Developments in Health Sciences 1(1), pp. 24–26 (2018)
DOI: 10.1556/2066.1.2018.10
First published online June 19, 2018

How early is too late?

M BERÉNYI*

Department of Developmental Neurology, Szent Margit Hospital, Budapest, Hungary

(Received: June 30, 2017; revised manuscript received: January 22, 2018; accepted: January 30, 2018)

Keywords: neurotherapeutics program, brain-damaged infants, sensorimotor abnormalities, early movement development

The quality of life in families of infants with suspected brain damage is seriously affected. Parents are uncertain about the future. The task of the Department of Developmental Neurology (the only one in Hungary) is to ensure the normal development of the infant in problematic cases or to clarify the nature of the abnormality. This is possible by serially applied objective diagnostic methods during approximately 1 week in a special ward. During this period, the professional team (developmental neurologist, developmental psychologist/special educator, physiotherapist, specially trained nurses, electrophysiological, and electrotherapeutic assistants) together with the parents repeatedly observe the awake and sleep behaviour of the infant, his/her visual and auditory acuities, short-term and long-term memory, precognitive function, and motor performance. The investigation also contains evaluation with neurosonography, video-electroencephalography, and evoked potential studies. It is important that the summary of objective data gives not only diagnosis, but prognosis as well. The negative functional diagnosis can predict normal development, despite the presence of various risk factors (such as extreme prematurity, prolonged artificial ventilation, neonatal convulsion, or abnormality discovered during brain imaging). If the development is not endangered, no early intervention, special manual therapy, hydrotherapy, etc. are needed. In such cases, the application of any therapy maintains the insecurity of the parents and burdens them with financial, time consuming, and psychological hardships.

The situation is just the contrary, if the diagnosis shows signs of abnormal brain development and the prognosis indicates the development of handicap. In such cases, immediate start of intensive, individualized neurotherapy is obligatory. There is no time to wait and see whether the infant overcomes his/her problem. A 6-month-old infant is young, but his/her brain development is already delayed. During this period, a vast amount of synapses develop, sprouting of neurons occurs, and neuronal networks become established. The so-called "plasticity" of the brain makes it possible that the functions of the damaged brain areas are taken over by the healthy areas. Due to regular activations during neurotherapy, the so-called "silent" areas can actively integrate into the proper developmental processes.

Parents are active members of the team dealing with the brain-damaged neonates and young infants. Neurotherapy is performed at home in the infant's own familiar environment by the parents. Following a detailed teaching process (presentation, practice, repetition, as well as written instructions and schedules), the parents perform items of the neurotherapeutics program on a daily basis with regular monthly consultations with the professionals. During these check-ups, if necessary, new items of therapy are taught and introduced.

While planning the individual neurotherapeutics program, several factors have to be considered. The most important among them is the knowledge of the so-called "epigenetic development" (i.e., the proper activity of a certain brain function determines the future developmental processes). For example, when head control does not develop, no rotation, no crawling, no sitting, and no walking can be expected to be later present according to the so-called developmental "milestones". The chronological and corrected age of the infant and the genetically and epigenetically determined sequence of development serve as the base of priority. Priority means that specific signs and symptoms need to be dealt with first and most intensively (Figure 1). Without knowledge (based on objective, repeated examinations!), it is easy to deal with the most obvious sing, such as for example the stiff lower extremities, and forget to give sufficient treatment to lagging head, and losing and wasting time – during the critical period – to achieve head control. During the general early intervention, the special educators or the physiotherapists fail to recognize early signs of symptomatic epilepsy and they suspect abnormal motor function instead, the further deterioration of the brain continues despite all efforts.

* Corresponding address: Marianne Berényi; Department of Developmental Neurology, Szent Margit Hospital, Budapest, Hungary; E-mail: fejlodes.neuro@gmail.com

This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium for non-commercial purposes, provided the original author and source are credited, a link to the CC License is provided, and changes – if any – are indicated.

© 2018 The Author(s)

Unauthenticated | Downloaded 06/20/24 07:42 PM UTC

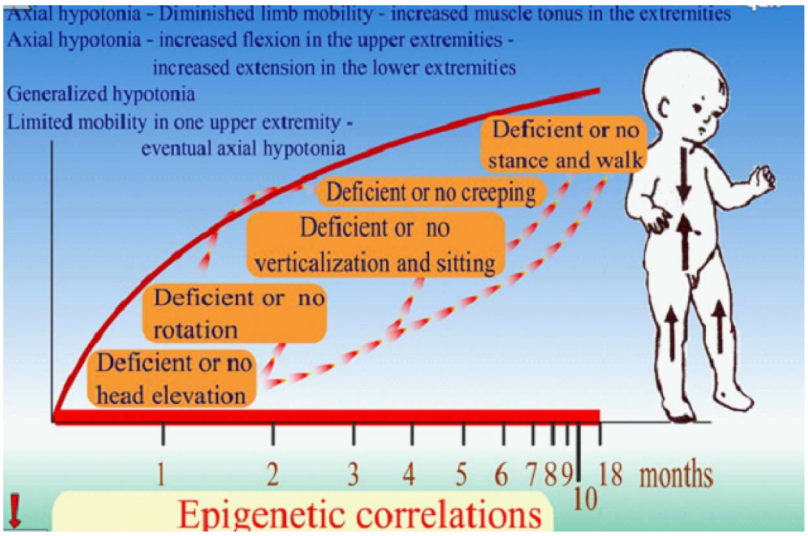
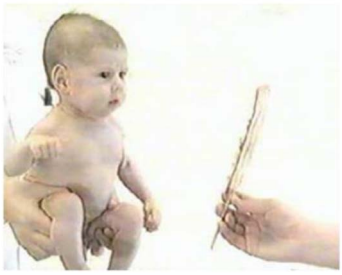


Figure 1. Epigenetic correlations, deficient orientation, and mobility. Dotted lines indicate epigenetic correlations among motor milestones, – i.e., lack of head control prevents rotation, crawling, sitting, standing, and walking

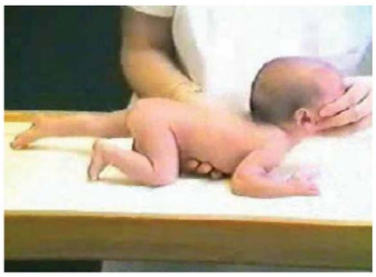
The hypoxic–ischaemic brain damage develops multiple symptoms. Not only sensorimotor regulation, but also visual, auditory, social, and precognitive–cognitive behaviours are involved in the abnormal development. Neurogenic dysphagia and symptomatic epilepsy can also be the symptoms characterizing abnormal brain development.

During the first weeks and months of life, the sensorimotor abnormalities, among them the problematic head control and the asymmetric limb movements can be treated with the genetically determined, human-specific elementary movements. These complex reactions can be elicited with vestibular stimuli due to gravity. They represent elementary forms of ultimate human-specific movements (sitting, creeping, crawling, and walking) and can be activated simultaneously during this early period (Figure 2). Because of their stereotypy, they can be applied for diagnostic and for therapeutic purposes. Their description, application in early diagnosis and early neurotherapy, and their neurophysiologic background were discovered and described by Professor Ferenc Katona in the 1970s.

During the seemingly limited but extensive period of the first year of life, the organization of diagnosis and treatment of brain-damaged neonates and young infants are in the hands of a medical team. Their activity is directed by a developmental neurologist, who has special knowledge in this field and who also takes the ethical, moral, and juridical responsibilities. The other paramedical members of the team are working under medical supervision.



"sitting in the air" (without support)



assisted crawling

creeping down a slope

Figure 2. Elementary sensorimotor patterns

Unauthenticated | Downloaded 06/20/24 07:42 PM UTC

LITERATURE CITED

1. Berényi M, Katona F. Fejlődésneurológia. Az öntudat, a kommunikáció és a mozgás kialakulása [Developmental neurology. The development of self-perception, communication, and movement]. Budapest: Medicina Könyvkiadó; 2012.
2. Berényi M, Katona F. Idegrendszeri károsodások diagnosztikája és kezelése [Diagnosis and treatment of neurological damage]. In: Oláh É, ed. Gyermekgyógyászati Kézikönyv [Handbook of paediatrics]. Budapest: Medicina Könyvkiadó; 2009. p. 1641–56.
3. Katona F, Berényi M. A fejlődésneurológia klinikuma – diagnosztikai programok [Clinical developmental neurology – diagnostic programs]. Clin Neurosci. 2001;54:142–55.
4. Katona F, Berényi M. Miért nem torna? Az extrapyramidalis neurotherapia idegélettani alapjai [Why can't it be called "exercise"? The neurophysiological foundations of extrapyramidal neurotherapy]. Gyermekgyógyászat. 2001;52:326–41.
5. Katona F, Berényi M. Milyen korán lesz már késõ? A fejlõdésneurológia korai terápiás programjai [How early is too late? The early therapeutic programs in developmental neurology]. Clin Neurosci. 2001;54:196–206.
6. Katona F. Az öntudat újraébredése – A human idegrendszer ontogenesise [The rewaking of self-perception. The ontogenesis of the human nervous system]. Budapest: Medicina Könyvkiadó; 2001.
7. Katona F. Klinikai Fejlődésneurológia [Clinical developmental neurology]. Budapest: Medicina Könyvkiadó; 1999.

Unauthenticated | Downloaded 06/20/24 07:42 PM UTC