

## Clivus Length Key In Differentiating Symptomatic vs Asymptomatic Cases

Researchers at the CCRC have uncovered another piece of evidence suggesting the clivus bone might play a key role in Chiari. Previous CCRC studies have shown that the clivus, a small bone that rises up from the skull base and is located in the middle, is significantly shorter and has up to 30% less volume in Chiari adults compared to controls. In addition, a study examining Chiari and related conditions found that a short clivus was the only morphometric feature beyond tonsillar position that was common across all Chiari related conditions. Now, the CCRC team has found that clivus length can differentiate between symptomatic Chiari patients with “small” herniations and healthy controls with low lying tonsils. Specifically, they looked at seven morphometric measures (tonsillar position, PCF area, clivus length, fastigium, Boogard angle, anterior CSF area, posterior CSF area) measured from the MRIs of 210 adult Chiari females (Chiari1000) and 90 healthy controls (Human Connectome Project). The subjects were divided into four groups: controls with normal tonsillar position above the Mcrae line, controls with low lying tonsils 1-5mm below the McRae line, Chiari with low lying tonsils 1-5mm below the Mcrae line, and Chiari with tonsils 6-11mm below the McRae line. Not surprisingly, all seven the morphometric measures of the Chiari group with severe tonsillar herniation were significantly different than both control groups. But when they compared the two low lying tonsil groups, only clivus length was significantly different. The Chiari group had a shorter clivus length than the control group even though both groups had tonsillar positions between 1-5mm. Since the two Chiari groups came from the Chiari1000, the researchers had additional information available such as self-reported symptoms, surgical rates, surgical outcomes, related conditions, and scores on certain assessments. Interestingly, they found NO differences between the two Chiari groups in any of the additional data. This means that the Chiari group who technically did not meet the traditional definition of Chiari (tonsillar position 5mm or more) looked essentially the same as the group who did meet the traditional definition of Chiari. This adds to the growing body of evidence that tonsillar position alone is not sufficient to identify the presence or severity of Chiari related symptoms.

**Source:** Clivus length distinguishes between asymptomatic healthy controls and symptomatic adult women with Chiari malformation type I. Nwotchouang BST, Eppelheimer MS, Ibrahimy A, Houston JR, Biswas D, Labuda R, Bapuraj JR, Allen PA, Frim D, Loth F. *Neuroradiology*. 2020 May 16. doi: 10.1007/s00234-020-02453-5. Online ahead of print. aPMID: 32418026

*Conquer Chiari's research updates highlight and summarize interesting publications from the medical literature while providing background and context. The summaries do contain some medical terminology and assume a general understanding of Chiari. Introductory information and many more research articles can be found [www.conquerchiari.org](http://www.conquerchiari.org)*