Early brain damage and the development of motor behavior in children: clues for therapeutic intervention

Mijna Hadders-Algra
Department of Neurology, University of Groningen, Groningen, The Netherlands

Copyright © 2001 Hindawi Publishing Corporation. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

The Neuronal Group Selection Theory (NGST) could offer new insights into the mechanisms directing motor disorders, such as cerebral palsy and developmental coordination disorder. According to NGST, normal motor development is characterized by two phases of variability. Variation is not at random but determined by criteria set by genetic information. Development starts with the phase of primary variability, during which variation in motor behavior is not geared to external conditions. At function-specific ages secondary variability starts, during which motor performance can be adapted to specific situations. In both forms of variability, selection on the basis of afferent information plays a significant role. From the NGST point of view, children with pre- or perinatally acquired brain damage, such as children with cerebral palsy and part of the children with developmental coordination disorder, suffer from stereotyped motor behavior, produced by a limited repertoire or primary (sub)cortical neuronal networks. These children also have problems in selecting the most efficient neuronal activity, due to deficits in the processing of sensory information. Therefore, NGST suggests that intervention in these children at early age should aim at an enlargement of the primary neuronal networks. With increasing age, the emphasis of intervention could shift to the provision of ample opportunities for active practice, which might form a compensation for the impaired selection.
This article provides information pertaining to recent scientific findings regarding neural and motor development and the effects of brain damage on that development. The article is intended to provide the clinician with new information that will assist in patient assessments and the establishment of therapeutic interventions. Clinical and scientific issues pertaining to perinatal and adult-onset brain damage are discussed. Authors: C T Leonard. Related Documents: 24110173 - Common spatial patterns for steady-state somatosensory evoked potentials. 8047563 - Motor behavior and neural changes.