Neurosci Lett 2013 Nov 27;556:89-92.
doi: 10.1016/j.neulet.2013.10.028. Epub 2013 Oct 21.

Are effects of the symmetric and asymmetric tonic neck reflexes still visible in healthy adults?

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Abstract

When a cat's head is rotated in a transverse plane to one side, the legs on that side of the body extend, while on the other side, they flex (asymmetric tonic neck reflexes ATNR). On the contrary, when the head is rotated in a sagittal plane both legs flex when the head flexes, and extend when the head extends (symmetric tonic neck reflexes STNR). These reflexes have also been found in newborn babies and are thought to be a motor primitive, which is suppressed later in life. Still, using a test in which children sit on hand and knees, the ATNR and STNR can be found in children up to 9 years of age. This may suggest that these reflexes may still be involved in motor control in these children. Whether this is also the case in full-grown adults has thus far only been studied using coarse methods. Thus, for the current study, we set out to measure in detail whether the ATNR/STNR can still be evoked in healthy adult subjects. We measured 10 subjects who were asked to sit on their hands and knees while (1) their head was rotated left and right by an experimenter, (2) their head was flexed and extended by an experimenter. Kinematics was registered using a Vicon system. Elbow and head angles were detrended, and a regression analysis was performed, to investigate the effects of head angle on elbow angle. Results clearly showed the existence of the ATNR and STNR in adult subjects. A next step will be to assess the effects of the ATNR and STNR during everyday motor control tasks, such as making head rotations while driving a bike.

Keywords: Asymmetric tonic neck reflex; Head movements; Reflexes; Symmetric tonic neck reflex.