

VESTIBULOSPINAL AND NECK REFLEXES: INTERACTION IN THE VESTIBULAR NUCLEI

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INTRODUCTION

The labyrinth and vestibular nuclei together constitute an important sensory system whose activation or malfunction can have profound motor, and other, consequences. The system is of intrinsic interest, and has also provided a valuable model for the study of sensorimotor transformation. The vestibular nuclei and their motor outputs, vestibulo-ocular and vestibulospinal reflexes, have been investigated extensively in numerous laboratories for the last three decades. It is no exaggeration to say that the foundation for the great progress that has been achieved was provided by the work of Alf Brodal, his colleagues, and students, first summarized in "The Vestibular Nuclei and their Connections, Anatomy and Functional Correlations" (11). These anatomical experiments were the starting point for my work, which has dealt with the physiology of the vestibular nuclei, and with the influence that they exert on the spinal cord *via* vestibulospinal reflexes. These reflexes, however, cannot be thought of in isolation, as it has been clear for many years that they form a functional unit together with reflexes originating in receptors in the neck. Interaction between neck- and vestibular-evoked activity has been observed and studied in detail at cervical and lumbar interneurons presumably involved in vestibulospinal and neck reflex pathways (10, 40, 42). However, the first site in the central nervous system where convergence between vestibular and neck afferent input takes place is in the vestibular nuclei. In this paper I will review some recent work on this convergence in decerebrate cats, and then consider the relevance of these findings to what is known about interaction of vestibulospinal and neck reflexes.

NECK-VESTIBULAR CONVERGENCE IN THE VESTIBULAR NUCLEI.

Experiments utilizing electric and natural stimulation have shown that neck and vestibular afferents can activate the same neurons in the vestibular nuclei, and that some of these neurons project to the extraocular nuclei, others to the spinal cord (1, 6, 7, 8, 9, 24). Boyle and Pompeiano (6, 7) have conducted detailed experiments on this convergence, using sinusoidal roll tilt of the whole animal to stimulate vestibular receptors, of the body with the head fixed in space to

