Module VI.1

Psychomotor development

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e-EarlyCare-T

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Concept of psychomotor development

Psychomotor development is a continuous process that goes from conception to maturity (García and Martínez, 2016). It is continuous devlopment of the abilities to perform a series of body movements and actions, as well as the mental and conscious representation of them (Justo, 2014).

Psychomotor development manifests through motor function, which is made up of movements oriented towards relationships with the world around the child.

Concept of psychomotor development

These motor functions are the beginning of the child's development, to the extent that movements are the only psychological manifestations that can be observed in the baby.

Psychomotor development is a composite process closely related and conditioned by (according to Cabezuelo and Frontera, 2012):

- Motor development, skills linked to the musculoskeletal system, capable of increasingly complex and precise movements. Muscular activity is coordinated by the nervous system.
- Psychological and affective development, linked to brain activity that functions such as language, affective manifestations and social relations depend on.

Concept of psychomotor development

The ultimate goal of psychomotor development is to achieve control of one's own body in order to achieve all actions that promote experiences at all levels.

Image 1

Image 2

2. Laws and principles of psychomotor development

The transition from the first uncoordinated movements to the control and coordination of these movements occurs following laws and principles.

2.1. Main laws

These laws indicate that the body muscles do not mature all at the same time and at the same time, but according to the following (Cordoba, 2018, Gil, 2003):

Image 3

2.1. Main laws of development

- Cephalo-caudal law: first the muscles closest to the child's head mature and then the muscles further away from the head develop, i.e. movement control matures from the head to the feet. The child holds its head before it is able to sit upright and is able to use its upper limbs skilfully before it is able to use its lower limbs skilfully.
- Proximal-distal law: the child controls the movements of the body first in the areas closest to its body axis, whereas the areas furthest from this body axis are controlled later. Thus, the shoulder joint is controlled before the elbow joint, which in turn is controlled before the wrist joint, which in turn is controlled before the finger joints.

2.1. Main implementing legislation

- Law from the general to the specific: children develop gross motor control before they develop fine motor control. Thus, children develop control over the whole of their arm before they develop the ability to pincer grasp with their fingers.
- Law of development of flexors and extensors: control of the muscles responsible for flexor functions occurs earlier than control of the muscles responsible for extensor functions. Thus, children acquire the ability to grasp rather than to pull objects earlier.

Image 4

2.2. Five development principles

The five principles of development were stated by Thelen in 1989:

- Motor development can only be understood in terms of the developing system, as movement is the result of the interaction of many subsystems.
- What determines how these subsystems come together is the task, not pre-existing genetic instructions. Tasks that require motor skills are context-dependent, and children draw on whatever components are available that are best suited to the task.

2.2. Five development principles

- Developmental processes are not linear. As small changes to one or two available components occur, the child reorganises the system to better suit the task.
- Action and perception form an inseparable circuit. This means that children can modify their actions to fit their perceptions.
- Variation is an important aspect of development. Children will change the way they approach specific tasks, partly because they can draw on different components.

3. Theories of psychomotor development

3.1. Muscle tone and postural control

Muscle tone is defined as the active tension of the muscle at rest that develops under the control of the central nervous system (Cordoba, 2018). Tone is the state of slight contraction the muscles of our body are found in, this contraction is not constant but variable and is harmonised continuously to allow the individual to be in a static position or in movement.

3.1. Muscle tone and postural control

The development of tonic control can be divided into two stages:

- First stage: this stage is global and uncontrolled. The newborn is not able to distinguish body segments and uses only those that it needs without control.
- Second stage: the child progresses in the evolution of the tonic control of body segments, this increased control will allow them to use only those structures that are necessary in each activity .

Image 5

3.1. Muscle tone and postural control

The most significant milestones in the normal evolution of muscle tone for Cordoba (2018) are:

- Hypertonia at birth, except in the neck and spine which are atrophied as a result of the prolonged intrauterine foetal position.
- From two to six months, hypotonia occurs, except in the neck and spine, which begin to acquire muscle tone.
- At six months, there is generalised stiffness throughout the child's body.
- Around the age of one year, the tone of the neck and spine is fortified until the bipedal position that will allow it to walk is possible.
- After the first year, tone control will increase to the level of coordination that will allow control of muscle tension and relaxation.

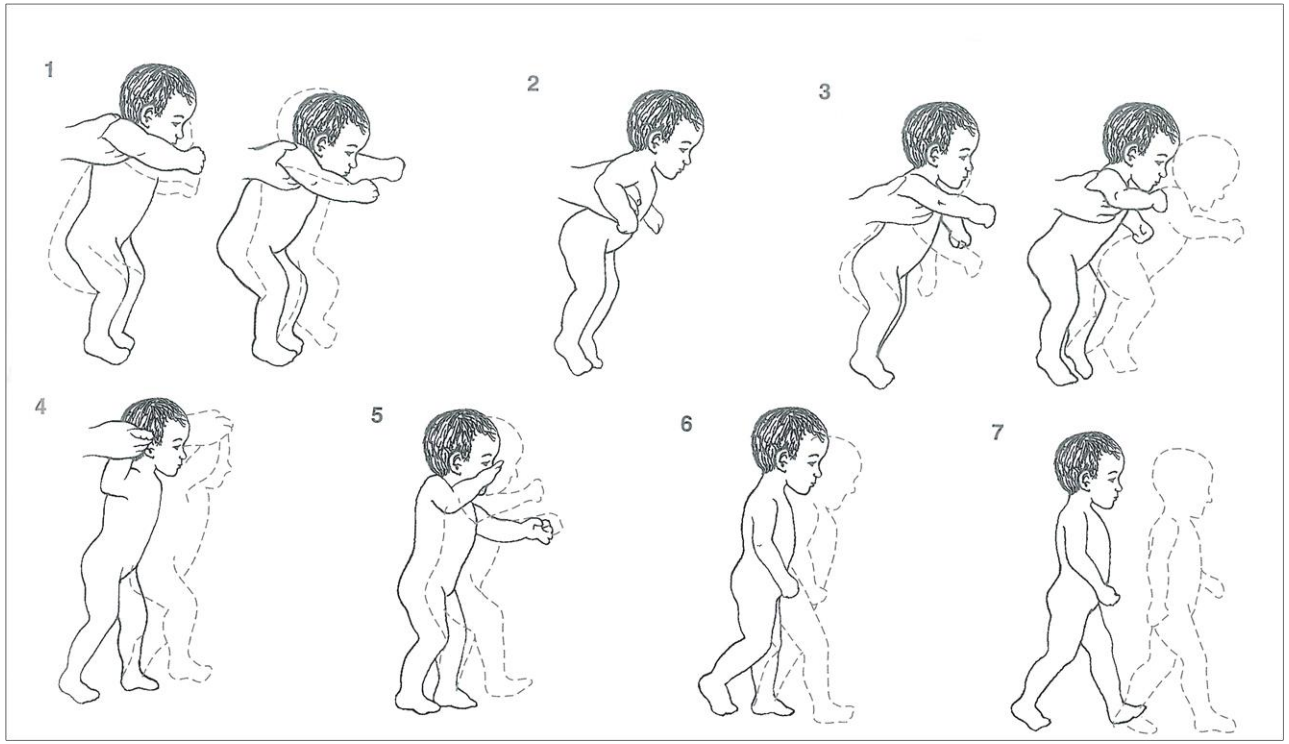
3.1. Muscle tone and postural control

Postural control is the set of anatomical-functional structures aimed at maintaining the body's relationships with itself and with space (Justo, 2014).

During the first years of life children develop a repertoire of skills including independent crawling, walking and running, climbing and manipulation of objects in a variety of ways, the emergence of these skills require postural control to support primary movement (Shumway-Cook, 2019).

Early developmental research has shown that the simultaneous development of the postural, locomotor and manipulative systems is essential for the emergence and refinement of skills in all these areas (Justo, 2014, Shumway-Cook, 2019).

3.1. Muscle tone and postural control



Source: Shumway-Cook, 2019

3.1. Muscle tone and postural control

Traditionally, postural development has been related to a sequence of motor milestones:

Age	Procurement
1 month	Raise your head
4 to 7 months	Supported sitting
4 to 7 months	Independent sitting
8 to 10 months	Trawl
8 to 10 months	Crawling
9 to 10 months	Pushing oneself upright
12 to 13 months	Standing upright
14 to 18 months	March

3. 2. Locomotion motor skills

Independent locomotion is a very complex task.

Before being able to walk the child moves on the ground in a limited way, since locomotion is conditioned by the possibility of standing and balance, to achieve independent walking the child follows a series of phases that are detailed below (Shumway-Cook, 2019., Molina, 2020):

- Phase 1 stepping reflex: alternating leg movements when holding the baby under the armpits.
- Phase 2 disappearance of the stepping reflex: 98-99% of infants lose this reflex as a result of inhibition by maturing higher neural centres.

Psychomotor development

- Phase 3 reappearance of the gait reflex: the onset of self-generated locomotion is resumed, similar to the gait reflex.
- Stage 4 assisted locomotion: children begin to take their first steps in an immature, unsteady, unstable, irregular and uncoordinated way, they manage to take their first steps with the support of their hands.
- Phase 5, 6 and 7 independent upright gait: the hands gradually move from an elevated protective position (phase 5) downwards and to the sides (phase 6) and the trunk and head assume a more upright posture (phase 7).

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The 10-step gait, without hand support, without carrying objects with a functional purpose and without falling, is achieved by 3% of children at around 9.6 months, 50-70% at 13-14 months and 97% at 18.4 months, for this to happen all the components of gait must be ready (Martín, 2014, Molina, 2020).

Image 6

3. 3. Manipulative motor skills

The development of manipulative skills such as grasping, throwing and catching is complex; they develop progressively over time through the association and maturation of different parts of the nervous and musculoskeletal systems with experience. It is the vision of the object at rest or in motion that triggers the precise execution of movements to catch, throw or grasp an object, just as the object triggers the precise, adjusted movements in the vision.

3. 3. Manipulative motor skills

- Grasping: refers to the execution of the use of the object, the upper limbs and the context in which the action is carried out; it is a complex act, needing visual location, the approach of the hand to where the object is located, and the grasping of the object. The literature describes three ways of hand approach that correspond to the progressive involvement of three joints: shoulder, elbow and wrist, and how this approach of the hand to the object evolves determines the development of grasping.

Image 7

3. 3. Manipulative motor skills

Age	Acquisition of the prehension
4/5 months	The child is able to direct a hand towards an object by "sweeping"; only the shoulder intervenes by grasping the object between the last two fingers and the palm.
6 months	The object is grasped by the last four fingers (without thumb), the approach to the object is lateral and parabolic, as the elbow is involved; at this age the child is able to hit a table with the object and release it voluntarily.
7 months	The grasp is palmar, the child can pass the object from one hand to the other and is able to keep the object they have if offered another one.
8 months	Radial-palmar grasp, the thumb acts as a stopper, allowing the child to strike objects against each other.
9 months	Fine grasping appears, the child can grasp small objects with the thumb and forefinger gripper. Hand approach involves: shoulder, elbow and wrist.

3. 3. Manipulative motor skills

- Throwing: the ability to throw develops in children before receiving, appearing at around 6 months of age, from the sitting position, and they detach themselves from the object in their hands in a coarse manner, until they have full control of the movements involved in the throw. This process develops throughout the maturational process from the age of 2 to 7 years.

3. 3. Manipulative motor skills

The launch

Age	Procurement
2 to 3 years	The throw consists of an extension of the arm, without involving the trunk, with the feet fixed on the ground.
3 to 5 years	Without involvement of the feet, the throw is produced by a rotation of the trunk to one side to prepare and then to the other side to throw.
5 to 6 years	Feet start to get involved, there is more rotation to prepare for the throw
6 to 7 years	There is broad bodily participation. The lower limbs are involved in opposition to the upper limbs.

3. 3. Manipulative motor skills

- Reception: is understood as the interruption of the trajectory of a moving object. In general, three stages in the acquisition of reception have been described:

a) Children under 3 years of age usually have their arms stiffened with their hands outstretched so that the ball falls between their hands.

b) By the age of 4 years children open their hands to receive the object, although the movement of the hands is still a little stiff.

c) At 5 years of age the arms are kept relaxed next to the body before attempting to catch the ball, the acquired behaviour is characterised by a balanced position of the feet, eyes, arms and hands waiting relaxed for the object.

3. 4. Graphic motor skills

Graphic motor skills are understood as the ability to write or manipulate certain tools that leave an imprint or trace on a support (Córdoba, 2018).

Graphic motor skills develop through different stages that follow a common pattern, with certain differences between individuals, passing through the following milestones:

- At a year and a half: the first graphic representations appear, the child is already able to pick up a writing utensil and make strokes on a support. At this stage, strokes are made with rapid, impulsive and uncontrolled movements.
- At twenty months: begins to use the elbow, so that the scribbling takes on a different, clearer appearance.

3. 4. Graphic motor skills

- At the age of two and a half years: control of the wrist and finger pincer movement begins to develop and the line tends to become clearer.
- At the age of three years: A greater control of space appears, the child no longer goes off the paper, the child tries to close lines.
- At four years of age: children anticipate their productions, the relationship between drawing and paper is better.
- At five years of age: the child has the necessary characteristics to start pre-writing activities.

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