

DYSFUNCTIONS IN THE DYNAMICS OF NEUROPSYCHOMOTOR BEHAVIOUR DEVELOPMENT IN CHILDREN IN THE 0-3 YEAR-OLD AGE GROUP

ABSTRACT

In our study, which has a more analytical-synthetic value, we focus on certain clinical aspects generated by a multitude of causes, which are more frequently met in the psychopathology of children in the 0-3 year-old age group (105 cases), with neuro-psychomotor dysfunctions in their development. Here are our findings:

1. The frequent occurrence of the affective – adaptive disorder in the form that we have described dictates the choice of modern, multifunctional methods of rehabilitation, taking into consideration the extent to which the behavior development is stimulated, ensuring gradually:
 - a. diminished neuro-psychomotor dysfunctions;
 - b. optimised family and social integration (through special education, ergo therapy, speech therapy, psychotherapy and parental counselling).
2. Out of the various methods used to examine the patient and to determine their behaviour development dysfunctions, we concluded that the NBT test (which our team has developed and presented at the 1999 International Congress of the European Society for Child and Adolescent Psychiatry, ESCAP, in Hamburg, Germany) allows a 0-3 year-old D.Q. quantification, so as to establish a degree and a clinical form of the retardation.
3. Children being treated at the Day Care Centres No.1 and No.8 in Buzău benefit from rehabilitation programme which takes into consideration both aetiopathogenic factors and the form and severity of the child's deficiency. In order to individualize the rehabilitation programme, it is necessary to assess the items previously achieved using the Primary Assessment Chart-I (PAC) H. Gunzburg, that gives definite information on the particular deficient function which the team members need to focus on in the next stage of the programme.
4. The basic principles in rehabilitating the CNS functions in toddlers (neuro-plasticity, neuro-regeneration and mutual conditioning of developing behaviours) dictate the rehabilitation methods for a particular case, thus ensuring the success of the recovery, especially in training the child's emotions.

Key words: children 0-3 years old, neuropsychomotor behaviors, dysfunction

I. The etiopathogenetic factors that generate dysfunctions in the dynamics of NPM behaviour development in infants and toddlers are very diverse, ranging from genetic, metabolic, viral-microbial, parasite, mycotic, allergic, immunologic, radiating agents to accidental traumatic factors or stressors, toxic agents, etc. **They constitute a very stringent reality** since, in practice, it has been demonstrated that an early treatment associated with a rehabilitation therapy prove to be efficient in time, in correcting the dysfunctional acquisitions.

II. The present possibilities to determine the causes (laboratory investigations, EEG, medical imaging such as CAT, MRI, PET, SPECT, etc.), side by side with clinical investigation techniques contribute to **the precision of the diagnosis**, and establish cer-

tain laws which **both the clinician and the rehabilitation specialist should take into account.**

The dysfunctions in the embryo-foetal development monitored by the obstetrician during the intra-uterine life, to which important perinatal pathogenic causes are added (small immaturity, bilirubinemic encephalopathy, multiform convulsive states generated by various causes, obstetrical traumas, severe infections of the newborn and the pluri-causal comatose states, etc.) influence the dynamics of the NPM development of the toddler in a negative way.

The lack of affection, well known to long-term institutionalised children, as well as to those coming from families with conflicting affective states, abandonment, divorce, etc. generates retardation in affective-adaptive behaviour.

III. In order to develop a diagnosis of these dysfunctions, the authors had to **select practical schemes of examination since birth.**

The research was conducted during 2005 -2009 at the Family – Type Home and the Day Care Centre No.1 and 8 Buzău and at the *Medinvest* Infant Neuropsychiatric Service, Buzău (directed by Paul Costache).

a). The value of the **tests Saint Ann Dargassies and V. Apgar draws our attention to** other vegetative disorders (detresses in various forms and degrees), to the necessity of instituting an early, effective drug and rehabilitation treatment.

b). Out of the numerous examination schemes of toddlers developed in the last two centuries (by Piaget, Brunet, Lezine, Herten, Gessel, Portager, Vincent, Denver, etc.) the authors of this paper have conceived the NBT Test (Nursery Buzău Test) based on the developmental dynamics of NPM behaviours which allows us to calculate the DQ (Development Quotient) according to the values of age and progressive acquisition items.

The test allows us to appreciate the type (harmonious or disharmonious) and the degree of the retardation.

c). The NPM deficiencies have been frequently associated with metabolic, organic and extra cerebral dysfunctions and with various malformations, some of them observed since birth, which need to be included in the therapeutic and rehabilitation plan.

WORK METHODS

Out of over 200 cases in ambulatory treatment at INP Medinvest and of children who were frequenting the Day Care Centres No.1 and No.8 in Buzău, we selected only 105 children in whom we evidenced anamnesticly the causes that have generated their NPM 0-3 year old dysfunctions and who could be numbered.

a) For those with neonatal affections: V. Apgar and S. A. Dargassies tests were enough, together with the vegetative disorders, to evidence the forms and the degree of the neonatal detresses (see Annex).

b) In children 1 to 36 months of age, our team evidences their behaviour development dynamics by means of the NBT test conceived with a number of items divided into behaviour types, each item being attributed a number of marks. According to the number of marks obtained in the tests we calculate the DQ (see the methodology of the test), mentioning the clinical aspect of a harmonious or disharmonious retardation, on a co-interested number of behaviours. (This test was presented at the Congress of Psychiatry in Hamburg in 1999.)

c) Periodically, the rehabilitation programme aimed at the deficient behaviours requires a detailed analysis, visible for the whole rehabilitation team, on the Primary Assessment Chart-I (PAC) Gunzburg, in order

to indicate to the team members which deficient behaviour should be insisted on in rehabilitation.

d) Besides the level of behaviour development at a certain age, it was necessary to apprehend some of the patient's particular symptoms, thus we arrived at a classification of these disorders. (See Table 1 on the next page).

DISCUSSIONS

The data presented in the table lead to the following conclusions:

1. Following the frequent occurrence of certain clinical forms signalled during the last two decades, associated disorders usually appear too: metabolic, genetic, immunologic and especially affective-adaptive ones, pointed out in groups 1, 4, 5, 6.

2. The dysfunctional forms and syndromes that are discovered by the family paediatrician and by the parents, starting with infancy, which receive treatment and are included into early intensive motor and affective-adaptive rehabilitation programmes benefit from a high level of recovery. (Group 2).

3. Sequellar morbidity and reactive affective dysfunctions (groups 7 and 8) are discovered early and the families get eagerly and actively involved in the rehabilitation programmes. Thus, the reduced percentage of this category has lately been maintained.

4. Due to the relevant documentation provided Prof. Dr. Milea Ștefan concerning the psychopathological disorders of the well known syndrome ADHD, which has enjoyed a large debate in the specialist literature lately, this syndrome is considered as a group of attention disorders of the involuntary hyperprosexia type which generate hyperactivity – impulsiveness (Thorlay). Professor Milea's analysis is especially valuable in helping us:

- to establish a correct psychopathogenic diagnosis,
- to consider an effective therapeutic approach.
- **Attention** being a complex psychic function connected to thinking and affection has three forms:
 - involuntary, specific to infants and toddlers,
 - voluntary, which develops since the age of 3 years old;
 - post-voluntary.

It assures:

- motor skills,
- capacity to concentrate (which pertains to voluntary attention),

Table 1. Clinical aspects of NPM dysfunctions in 105 children from INP Medinvest Healthcare Unit and Day Care Centres No.1 and No.8 in Buzău

Group no.	Title of clinical entities	No. of cases	Percentage	Observations
1.	Epilepsy (febrile seizures with commemorative potential for late onset epileptic episodes) (West Syndrome, GM, PM, focal seizures and other forms, too)	21	20 %	Correct prescription of antiepileptic treatment and appropriate monitoring assures the favourable solving of the cases
2.	Behavioural retardation "Unequal in limits" (RCIL)	20	19,4 %	They have a benign prognosis if they obey the rehabilitation programme which should be started early and last over a prolonged period of time
3.	Delays in speech development, development dyslalia, stuttering, etc	17	16,1 %	Sustained speech therapy proves to be efficient
4.	Chromosomopathies with craniofacial and limb malformations, metabolic encefalopathies phakomatoses, cranio-stenoses	14	13,3 %	We also control multi-disciplinary rehabilitation: L. Down, Ellise von Creveld, P.K.U., sindr. Crouson Appert, etc
5.	ADHD Syndrome (according to Ștefan Milea: involuntary hyperprosexia with hyperkinetism, voluntary hypoprosexia, aggressiveness, etc.)	13	12,3 %	Interdisciplinary interventions are required, according to aetiopathogenesis. The recommendation is to include the patient in rehabilitation and education programmes as early as possible
6.	Perceptual disharmonies (autism, pervasive developmental disorder, etc.)	11	10,4 %	Complex treatment with Atomoxetine, neurostimulants, Ritalin, etc. and specialised intervention programmes
7.	Lesion sequelae of the CNS (CP in various forms and degrees) consequences of certain infections: meningoencephalitis, pluri-causal comas, Angiotensin Converting Enzyme ACE, etc	5	4,7 %	Since they have been discovered early and treated accordingly with introduction into rehabilitation programmes tailored on the deficient behaviour, their number has decreased
8.	Reactive psychogeneses generated by severe affective disorders in the family: separation from mother, alcoholic father, conflicts	4	3,8 %	The aim of the intervention is to harmonize the affective relationships in the family with the help of psychologists, social assistants, family surgeon and a special education programme

- resistance to inhibiting stimuli,
- stability and volume of acquisitions,
- in this syndrome it would be a voluntary hypoprosexia,

According to Buckely Duckman (1972), the constant attention disorders in this syndrome are a consequence of some dysfunctions of the Ascending Reticular activating System (ARAS) when:

- the inhibitive processes weaken
- the possibilities of selecting the stimuli decrease (Zental 1979)
- according to Öttinger, there is an immaturity of the system that regulates affectivity
- in 2003, Moll talks about infracortical inhibition at the level of the caudate nucleus where such morpho-functional alterations have

been described, thus resulting impulsiveness (“a temporization of the answer”)

— the consequences of the notional imperfection of this syndrome are

a. an error in the differential diagnosis (e.g. Autism where we talk about a voluntary hypoprosexia accompanied by hyperactivity);

b. errors might be made in the therapeutic attitude.

5. Revising the affective-adaptive development peculiarities in infants and toddlers in comparison to the other developing behaviours, we realise the importance of this complex function which constitutes the **key to functional plasticity of the SNC**. At this age, these peculiarities give an impulse through conditioning to self stimulation, organization in stages, development of all behaviours. **The assimilation of primitive emotional reactions in infants and toddlers** often limits the discernment capacity (field of consciousness).

The stages in the development of affection take various forms:

a. emotion is generally conditioned by social benefits and appears as a sudden or lasting manifestation, always maintaining its objectal character. As a consequence, the reactions are:

— positive emotions (pleasure, satisfaction, joy);
— negative emotions (displeasure, sadness, anger) which accelerate the circuits of the maturing of the other behaviours.

b. disposition reflects the adaptability to the environment which, in children under 3 years old, reflects their nursing and education conditions.

According to A.R.Spitz, one should analyse the organizing psychism in the development of infants and toddlers. This analysis helps us interpret the affective reactions to different stimuli in order to develop positive emotions which might be encouraged since the age of 3-4 months old, **constituting the first organizer** – the one that results from touching the affection generating zones: facial teguments, abdomen, etc

c. anxiety around the age of 8 months is a new stage in the development of affection, **constituting the second organizer**. The positive reactions have a great role in the development of the psyche (by means of speech, gestures, play).

d. fright appears when mother abandons her baby and strangers surround it.

e. learning to negate using gestures, words; it has an important role in the development of emotions **constituting the third organizer**, that develops around the age of 2 years having an important role in the communicative function through action and in education, in general.

According to E. Erickson, the parents have the most important role in the development of their child's affective reactions, in structuring them into stages under the age of 3 years old and making use of the above mentioned means. It follows that prolonged institutionalization since an early age has a negative role in the development of affection. It is not the abundance of toys that might help but the positive, affective stimuli of the special education programme.

After 18 month, toddlers manifest interests, preferences which increase the volume of acquisition through concentrating the attention when the development of limbic and prefrontal areas is stimulated. Starting with the age of 3 years old, the child becomes egocentric.

According to R.A.Spitz, **the psychopathological forms** in children under the age of 3 year old are caused by:

— the fact that the baby is abandoned by its mother, generating “anaclitic depression” which determines, besides a distorted facies, undeveloped speech and somatic disorders (it decreases in weight). In prolonged hospitalism, this psychopathological form is called “affection deprivation syndrome” (Levi, Bender, Bowbly).

— “affection crises”, manifested by screams and chaotic motor activity followed by a state of exhaustion. According to L. Michaux, “it is a psychogenic crisis by its motivation and a motor crisis by expression”.

The breathing and vasomotor vegetative phenomena which accompany these crises produce “the sobbing spasm” that goes as far as convulsive states with ECG alterations, suggesting epileptic equivalences.

— **anger crises**, expressing certain educative exigencies which, according to L.Kanner, are accumulative answer to profound internal conflicts.

— in the little children, in general, the fright reactions (do not have an object), are similar to the an-

xiety by contagion with the persons around them. The affective disorders in the little child are more qualitative in their clinical aspect in contrast to the quantitative ones which develop after the age of 3 years old.

The psychopathological mechanism of affectiveness is based on:

- biological tendencies;
- ethical-moral (educative) necessities.

Even in the last century, R. Laforque, E. Pichon, Kassine and others described motor disharmonies due to affective immaturity as an expression of thalamic-hypothalamic-hypophyseal hypofunction.

Busy links affection to the function of the frontal lobes.

Brady considers that the temporal and amygdaline lobes play an important role in the development of affectivity. Experimental modern investigations specify the role played by the prefrontal lobe, cingulate gyrus, limbic lobe, thalamus, striate nuclei, etc. in the affective circuit. Prof. Dr. T. Mircea describes this circuit very precisely in its neuroanatomic support of affectivity.

6. The ontogenetic development of motor skills in general, expressed mainly by its regulating the muscular tonus, concomitantly with the development of the other behaviours, is conditioned by the function of other systemic structures along the cerebrospinal axis, of the medulospinal connexions and of the medulo-bulbo-cerebelo-thalamo-parieto-frontal information centres. Thus, the general and refined motor behaviour takes place at different modulation levels:

- general motor skills in static control,
- fine motor skills, which controls dexterity and the ability necessary to perform the function of self-help.

These circuits have been studied by Chesni, Walgreen, Claveri and others.

The pathology of controlling the tonic centres with hundreds of dysfunctional cases was debated at the ESCAP Congress in Bled, Slovenia, in 1999 (parca era in Hamburg la inceputul lucrarii!!!), where I also participated. Besides the clinical cases displayed on television and presented in workshops, a rich material was made available concerning rehabilitation methods for various forms of C.P.

7. Interconditioning of all the developing behaviours (see the material exposed in Hamburg) is the most important, having as a key, the child's affective-adaptive function. At a certain age, the

children, by their emotional expression dictate the amendment of the special education programme for the impaired, thus helping the rehabilitation team to finally improve the verbal-cognitive communication and affective-adaptive functions.

CONCLUSIONS

Revising the role of aetiopathogeny and of the clinical forms in the developmental pathology of children in the 0-3 year-old age group in 105 cases and analysing the effectiveness of different rehabilitation schemes, the authors conclude:

1. The large therapeutic team, specific to each group assisted in the social and healthcare units (equipped with various rehabilitation facilities) should be as complex as possible including the family, too.

2. The family affective-adaptive support is indisputable in the **impaired groups who attend the Day Care Centres**, having rehabilitation programmes in the morning. Usually, trained mothers, continue the rehabilitation exercises at home, too.

3. The group of 105 children from the two socio-medical centres, who are included in various rehabilitation methods according to the preponderance of their behaviour dysfunctions, allowed us to take into consideration the **methods of dynamic behaviour development until the age of 3**, evidenced on the above mentioned tests.

4. The methods of assessing the progress made by the impaired child in rehabilitation have been established by PAC Primary Gunzburg (the map of progressive acquisitions). They have been very efficient, especially in the stage periodic examinations.

5. In the group of children examined ambulatory who had dysfunctions in the development dynamics of their behaviours accompanied by other neuro-psychic disorders (epilepsy, ADHD, psychotic manifestations, motor neuroses: tics, logo-neurosis, sensory perceptual deficiencies, etc.) it is necessary to enlarge the therapeutic team so as to include a psychotherapist and a sociologist who should supervise the improvement of the intrafamily relationships in order to stimulate the deficient behaviour.

6. The large range of therapeutic plans in 0-3 year-old children, when the plasticity, regeneration and rehabilitation of their developing CNS are high, urgently imposes a specific drug treatment, too, together with the rehabilitation methods. This treatment should be specific for the associated

symptoms and syndromes, thus eliminating and improving the coefficient of diminishing the deficiencies. (See the medical scheme).

7. Let us not ignore **the rapid changes in the development of general and fine motor skills (dexterity, ability), in the cognitive-verbal communication and affective-adaptive behaviours which constitute the progress points of the acquisitions** in conformity with **the reciprocal conditioning laws of the developing behaviours.** (Cravcevschi O. See the material exposed in Hamburg).

8. **The contribution of the specialists in documenting rehabilitation by their participation in scientific congresses** (Bled – Slovenia, Vari – Grecia) and the **study visits to specialised rehabilitation centres for NPM deficient children from Jeleznice – Spa (Boemia)**, was very helpful for the quality of our work.

9. In order to enlarge the range of rehabilitation methods and enhance the receptivity of our patients we have attracted, besides kineto-logotherapy and psychopedagogy, other forms of child stimulation like music therapy, play therapy, art therapy, cromotherapy, special education in the Day Care Centres.

10. The nutrition factors, included in a correct diet (as a consequence of the research during the last two decades), have **overwhelming importance** because the damaged brain abounds in free radicals and there is a need for antioxidants obtained from macro and micronutrients in order to regenerate the synaptic transmitters, thus securing:

- the increase of the receptivity level
- the improvement of the degree of appropriation of certain obligatory social rules, especially in social-medical centres.

11. Both securing a more balanced emotional structure and improving the sleep-wake rhythm are obligatory rules in stimulating the behaviours that need rehabilitation.

12. It was necessary for us to do documentation research in order to stimulate the positive affective reactions necessary in the rehabilitation of our 0-3 year old patients. We also wanted to find out more about the neurophysiologic substrate of affectivity and of affective reactions that are characteristic to this particular age group (T. Mircea). All this knowledge has helped us in re-balancing the functional dynamics of behaviours.

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