesions were not documented on routine x-rays.

In the human subjects with these lesions, their pain was reproduced with a discogram, and at surgery the "disc could be readily separated from the adjacent vertebral body on blunt dissection."

At surgery on these humans, "there had been little or no reattachment of the disc to the vertebrae from which it had been avulsed" [up to 2 years after the injury occurred].

Dr. Macnab summarizes this article with the following points:

1) "Extension-acceleration injuries of the neck are more likely to produce soft-tissue lesions than forward and lateral flexion injuries."

2) The following are indicative of serious injuries in humans:

"Dysphagia, constriction of pupils, retropharyngeal hematoma, hoarseness, and other symptoms suggestive of vertebral-artery spasm or cervical sympathetic irritation."

3) "If tearing occurs through a cervical disc, healing may be slow and incomplete," and "such lesions to the cervical disc frequently do not produce changes demonstrable on routine roentgenographic studies."

KEY POINTS FROM DAN MURPHY

1) Patients sustaining extension-acceleration injuries have much more prolonged symptoms than patients sustaining lateral flexion or forward flexion injuries.

2) Dr. Macnab presents a study that shows between 45% to 83% of whiplash-injured patients will have ongoing symptoms more than 2 years after they have settled the legal aspect of their injury claims:

45% is the number if he assumes that all patients from the original series that were lost in the follow-up were completely cured of their symptoms.

83% is the actual number of individuals with chronic symptoms found in the group he was able to follow-up on.

3) Chronic whiplash-injured patients are unlikely to have chronic pain because they are hysterical, neurotic, or dishonest.

4) Patients who had injured their necks, plus broken their wrist or sprained their ankle, did not complain of chronic wrist or ankle pain, they only complained of chronic neck pain. This fact supports the contention that chronic whiplash patients are not hysterical, neurotic, or dishonest.

5) "If the symptoms resulting from an extension-acceleration injury of the neck are purely the result of litigation neurosis, it is difficult to explain why 45% [minimum, could be as high as 83%] of the patients should still have symptoms two years or more after settlement of their court action."

6) Animal experiments and human surgery has proven that whiplash-trauma can cause:

A) "Muscle injuries were noted ranging in severity from minor tears of the sternocleidomastoid to partial avulsion of the longus colli."

B) "Any tear of the longus colli was associated with the development of a retropharyngeal hematoma," and "damage to the cervical sympathetic nerves."

C) "These injuries [sympathetic nerves] in humans might explain some of the blurring of the vision and vertigo seen clinically."

D) Hemorrhages in the muscle layer of the esophagus, which can cause dysphagia.

E) Vertebral artery spasm that can cause tinnitus, deafness and nystagmus.

F) "Tearing of the anterior longitudinal ligament and separation of the disc from the associated vertebrae." These lesions are not documented on routine x-rays. Surgery shows that "there had been little or no reattachment of the disc to the vertebrae from which is had been avulsed" [up to 2 years after the injury occurred].

6) The following are indicative of serious injuries in humans:

"Dysphagia, constriction of pupils, retropharyngeal hematoma, hoarseness, and other symptoms suggestive of vertebral-artery spasm or cervical sympathetic irritation."

7) "If tearing occurs through a cervical disc, healing may be slow and incomplete," and "such lesions to the cervical disc frequently do not produce changes demonstrable on routine roentgenographic studies."