

### Key Points

1. The role that trauma plays in Chiari is not well understood and controversial
2. There are case reports and one study which suggest that head/neck trauma can spark Chiari symptoms
3. Study looked at the records of 85 Chiari patients to identify cases where minor head/neck trauma sparked Chiari symptoms
4. The researchers used strict criteria to identify such cases
5. Although 11 people reported some type of trauma, only 3 met all of the criteria set forth
6. Legal issues surrounding these cases complicate the problem of studying the trauma-Chiari link
7. What is needed is an understanding of what differentiates symptomatic and asymptomatic patients not involved with any trauma

### Definitions

**concussion** - an injury to the brain caused by a direct blow to the head

**congenital** - refers to a condition which is present at birth

**whiplash** - an injury to the neck/spine cause by sudden, violent jerking motions, for example from a car accident

**cerebellar tonsils** - portion of the cerebellum located at the bottom, so named because of their shape

**cerebellum** - part of the brain located at the bottom of the skull, near the opening to the spinal area; important for muscle control, movement, and balance

**cerebrospinal fluid (CSF)** - clear liquid in the brain and spinal cord, acts as a shock absorber

**Chiari malformation I** - condition where the cerebellar tonsils are displaced out of the skull area into

## Minor Head/Neck Trauma Sparks Chiari Symptoms

**November 30, 2008** -- The role that physical trauma plays in Chiari is both poorly understood and controversial. Many patients want to know if head and neck trauma, such as from a car accident, can cause Chiari. This is a very difficult question to answer.

First, it depends on what is meant by 'cause'. Most Chiari cases are considered to be congenital, meaning that people are born structurally with Chiari. However, the symptoms associated with Chiari are dynamic, and many people do not develop symptoms until adulthood. While it is possible that extreme trauma, such as a severe whiplash, may actually cause the cerebellar tonsils to herniate, when people refer to trauma 'causing' Chiari, what they usually mean is that trauma triggered, or aggravated, Chiari related symptoms.

In fact, there is some evidence that trauma can spark symptoms. Milhorat's landmark study found that nearly one quarter of Chiari patients reported that some type of trauma precipitated their symptoms. However, self-reports such as these are not very strong scientifically and certainly do not prove a causative link. While there are additional case reports in the medical literature, some in the medical community are skeptical of a trauma-Chiari link.

One reason for skepticism is that no underlying mechanism of how trauma can lead to Chiari symptoms has been proposed or studied. In order to move from a general association of the two, such as is reported anecdotally, to a true theory that trauma can spark Chiari symptoms, the actual causative chain of events must be proposed, tested, and understood.

A second, and perhaps bigger, reason for some to be skeptical is that trauma related cases are often confused by legal actions and litigation. Many of the reported traumas involve car accidents and people at fault for those accidents. This in turn means that the person who is now experiencing Chiari symptoms may have a financial stake in showing that the accident has caused symptoms and disability. This of course, does not mean that the trauma did not in fact cause the Chiari symptoms, but it does cloud the picture.

Conquer Chiari has been contacted several times by patients involved in lawsuits, paralegals, and attorneys. As a side note, it is our policy to not get involved with any legal issues such as those. However, Chiari & Syringomyelia News has tried, on several occasions, unsuccessfully to find someone who could shed some light on the legal issues surrounding car accident-Chiari cases.

Now, against this backdrop of confusion and controversy, comes a report from the University of Toronto (Wan et al.), that minor head and neck trauma may indeed spark Chiari symptoms in a small number of patients.

Published in the October, 2008 issue of the journal, Neurosurgery, the study retrospectively reviewed the medical records of 85 Chiari patients treated by Dr. Charles Tator, in order to identify any cases where a minor head and/or neck trauma sparked Chiari symptoms. For the purposes of the study, a minor trauma was defined as meaning there were no fractures and no identifiable neurological injury which could contribute to worsening symptoms.

Further, the researchers used a rigorous set of criteria to narrowly define when Chiari symptoms were likely to be caused by trauma:

- The patient was asymptomatic from the Chiari I malformation and syringomyelia (if present) before the trauma.
- The trauma did not cause an identifiable structural neurological injury or an immediate onset of neurological deficit.
- Symptoms of the trauma were significant (concussion or whiplash).
- Neurological symptoms and signs attributable to the Chiari I malformation, with or without syringomyelia, developed within 6 months of the trauma.
- There was no other structural abnormality, disease, or previous neurosurgical intervention to account for the patient's symptoms.
- The symptoms of Chiari malformation were severe enough to warrant surgical treatment, and improved or stabilized postoperatively.

Out of the 85 total Chiari patients, 11, or 13%, reported a history of some type of trauma. However, only 3 of the 11 cases, or 3.5%, met all of the criteria listed above. The other 8 were excluded because they did not develop symptoms close in time to the trauma, the traumas were too minor to cause any type of symptoms, they had symptoms before the trauma, or they did not respond to surgical treatment.

All three patients were women (see Figure 1) and two of them were involved in car accidents. Interestingly, all

the spinal area, causing compression of brain tissue and disruption of CSF flow

**decompression surgery** - general term used for any of several surgical techniques employed to create more space around a Chiari malformation and to relieve compression

**syringomyelia** - condition where a fluid filled cyst forms in the spinal cord

### Source

**Source:** Wan MJ, Nomura H, Tator CH. [Conversion to symptomatic Chiari I malformation after minor head or neck trauma.](#) *Neurosurgery*. 2008 Oct;63(4):748-53

three experienced head and neck pain almost immediately after the trauma, however whether this pain was from the trauma itself, or from Chiari, is not clear. Complicating the matter, as discussed above, two of the patients pursued legal action as a result of their traumas.

Although the researchers tried to make this work rigorous by using strict inclusion criteria, as long as the research is based upon patient self reports regarding both symptoms and trauma, it will be treated with some level of skepticism. For example, in this work, if the two cases involving litigation are removed then there is only one Chiari case out of 85 where a minor trauma may have played a role in developing symptoms. This is a small number to draw conclusions from.

In fact, this is highlighted in comments published in the same journal by other neurosurgeons. While several surgeons think this study is strongly suggestive of a link, one states quite clearly that he remains skeptical. A more detailed look at the comments also shows that the surgeons commenting have a predetermined bias on the subject, in that some think that patients with Chiari, symptomatic or not, should avoid contact sports, while others are less restrictive.

Until more light is shed on what differentiates symptomatic and asymptomatic Chiari, the controversies around trauma and activity restrictions are likely to remain.

**Figure 1: Patients Who Developed Chiari Symptoms After Minor Trauma**

Age	Gender	Syrinx	Trauma
42	F	Y	Concussion
17	F	N	Whiplash
43	F	Y	Concussion and Whiplash

**Notes:** Patients 1 and 3 have undertaken litigation concerning their cases

### Related C&S News Articles:

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[Chiari Patients May Be At Greater Risk With Head Trauma](#)

[Looking Back: Milhorat Redefines Chiari](#)

[Chiari Symptoms Can Come Back Years After Surgery](#)

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