The sense of Upright after stroke

Prof Dominic Pérennou

Institut de rééducation-CHU, labo LPNC-CNRS, Université Grenoble-Alpes, France
DPerennou@chu-grenoble.fr

The existence of two separate mechanisms for the control of body orientation with respect to gravity and for its stabilisation is an emerging concept which allows a better understanding of postural and gait disorders after a stroke. Indeed, many stroke patients show severe balance disorders due to a bias in their internal model of verticality, as if they align their erect posture with an erroneous reference of verticality. We argue for a more systematic measurement of verticality perception in stroke patients, and discuss the relevance of the visual (VV) and the postural (PV) vertical for explaining lateropulsion, with or without active pushing. Using modern analyses of brain imaging in stroke patients, several recent papers have specified which brain structures are involved in verticality perception and lateropulsion. These new findings, mainly obtained with studies of stroke patients, contribute to a better understanding of internal models of verticality with vestibular and somaesthetic graviception synthetized in the postero-lateral thalamus, the parietal operculum and the insula, and predict an improvement of balance by recalibrating verticality representation. Interestingly, this approach brings arguments supporting the relevance of traditional techniques used in clinical practice to attenuate lateropulsion, and points out new tracks for rehabilitation. This argues for a more systematic measurement of verticality perception in stroke patients showing postural disorders.

References of our group: Pérennou et al Brain 2008; Barra et al Brain 2010 ; Pérennou et al Clin Neurophysiol 2014; Piscicelli et al Annals of PRM 2017, and in preparation; Odin et al in revision, Dai et al in preparation; Lemaire et al in preparation.