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Early brain damage and its plasticity

Modern brain-imaging techniques, mainly pre- and perinatal ultrasound or MRI allow for an early diagnosis of brain damage. They allow, on the one hand to clarify the exact location of the damage and its extent, and on the other hand to track the evolution of the damage during the first months after its occurrence. The image of early disturbances is subject to change: swellings disappear, bleeding is absorbed, post-encephalic cavities collapse and they are replaced by gliosis. Universal access to ultrasound is therefore essential, since the technique is repeatable and safe. Early ailure occurs within the central nervous system, which undergoes many years of maturation. It takes place mainly during fetal life and for the first 2 years of life, but significantly lasts till the 6th year and then, in the cortex, during the next decades...The process of maturation is genetically programmed. It involves several mechanisms, among others: the emergence and disappearance of neurons, synaptogenesis, migration of neurons to the cortex, and finally myelination. There is an interaction between the dynamic self-modification of brain and its early damage. Another factor related to interaction in the CNS is the plasticity of brain. It depends on the impact of incentives on brain tissue (strictly speaking, on synapses) which, under the influence of stimulation, is subject to morphological and functional modifications, followed by the development of dendrite and axon networks. Thus, neuronal activity increases the area of the networks. In this way, sensory and emotional stimulation modifies the structures of brain. Mnemonic effort results in the molecular and synaptic changes. The phenomenon of epigenesis describes the elimination of ineffective synaptic connections, particularly the possibility of reorganization of function after injury. Brain plasticity is a mechanism used by the rehabilitation. Stimulation may help or worsen the functional status of a child. It is important to choose the proper type of stimulation, according to the characteristics of damage. It is necessary too take into account the whole of the child's development including its physical cognitive, emotional and educational components.