

Ankle Stiffness Plays A Role In Chiari Balance Issues

Balance issues are common with Chiari. In fact, our recent Physical Impact of Chiari survey found that 62% of adults with Chiari have a Low Level of Physical Function due to lack of balance confidence. The human balance system is complex and with Chiari the focus naturally tends to be on damage to the cerebellum causing issues balance issues. However, a recent Conquer Chiari study found that ankle stiffness (technically quasi-stiffness) may also play a role.

The ankles are an important part of how humans maintain an upright position. When muscles are activated around the ankle during movement, the stability provided is referred to as 'stiffness' or 'active stiffness'. However, the ankles are also important when standing still, or unperturbed. The degree to which the ankles control the natural sway in this position is called 'quasi-stiffness' or 'intrinsic stiffness'.

For this study, the researchers examined the quasi-stiffness of 12 Chiari subjects and 8 non-Chiari controls by having them stand still on a force plate for thirty seconds. The force plate captured how much pressure was being exerted at different points on their feet and from that the researchers could mathematically determine their ankle quasi-stiffness.

They found that the quasi-stiffness of the Chiari subjects was significantly less than that of the controls. This was true independent of whether the Chiari patients had had decompression surgery or not (there were six of each), and this lower quasi-stiffness translates to less stability at the base of support. Even though it is at the other end of the body, it is important to keep in mind that this finding may still be due to impaired or damaged signaling from the brain. Future studies will be required to determine if ankle exercises can improve this Chiari related deficit and improve balance and functioning.

Source: Frequency analysis of ankle joint quasi-stiffness during quiet unperturbed standing in Chiari Malformation. Sommers BN, Davis BL. J Biomech. 2024 May;169:112146. doi: 10.1016/j.jbiomech.2024.112146. Epub 2024 May 11. PMID: 38749240

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