

Introduction

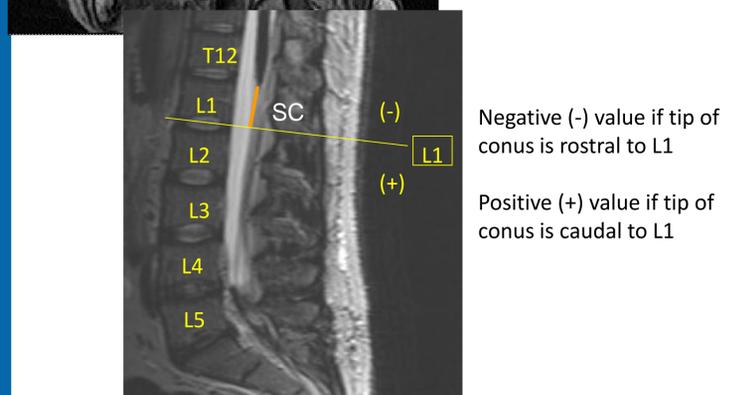
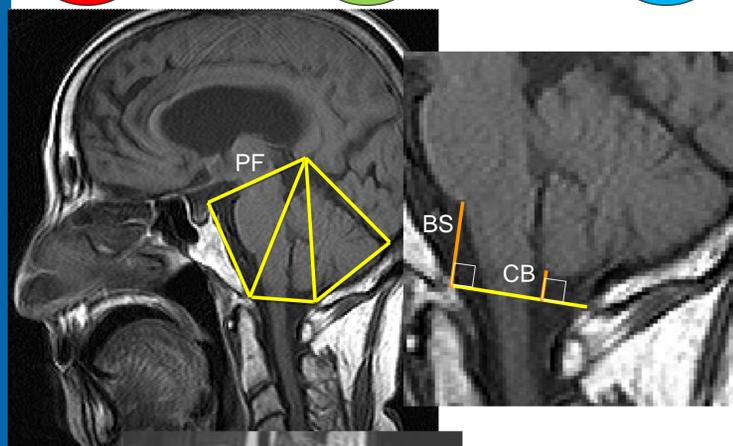
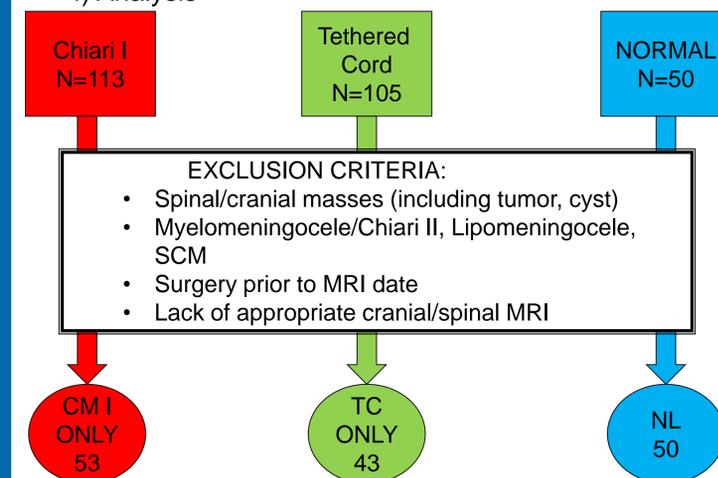
- **Chiari malformation (CM)** is a neurological disorder in which a portion of the cerebellum protrudes into the spinal canal. It may cause Cerebrospinal Fluid (CSF) blockage.
- CM patients may experience headache, vomiting, difficulty swallowing, and hoarseness.
- Surgery is the treatment for CM.
- **Tethered cord (TC)** is a neurological disorder in which the spinal cord is being pulled from the base of the spinal canal since it is fused to it.
- TC patients experience sever pain, bilateral muscle weakness, and bowel incontinence.
- Surgery is the treatment for TC
- CM and TC may occur in the same patient.
- The goal of this study is to determine whether there is a relationship between CM and TC.

Rationale & Hypothesis

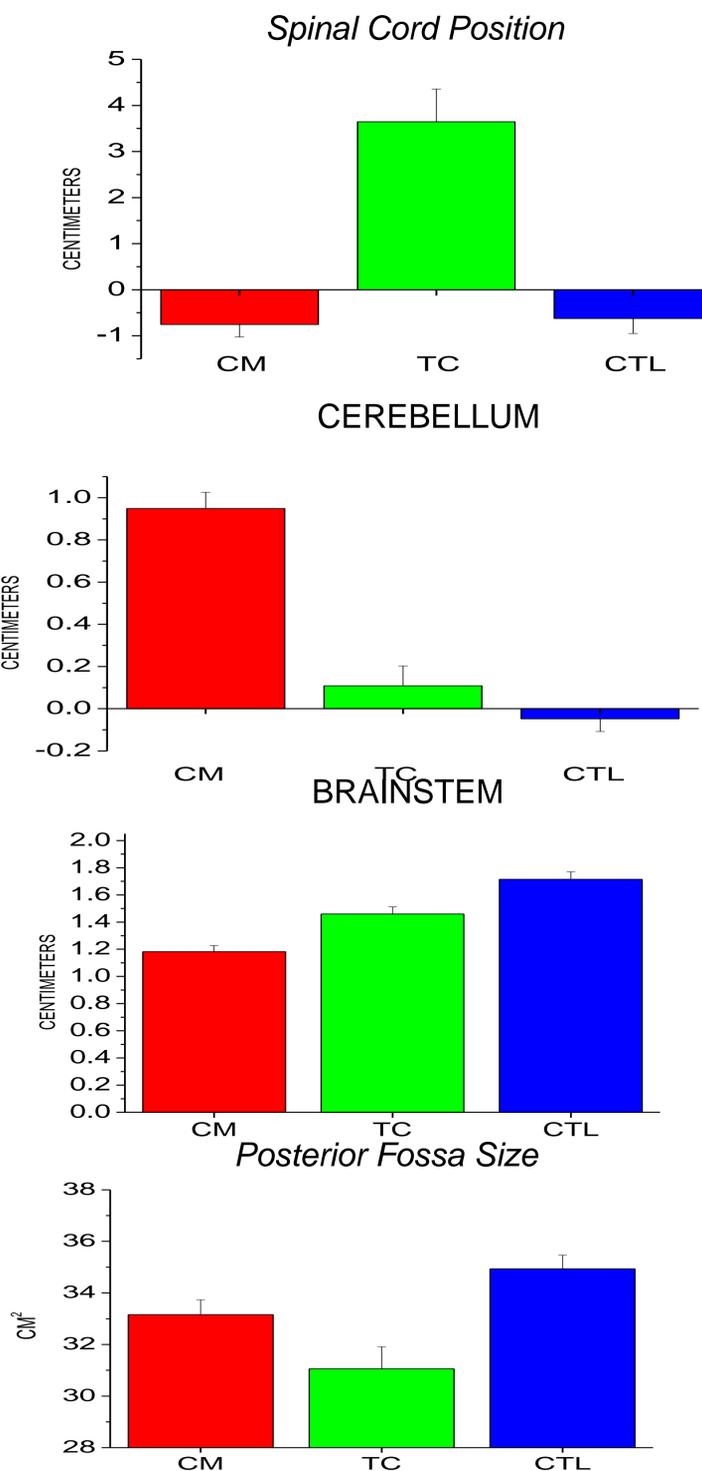
- The tethering of the spinal cord (as in TC) creates a tension on the cord and thus hindbrain and cerebellar migration to the spinal canal (as in CM); therefore we should expect a relationship between the caudal and rostral anatomy.
- If a relationship does occur, the causality is not proven.
- If a relationship does not occur, then the paradigm of causality is cast into doubt.
- **Hypothesis:** Both posterior fossa (PF) size and spinal cord position will play a role in determining the position of the hind brain and cerebellum.

Methodology

- **Study Design:**
 - 1) Clinical Computer Search: Search for patients.
 - 2) Chart Review: Verification & exclusion.
 - 3) MRI Quantification: Linear measures on images
 - 4) Analysis



Results



Discussion

- Spinal cord position was normal in Chiari group.
- Cerebellar position was normal in Tethered group.
- The brainstem was lower than normal in both the Chiari and Tethered groups; it was lowest in the Chiari group.
- Posterior Fossa size was smaller than normal in both the Chiari and Tethered groups; it was smallest in the Tethered group.
- Using Multiple Regression analysis, it was found that Tonsil position was related to Posterior Fossa size in the Normal group only and not in the Chiari group.

Conclusions

- While spinal cord position appears to be linked to cranial anatomy such as hind brain position and posterior fossa, there is little evidence that this link exists in Chiari patients.
- While this study reinforces anatomical links between caudal and rostral neural development but not the practice of tether release in the treatment of Chiari.