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THE SYNACTIVE THEORY OF DEVELOPMENT: THE KEYWORD FOR NEURODEVELOPMENTAL DISORDERS

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ABSTRACT

The synactive theory of development may be considered the keyword for neurodevelopmental disorders, considering that each one presents constantly autonomic troubles such as sleep disorders, feeding problems.

Keywords*: Synactive Theory of Development, autonomic nervous system, sleep.*

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Introduction

The nervous system is distinct in the central nervous system (CNS), consisting of the brainstem, spinal cord and peripheral nervous system (PNS), which includes all nerve structures located outside the CNS. PNS is composed by an afferent component for sensitive information, and an efferent component for peripheral organs control. Moreover, efferent system is composed by somatic component (for skeletal muscles contraction regulation and control) and visceral or autonomic component identified as neurovegetative system (for heart and respiratory frequencies, digestive, urinary, and reproductive functions regulation). In neurodevelopmental disorders constantly[(1-6)].

The Synactive Theory

The synactive development (SDT) model was developed by Heidelise Als, American neuropsychologist in Boston, providing a different access to brain research through child's behavior observation. In this picture, behavior is the first way for preterm infants and neonate may communicate and by simple observing, it is possible to put in place adequate care paths.

Assistance process is understood as a co-regulation and collaboration action to enable and maintain the homeostasis of the various subsystems. SDT enhances the way the child appears to handle the experiences from the environment rather than the individual abilities[(1-6)].

SDT identifies development as an interactive and hierarchical process including five subsystems:

1) neurovegetative/autonomic system,
2) motor system,
3) behavioral system,
4) attention-to-interaction system,
5) self-regulation system (Figure 1).

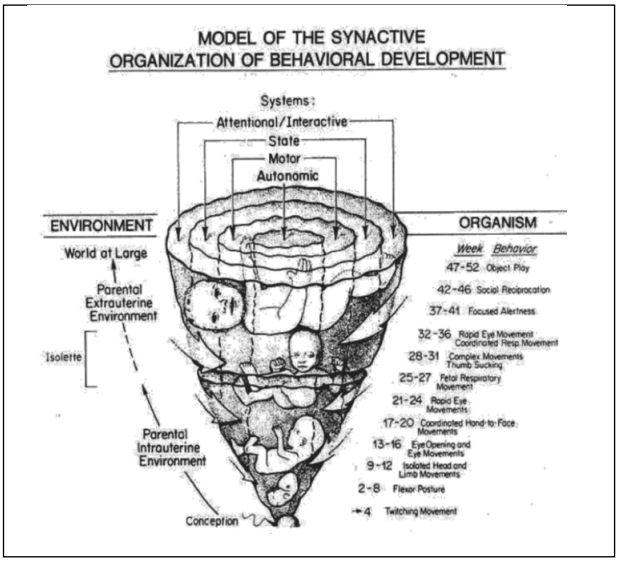

Figure 1: The synactive theory development scheme.

These systems develop in the embryo, in the fetus and in the newborn according to a well-established sequence, according to independent development. Nevertheless, the 5 systems are constantly influenced, although interdependent and their development takes place interactively with the environment. The good functioning and stability of each system facilitates the maturation of the next one as well as the instability and disorganization of a system adversely affect the functioning and maturation of others.

In order of development we have:

• Nervous system: observable through vital functions, therefore with respiratory and cardiac frequency, thermoregulation, cutaneous color, visceral functions such as excretory, regurgitation, hiccups, vomiting and motor functions such as tremors, startles and clones;

• Motor system evaluated by observing the different postures taken by the newborn (hands to the mouth, hands to the face, bracing, grasping, sucking, cuddling), the quality and variability of the movements of the limbs and trunk and observing all strategies fo self-regulation. Art /trunk movements (quality, quantity);

• Behavioral states: the status of states of consciousness, the state of sleep, wakefulness and agitation, the mode of transition from one state to the other, and the presence and duration of the individual states are observed. The states of consciousness are: deep sleep (quiet); Light sleep (active - REM); Drowsiness (sleeping); Calm / active, that is, the state necessary to interact with the child, characterized by reduced motor activity, opening and enlarging the eyes, attentive look in response to auditory / visual stimuli, regular respiratory rate; Shaken Vigil; Cry.

• Attention-Interaction System: Assess the ability of the child to maintain a state of vigilant alert alert that can be observed through the ability to relate to the environment and caregiver;

• Self-regulation system: evaluable, after 36 weeks gestational age, through the strategies the body uses to find a stable balance and the organization of the interaction between the subsystems. If the infant can not find a stable interaction between the subsystems, the quality and type of environmental facilitation must be assessed to help the child reach this organization

In neuromotor development these subsystems mature according to a compulsory sequence, divided into three phases, during each one, there are precise characteristics at each state level (1-6).

The Stabilization Phase (24 to 29 weeks gestational age):

• Neurovegetative/autonomic System is unstable and breathing and feeding are not autonomous,

• Motor System is unstable and the postural control is poor;

• Behavioral System is not evaluated because there are cycles of alternation of movement and quiet and an alternation of sleep/wake;

• Attention-Interaction System → the Interactive skills are developed during the fetal life. Fetus has a perception and reaction to stimuli through tactile, propriocitative, painful, auditory, vestibular sensitivity. After born, the interaction takes place thanks to the body language and thanks to the different visual, olfactory, tasting, and thermic devices.

• Self-regulation system is still very poor

The Organization Phase (30 to 35 weeks gestational age):

• Neurovegetative System is more stable, respiration often becomes autonomous, as feeding, linked to the coordination of suction, swallowing and breathing functions •

• Motor System is more stable with postural

control that begins to mature with the acquisition of antigravity skills

• Behavioral System → now we can recognize the different states, there begins to be an alternation between sleep and wake, between tears and consolation, between the state of quiet and the movement and, thanks to the acquisition of visual skills, also appears the alert state •

• Attentiveness-Interaction System. The attentive and alertness skills appear more stable and the child is capable of short social interactions, succeeding in responding to a stimulus at a time •

• Self-regulation system begins to have a hint of maturation but there is a need for facilitations

The Integration phase (36-40 weeks gestational age):

• Neurovegetative/autonomic system is still Stable The respiratory system and the feeding are autonomous;

• Motor System is even more stable with a postural control that is acquired, as well as the most antigravitational skills that are observable in the various postures, prong, supine

• Behavioral System has a precise definition with a well-defined cyclical organization with the alternation of different sleep/wake states, crying/consolation, rest/movement

• Attention-Interaction System. The social interactions are more stable and greater propositiveness can be found • self-regulation system

• Self-regulation capacity increases and there is a need for external facilitations[7-57].

The goals of SDT are many; firstly, we want to propose reading the behavior of the infant through signs of self-regulation or, conversely, of stress of the know to provide a tool for a more detailed and sophisticated observation of the infant's behavior, to fully understand the development, and finally to plan customized care measures tailored to that individual's child in order to promote their development

Through the facilitation of the organization, the maturation and integration of the individual subsystems. Stress caused by care maneuvers, invasiveness of environmental stimuli and medical interventions causes a destabilization of the entire premature organism. Neuro-vascular, motor, behavioral, attention-interaction and self-regulation skills can be observed to specifically identify stress tolerance thresholds, level of organization, evolving capabilities, self-regulation and self-differentiation. The baby's world is full of new experiences that the child learns to handle quickly.

The infant seems to experience the world significantly, learning to quickly adjust his own behavior, aiming to express his intentions and requests for support. The infant reaches these behavioral goals through self-regulation support and the positive integration and interaction of the five subsystems. Systems are interdependent and the behaviors that express them are significant and communicative. The behaviors of a newborn, but in general of the child, indicate the level of self-regulation and the contribution of each behavioral system to this regulatory process. Self-regulation is always determined in the context of an environmental event, which can also be a physical therapy intervention.

Environmental events call upon the infant and challenge her ability to maintain a state of good behavioral organization. Adequate self-directed behaviors indicate a child's state of well-being and are observed when self-regulation is able to support the social and environmental demands that are proposed to him/her. Loss of self-regulation and disorganization manifestations are a vulnerability to the child's development, or what the child has difficulty in doing under specific conditions. While stress behaviors indicate a state of tiredness or disorganization and have been observed when self-regulating thresholds in the newborn are overcome by the situation being proposed.

A bimodal approach to understanding neurobehavioral functioning can, however, only partly explain the behaviors that manifest themselves as transitions from a self-regulating state to one of a loss of self-regulation. Stress or elusive behavior requires a lot of attention from the ' Observer, as at the moment when the child's sensory thresholds are reached, it is necessary to offer support to the baby to minimize or prevent the complete loss of self-regulation[58-85].

This model may be applied in pediatric management of neurodevelopmental disorders, in order to improve the quality care.

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