Humanization in newborn care: interpersonal relationships and their importance to the neurobiological organization

A humanização no atendimento ao recém-nascido: a importância das relações interpessoais e a organização neurobiológica

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ABSTRACT

Humanization in newborn care is an ever more emphasized proposal in maternity ward care, both in normal delivery conditions and especially, when medical intercurrences (prematurity, infections, etc.) occur in neonatal intensive care units. The relevance of this approach is based on the current understanding and valorization of the early interpersonal relationships in the organization of the neurobiological foundations to which more complex living and learning experiences will successively add, building what is currently conceptualized as Developmental Neurobiology. The present paper has the objective of stressing these aspects, attempting to correlate them with the corresponding neurobiological structures, stressing the fact that the early bonds established by the newborn will shape the neuronal circuitry responsible for future behaviors and actions of this child.

Keywords: Humanizing delivery; Neurobiology; Interpersonal relations; Infant, newborn; Neural networks (computer)

RESUMO

A proposta de humanização no atendimento aos recém-nascidos vem sendo cada vez mais enfatizada nos atendimentos das maternidades, seja nas condições normais de parto, seja principalmente quando ocorrem intercorrências clínicas com acompanhamento em unidades de tratamento intensivo neonatal (prematuridade, infeções, etc.). A relevância de tal conduta liga-se à compreensão e valorização que atualmente são atribuídas aos relacionamentos interpessoais precoces na organização dos alicerces neurobiológicos sobre os quais se agregarão, sucessivamente, as vivências e os aprendizados mais complexos, constituindo o que modernamente se conceitua como Neurobiologia do Desenvolvimento. O presente trabalho tem o objetivo de salientar esses aspectos, procurando correlacioná-los com as estruturas neurobiológicas correspondentes, destacando o fato de que os vínculos precoces que o recém-nascido estabelece modelarão a circuitação neuronal que será responsável pelos comportamentos e pelas ações futuras dessa criança.

Descritores: Parto humanizado; Neurobiologia, Relações interpessoais; Recém-nascido; Redes neurais (computação)

There has been much progress in morphological and functional knowledge on the nervous system, especially regarding acquisitions in school-aged children, adolescents and adults. However, during the period spanning from birth until approximately three years of age, the correlations between function and structure are quite restricted, almost exclusively aimed at the motor and language aspects.

This is an important time of the individual’s life, and such is the emphasis with which it is appreciated by several branches of science, such as Neurology, Pediatrics, Psychology, Psychiatry, Psychoanalysis, Ethology and several others, seeking more differentiated understanding of human behavior. If in the one hand theoretical concepts about the dynamic organization of the psychological apparatus have long existed, on the other hand their correlations with neurobiological aspects that would be the structural expression corresponding to those behaviors are scarce. Starting from these assumptions, the neurobiological organization in the newborn (NB), that occur concomitantly to the successive learning processes determined by interpersonal experiences and by the environment will be considered.

Morphological development of the nervous system begins early, in the first embryony weeks, with the neural placode originating from the ectoderm. From this time on, both macroscopic and microscopic changes will succeed until birth, organizing the neuronal structures and networks, a preparation for the functional requirements of the maturational process. What happens, from the structural standpoint, when the NB begins interacting with the environment? And when the contact with the parents, the caring or not experiences, or the risk and threatening experiences if there are clinical
complications and need for prolonged intensive care in a neonatal intensive care unit (NICU)? What are the impact and the interferences and how will the neuronal circuitry be organized with the successive experiences the child will have?

The objective of the present study is to reason about the importance of bonding with significant people established early by the child and the consequent neurobiological structuring, as well as its relation with the process of functional development, which will determine in the future the higher acquisitions of the individual, which are the executive functions, that is, the ability to define and to reach goals, to plan them, to carry them out and to control each of their stages. In the same objective, by means of understanding how this complex functional activity is organized, prophylactic measures favoring improved development and avoiding situations that hamper such acquisitions are proposed.

INTERPERSONAL BONDS AND NEUROBIOLOGICAL STRUCTURING – THE PROCESS OF TRANSFORMING BRAIN INTO MIND

As already mentioned, the brain during gestation is in an intense process of structural transformation, and neuronal multiplication and migration can be verified, as well as the peculiar and selective organization of the cytoarchitecture in the different cortical layers and subcortical structures; afterwards, along with the post-natal experiences, there is progressive synaptization and myelination\footnote{1}. Neurochemical factors mediate the design of such neuronal maps\footnote{2}, such as NCAM (Neural Cell Adhesion Molecule), GAP-43 (Grow Associated Protein), and LAMP (Limbic System Associated Membrane Protein).

In another context, a neurochemical complex of neurotransmitters will become active, concomitantly, in order to turn on these circuits, promoting their functioning and interaction. It includes especially dopamine, noradrenalin, serotonin and others. This subject is particularly challenging and of high complexity, however its description is beyond the scope of this study.

At birth, the NB brain is quite well shaped in condition to begin its contact with stimuli from the outer world. However, at this time, the child is a completely dependent somatosensory individual, requiring essential care for maintaining his/her vitality and integrity\footnote{3}. With peculiar competences, it is in a depending condition, needing to establish relations with the so-called “first caretakers” (mother and father) and with the surrounding environment in order to survive. It may not be considered a “tabula rasa” or reduced to a digestive tube that only nurses and sleeps and, for this, needs to be recognized and treated in order to experience such initial relationships.

It is important to remark that since these early times of life, the bonds the NB will establish with the people around him/her should favor or not their intellectual and emotional evolution, so that the condition of early absolute dependence can be modified, allowing the development and the acquisition of progressive autonomy\footnote{4,5}.

It is known that NB have a genetic constitution that will predispose them to certain behavioral trends; nonetheless, such trends will be influenced by the surroundings and their future behaviors will result from such composition.

An important aspect currently recognized by professionals working in Neurosciences, is that the bonding relationships, as they happen, establish or modify behaviors, accompanied by a modeling process of the neuronal circuitry. That is, the continuous and permanent establishment of the bonds between the environment and the child are like learning with records expressed in the neurobiological structure\footnote{6-11}. Therefore, the relationship with the so called “first caretakers”, specifically the mother, will have an outstanding value. Through nurturing, the fact that she is continent and assimilates the anguishes, responding with attention, care and attending to its needs, the mothering function will favor her child’s organization of the self\footnote{12}. In 1962, Bion called this maternal attitude of continence “réverie capacity”\footnote{13}.

It should be stressed that the emotional experiences of the early times of life will determine the beginning of the functional neuronal networks, essential to the appropriateness and expression of the future behaviors and actions and to the development of the capacity to think.

It is also important to highlight that the mother/child exchange will determine neurobiological changes in both, especially in the child, creating the basis for novel functional acquisitions. The organization of the synaptic connections will depend on the quality and, above all, on the persistence of such stimuli, to acquire a consistent structure.

The continuous and meticulous organization of such autonomy will be responsible for the construction and development of the self, as it means the expression of the totality of individual personality. The homeostasis of this structural set will represent the adjustment or not of the child reactions facing situations of bliss or frustration. What is called the self-regulation is then processed, and the record of the first memories and the elementary primordia of the executive functions are established\footnote{14}.

The right cerebral hemisphere is preferably involved with this early functioning. The orbital-frontal area of the pre-frontal region, the anterior cingulus and the amygdala
or amygdaloid nucleus constitute the structural sites through which this circuitry will form and settle\(^\text{(6,7,15-16)}\).

The amygdala is key in these events, as its volume is proportionally greater at birth compared to the pre-frontal structures in post-natal periods. Its function is to trigger and intermediate the emotional behavior\(^\text{(17)}\). It is responsible for the anxiety and fear reactions, triggering autonomic manifestations, both sympathetic and parasympathetic (circulatory changes of tachycardia and increased blood pressure, muscle tone, sweating, pallor), as well as it interferes in endocrine function through its hypothalamic connections that promote the release of hormone precursors such as ACTH, TSH and others and the target hormones will have a vital role in the structure of the neuronal cell.

These extremely necessary reactions that indicate a call for protection by the NB, often exaggerated in the beginning, will adjust as the “first caretaker” tends and cares for him/her in his/her complaints, soothing the warning determined by the amygdala. This care is identified and learned by the pre-frontal structures, in order to be recognized when repeated at other times, allowing calm and coherent reactions.

As experiences occur progressively, babies follow in a path of search for the best adaptation, the expression of which will be the sum of the results of the previous experiences and learning, and of the more recent ones, shaping their neurobiological structure, correspondingly.

Through the developmental pathway it will be necessary to experiment and live not only with bliss, but with frustrations as well, that is, with the no, essential for emotional growth. The dialogic relationship established by the baby with the mother will be the great advantage and opportunity to experience a set of complex feelings: presence, absence, loss, frustration and others.

Initially the NB perceives himself/herself and the mother as one single, undifferentiated person, the presence of the mother occurs whenever he/she asks for it, whether to feed him/her, change his/her diapers, soothe him/her. It remains so for some weeks until the baby perceives that his/her mother is another individual, different, apart from him/her and not always available to respond to his/her claims.

His/her experiences of I and the Other (I/not I) and the resulting frustration of not getting immediate attention, of having to wait the other’s availability begin\(^\text{(13,18)}\). Such experiences will succeed and a possible learning of waiting, of tolerance, of progressively acquiring confidence and of more security, knowing that soon he/she will be tended, will begin. Little by little the baby will not have exaggerated anguish, may display a mild signaling cry with the goal of communicating the need for attention rather than showing some feeling of severe threat.

The possibility of learning to live with others, with the feelings of loss and maternal absence will be favored and those experiences will be progressively internalized, as well as that the mother returns and cares for him/her moments later. Although the mother is not visible in person or touching the child, he/she knows that she is around and will respond; he/she will be building an internal reference of the mother figure (internal representation of the maternal figure) which corresponds to the early processes of symbolization.

These are the primitive steps of the pathway of acquisition of independence and of autonomy that will grow with successive tending to his/her needs and establishment of early discipline rules. Despite it may seem excessive to describe it this way, it will be important since early on that the child should get used to the family routine, like for instance, nursing times, although not strict, should be reasonably determined and occurring at three to four-hour intervals, giving room to resting and other interests of the mother. The same could be said concerning sleep, which through the repetition of sequential preparatory actions (bath, feeding and resting in the crib) would educate and favor it to adapt to the family routine.

From everyday situations that keep on occurring in growing complexity, the neuronal circuitry is organized and enhanced and this is the anatomical and dynamic expression of the neurological structure responsible for the manifestation of behavioral reactions, and will change as the life situations happen.

Keeping with the purpose of this paper that refers to the NB, what happens in other normal neurodevelopment stages will be described in future papers.

**DISADAPTATION**

When the early interpersonal relationships occur inappropriately, development occurs in a disadaptive manner through more difficult and exhaustive pathways.

Even in a term NB, if the first caretaker (mother) is not continent to shelter its anguishes, care for him and comfort him, his anxiety and insecurity emotions triggered in the amygdaloid nucleus will not favor the organization of “soothing” neuronal circuits with the pre-frontal region. These sensations of insecurity and fear tend to grow and a highly irritable NB, crying very often and for long periods sometimes, will be found. Many behaviors are the corollary to these early unsatisfactory conditions and feedback on each other.

Great voraciousness during feedings is observed easy, choking happens and the trend to ask for feeding at short intervals, at times hourly, lead the mother to exhaustion.
Also sleeping problems may occur, the child awakes after a short time, with strident cry and attempts to quiet him/her by rocking for undetermined time, are is not always easy. When the baby finally calms down, placing him/her back on the crib is enough to make him/her cry again.

These children display resent for rules and discipline from very early on, and follow their path without adequate perception of the other, unable to tolerate minimal frustrations. They react in an intense and disproportionate manner, as if in fact something very severe and threatening to their vitality was occurring. Like the “kindling” mechanism observed in epilepsy in which, after a certain amount of time of animal experimentation with convulsant drugs, tiny doses can trigger crises, it is observed in these babies, after some time, that small stimuli cause behaviors of extreme irritability and discomfort. The mother appears as the individual who, even if committed and dedicated, finds herself engulfed by the turmoil of the relationship with the NB, without the necessary knowledge and tools to understand the situation, without emotional resources or support to deal with her own anxiety, unable to contain these behaviors. It should be added that in some circumstances, paternal help is limited and poor.

Similar behaviors are often observed in premature babies remaining in intensive care for a long time, or even in term NB who had some or any clinical complication requiring longer hospital stay. Risk situations like infections, surgical interventions, mechanical ventilation and others, certainly mean conditions threatening to their lives and the feelings of anxiety and fear are enhanced.

In addition to these conditions of delivery, some other circumstances which favor disadaptive bonds and occur in mothers who experienced pregnancy with excess anxiety or even depression, for different reasons: prior abortions, pre- or postnatal depression, loss of family member, severe diseases in the family, marriage problems, alcoholism and other drugs, etc.

Mothers in such circumstances will not have free affective valences to live and shelter her child properly; they will do it with little tolerance, many times with neglect and unskilled handling, perceiving solely the overbearing task of caring without feeling or perceiving the needs of the NB and thus, enjoying the opportunity of “being a mother”. Sometimes they resist even to learn the basic care, delegating to nannies or nurses “in permanent call” daily routine tasks like bathing, changing clothes, putting to sleep... time goes by and they miss essential and irretrievable moments for their maternal life condition.

Wasting such opportunities often does not seem so to the mother who may even feel valued and socially admired within a context of personal comfort and wellbeing, especially to her NB, because of the excellent care delivred by the working team she hired. Similar behaviors are quite frequent within the same family or in families of friends and thus are established due to a complete lack of knowledge about the importance of these early bonds, which might likely have future consequences on the child’s global development and, especially, as it is known today in the child’s neurological development(19).

It is important to stress that despite the occurrence of adverse conditions for the NB during pregnancy and birth, the existence of a nurturing environment and of appropriate attention will minimize the risks mentioned above, favoring the update of its potentialities.

Other background emotional reasons for such family attitudes are very complex and deserve a separate chapter to approach the psychological dynamics which favor them; they would certainly be better contextualized by means of a profound and expert psychoanalytical collaboration.

However, there is a consistent bibliography with well conducted investigations, for instance, relating prognosis to the emotional aspects and the evidence of psychopathology in very low weight premature babies (less than 1,500 g). Specifically, a higher incidence of behavioral disorders during childhood and adolescence of children born to risk pregnancies of risk when compared to a sample of normal weight term NB was described. The most common are attention and hyperactivity disorders, as well as shyness, disruptive behaviors, anxiety and depression, and problems in sociability(20-23). Other studies refer to the risk of severe psychopathology, such as schizophrenia, affective disorders and antisocial behaviors(24-27).

Widening the perspective and valorizing what was said, it is understood that well established structural and functional basis on early foundations will favor the sequence of acquisitions, at first elementary and later more complex, guiding the individual towards autonomy facilitating his/her capacity to think and fully perform executive functions. The detailed accomplishment of such autonomy expresses the development of the self, the totality of individual personality(12).

**HUMANIZATION**

It is important to be aware to this set of conditions in order to intervene more efficiently.

Thus, it is important to consider what has been stressed about humanization in perinatal care. It is not merely conceptually approaching the issues related to the emotional development, but to understand that if caring and nurturing this NB are not observed, either by the parents or by the hospital-maternity staff, non-healthy experiences will be offered and the consequent neurobiological structure will express such harm in a not so distant future(28-29).
The knowledge of such dynamics and their corresponding organic substrate is mandatory, as much as the understanding that the NB lung will be severely affected if infections are not treated and respiratory care given.

Hospitals must perform this role, emphasizing to the parents the importance of the effective presence, participation and nurturing of the NB as early as that, as well as teach the traditional orientations regarding the child hygiene, nursing and other practical issues.

Parents often lack knowledge regarding the so-called maternal and paternal functions and they will be better instructed if given such information. It is my opinion that the parents should already know these issues from the time they decided to have children. Courses exist in some countries, such as England, France and the United States, where investments are big in preventive actions and, fortunately, they are starting to appear in our country.

I think that it is desirable that the whole team working at the hospital nursery must be apt, and in possession of this knowledge as well as about its importance so that when they become conscious of these problems they will be more attentive in their observations and actions at their daily work. Consequently, they will find the opportunities to better reach the families during their hospital stay.

This way, the proposed humanization would be fully and genuinely exerted and have a prophylactic nature. The NB and their families would be forever thankful.

REFERENCES