1 DETECTING MOTOR MILESTONES THROUGH OBSERVATION AND USE OF GENDER-SENSITIVE TERMS WHEN COMMUNICATING WITH FAMILIES

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1.1 Sensomotor development

Sensomotor Development means the development of senses and movement. Development is based on inherent qualities, experiences from the environment and learning through experience. It begins already during the pregnancy as the featus moves a lot in the uterus. An infant continues the development by touching oneself and being in contact with the surroundings. In motor development, each stage is based on the skill learned before. Therefore, we can say that the skills are learned in a certain order, but each child is unique. The most development occurs during the first 18 months of life. In order to be able to detect atypical development, we need to be aware of the neurotypical development. Understanding a typical motor development is very important physiotherapeutic knowledge. However, identification of motor development disorders we also need to give up on over-reliance on the developmental milestones that have a great variability and move on to qualitative observations, common variations in achieving locomotor abilities and neurological or other markers of abnormality (Sheridan M, 2010)

The sequence of motor development of infant motor development is predictable, but the rate is variable (Gallahue & Ozmon 2012). In this lesson, we focus on the full-term child with no previous medical conditions. The focus is on detecting possible developmental delays related to motor functions through observation. Traditionally motor developmental evaluation is based on neurodevelopmental model that assumes the pace and sequence of development to be automatic with the central nervous system maturity. However, there are several factors affecting motor development such as growth, environment, genetics and muscle tone. One of the most important references for further examinations on child's development is the caregivers worry about child's development. With premature, it is essential to use the correct age when evaluating the motor milestones. (Tecklin, J.S. 2015)

Motor skills progress occur in typical development according to following sequence; from cephalic to caudal, from proximal to distal, and from generalized to specific, goal-oriented reactions. These neurodevelopmental sequences often are described in terms of the traditional developmental milestones. If the child has achieved the previous motor developmental milestones on time, at 6 months, infants develop the ability to adapt their postural activity to

specific situations. Infant is able to roll around the extended longitudinal axis of the body. They are able to support their extended upper limbs and unfolded hands in pronation. Child is having readiness for a quadrupedal stance. (Kuchler O'Shea, Roberta, 2009)

The observation of motor development or detection of developmental delays includes also evaluation of muscle tone (infants' ability to work against the gravity) and reflexes. It is important to also consider infants vitality for evaluation as it might have a great impact on the infant's performance. How the child reacts to sensory input and being in interaction with the surroundings. The goal of the neurodevelopmental evaluation for milestones is to detect severe abnormalities in motor and cognitive development. Regardless of the cause of the referral to physiotherapist neurodevelopmental evaluation, the concern of the caregivers should always be taken into notice and infants' status carefully explained in detail to meet caregivers need of information. (Kuchler O'Shea, Roberta, 2009)

Since in this lesson we focus on 6months old neurodevelopmental age, it is important that you read and refresh your knowledge on normal motor psychomotor development in 0-18month of age. When reading, pay special attention to red flags in reaching the developmental milestones. Also remind yourself the meaning of muscle tone and its variations.

You can refresh your memory for example by loading apps related to motor milestones (CDC milestone tracker) or by visiting accessible e-learning material https://www.healthychildren.org/English/MotorDelay/Pages/default.aspx#/explorer to see videos and explanations on normal/developmental delay.

1.2 Reflexes

A full-term newborns readiness for life and the neurodevelopmental evaluation is done by detecting neonatal primitive reflexes. Primitive reflexes can be present also with infants having neurological conditions, but they are often either asymmetrical or don't disappear at expected age. Below you can see a (table 1) reflexes.

Table 1: Reflexes that should disappear by 6 months. (self-made table)

Reflex	Purpose	Appears	Should integrate by:
Moro	Primitive fight or flight reaction	At Birth	4-6months
Rooting	Automatic response to turn towards food	At Birth	3-4months
Palmer	Help to automatically grasp	At Birth	5-6 months
ATNR	Develop cross patterns movements	At birth	6months

1.3 Muscle tone

Muscle tone is detected in various positions. It is important to notice that premature infants muscle tone is often decreased in the beginning compared to full term infant. Variations in muscle tone can be seen either as decreased, increased or asymmetrical. Increased muscle tone is seen as a strong flexion of the upper limbs, lowed limbs and head can be extended. Decreased muscle tone is seen as the opposite and appears as floppy and slow reactions to changes in position. In asymmetrical muscle tone there is a variation between the sides of the infants' muscle tone (Table 2) A detected abnormal variation of muscle tone always needs follow up for possible early diagnosis of Cerebral Palsy.

Table 2: Newborns variations on muscle tone (self-made table)

Increased muscle tone	Decreased muscle tone	Asymmetrical muscle tone
• Muscles feel tensed when palpated • Decreased range of motion in the joints • Strong flexion in joints • Stiff response to Moro-reflex	• Muscles feel extremely soft when palpated • Position follows the underlying surface • Extremities are easily moved to different positions • Moro-reflex is very weak	• Asymmetrical position on supine • Asymmetrical muscle tone in the body • Asymmetrical Moro-reflex response

1.4 Observation

As a physiotherapist, you need to be aware how to evaluate your clients/patient's motor development. As mentioned before, it is important to understand the reflexes and muscle tone variations. Before the observation, prepare the environment as well as possible. Increase attractive toys and keep in mind that the surface can be changed from hard to soft and vice versa if needed. The main idea is that the child would be able to play freely, and the role of the physiotherapist is only to observe and play along with the child to see what capabilities they have. If you need more information, you can facilitate the baby through the environment and senses or manually. For basic motor development evaluation through observation, you need to analyse the baby in the following positions: supine, prone, sitting, side lying and standing.

What you would expect from a typically developed baby to achieve by six months in different starting positions is listed on the table 3 below. Findings that indicate further follow up and examinations are listed on the Table 4. By six months, the baby has developed their functional abilities through the control of the movement. When baby loses the balance, they should be able to break down the movement through the development of the balance reactions. What you should also be able to see is that the movements of the head are isolated from the trunk.

This rotation is possible through the development of righting reactions combined with weightbearing. Baby is interested on the surroundings and moves head and eyes towards attention. Baby is alert and usually interested in all small objects close by. Child might also show the understanding of depth awareness by dropping obstacles on the floor. (Salpa, Pirjo 2007)

Table 3: Starting positions for observation of 6 months old (self made table)

Supine:	-Babys body Is very symmetrical, and baby is able to use both sides of the body symmetrically. -Baby is able to bring lower extremities on top of the abdomen and flexion is very strong. -Baby is able to have weight bearing on the feet and lift the pelvis. -Fine motor functions are easier to achieve on supine and can be isolated -When lifting from the arms, baby braces shoulders and pulls self to sitting
Prone	-Baby is able to roll from prone to supine and back (can be still only one side) -Functional position where child likes to play -Baby is able to push to extended arms and flattened palms.
Sitting	-Ability to sit needs the development of protective reactions -Ability to right the head and trunk against the gravity -Baby has the ability to sit assisted and turn head from side to side
Side lying	-Requires controlled coordination between anterior and posterior muscles to obtain the position.
Standing	-When held in supported standing, the baby is able to bounce up and down actively -Protective reactions are starting to appear

As mentioned, by six months the baby might start to have protective reactions. Protective reactions can be forward, sideward and backward that appear by baby putting arms against the surface when tilted off balance. (Salpa, Pirjo 2007)

Table 4: Findings that require further examinations in the age of 6-12 months (self-made table)

Social interaction	- Baby is passive or tame in interaction - Baby is only interested in the environment for a short while - Baby is not shy with strange people - Baby does not mimic or imitate movements or wave - Baby is not in interaction with the caregiver
Communication	- Babys cry is anomalous - Baby's vocals are monotonous - Baby does not babble - Baby does not recognize own name - Baby does not understand speech, mimic or try to say words
Oral motor skills	- Baby has difficulties in chewing or processing food in mouth
Fine motor skills	- Baby doesn’t hold obstacle in both hands simultaneously - Baby is not able the transfer a toy from hand to hand - Baby is not able to grip with fingers - Pincer’s grip is missing - Baby has stereotypical movements
Gross motor skills	- Primitive reflexes still present - Protective reflexes have not started to develop - no crawling - not learning to sit or learn how to achieve sitting position - not learning to walk - Baby continuously swaying or rocking

To make a summary what you want to see from a 6-month-old baby are listed below:

- Symmetry and midline orientation
- Controlled and volitional asymmetry
- Combination of different movement patterns
- Strong extension and flexion in the trunk
- Extended arms on prone
- Rotations in spine and separate movements of the head
- The use of vision to discover the surroundings

1.5 Red flags

When the baby is not achieving the developmental milestones or the baby's movements are anomaly and the control of the movements is lacking, we need to refer the family for doctors' evaluation. It is important that we don't only observe is the baby able to achieve the movement but pay attention to quality of the movement and baby's ability to use variety of movements. (Salpa, P. & Autti-Rämö, I. 2010)

Red flags mean that the child is not achieving the majority of the milestones, there is a sudden stop of constant progress over weeks, or deprivation of already gained skills. If a red flag is detected during the observation, the caregivers are carefully explained that the baby needs further examination and referred to doctor and check-up within few weeks. Parents are often really worried, and it is very important that the situation is explained in detail and that time will show if there is something to be concerned. With a child that has reached motor milestones on time so far, at six months following signs would indicate for a red flag: Child doesn't roll in either direction. Child is not able to bring hands to the midline and together on supine. Child is having difficulties in bringing hands to mouth. Child only uses either upper extremity while other is fisted when reaching for objects. (Department of Health and Human Services, Centers for disease control and prevention)

1.6 Case and case report

Kuura is a 6m and 1w old baby with a referral to physiotherapy by public health nurse. Kuura is the second child in the family with a 3-year older sibling. The mother of Kuura was little concerned on the motor development of Kuura, as baby seems to prefer the left side in rolling over. Other than that, the mother had no concerns about the baby's development. Kuura and mother come to physiotherapy for the first time (Video 1).

Kuura was born as a second child of the family on week 39+5 weighting 3760g and being 51cm long. Kuura has developed at normal pace so far and achieved all the motor milestones according to age. Kuura is still breast fed but is already practicing eating cooked carrots, potatoes and sweet potatoes. Kuura sleeps well and is expected to be active during the time of the scheduled physiotherapy. What we can also see from the papers is that the family wants to use gender neutral terms and therefore they have selected also gender-neutral name, Kuura for the child.

With a limited amount of data available, physiotherapist needs to be well prepared when planning the meeting. A soft mattress is selected, with a possibility to also observe the baby on a hard surface. The observation is made during spontaneous play if possible. It is important that we select beforehand the suitable toys to achieve the goals of observation and participate actively in the interaction. Engaging the caregivers to observation needs room. Things to pay attention are also parent-child interaction and handling the baby. We make a list of the milestones we expect to see, look for symmetry/asymmetry, muscle tone and interaction through play.

Good book to read on preparing for motor development observation is Mary D.Sheridan's book; From Birth to five years, children's developmental progress, 2021, Routledge. By reading the book, you are able to learn the steps of the motor evaluation (performance, quality of movement, symmetry, typical and atypical movement, decision making). You can also go through the age-related motor milestones that you can assume to detect through observation and examination of the child. At this point, it is also good to refresh your memory on gender sensitive terms (Video 2), that the family prefers.

At 6 months of age, we start to see weight shifts and we can expect that the child would be lying on their back and raising hands to be lifted. When hands are grasped, the child should be able to lift the head, brace shoulders and pull to sitting. When the child is pulled to supported sitting, the back is straight, and the child is able to turn head from side to side. Child is not yet expected to sit independently. Child could also be expected to roll over from supine to prone and from prone to supine, but it usually is achieved by 7months. On abdomen, the child should be able to have open palms and ability to support themselves on extended extremities. When the child is held in a standing position, they take weight on the legs and usually also like to bounce up and down. Child is beginning to show signs of protective reactions and at this phase such as downward parachute and sideward/forward protective reaction. Child is able to manipulate objects and change them between the hands. (Sheridan, M.D. 2008. From birth to five years).

What we could see from the video 1. Was that Kuura's motor development is in the variety of normal. Kuura prefers the other side in rolling over but is able to roll over through both sides with the use of external stimuli. On top of that, we were able to detect during the observation, the pulled sitting with support, head support, pivoting on both directions, extended upper extremities on prone, bringing hands to midline on supine, symmetry in the body and normal muscle tone. Based on the observation, we have no reason to doubt any developmental delay and we make a report to health nurse that the physiotherapist check for motor delays is clear.

However, as the parents had a concern and Kuura is not yet completing tasks totally symmetrically, we agree a second appointment within two weeks of time, and we expect to see the symmetry to both directions in rolling over and at least the increase in the quality of the movements gained. We explain the situation and protocol for the mother carefully and leave time and space for further questions before ending the appointment. (Purpose here is to mark the hotspots to video with the timing of each observed component)

Still, it is very important to remember that even the observation and examination is crucial part of screening motor development, it is essential to use also standardized measures to provide systematic method to administer and score an assessment. This allows the therapists to compare results between the assessments. For example, with preterm infants, motor assessments are done on regular basis due to high risk of motor delays. (Piper, M. C, Darrah J, 2022)

1.7 Gender sensitive communication

When we work as physiotherapists in the social, health or welfare sector, we always encounter people as individuals. By deepening our own understanding of gender diversity, we can develop your speech to be more sensitive and therefore more appreciative towards each of our patient or client. It is impossible to know everything and avoid all the mistakes, but it makes it easier to meet people when you have up-to-date information on the topic. Gender-sensitivity is not intended to invalidate gender, but to enable everyone to grow into as own persons, for example become a girl, a boy, a transgender or an intersex person.

Gender has many meanings in our cultures. Take for example the birth of a baby in a family. The first thing that catches your attention at the moment of birth is often gender. There are a lot of expectations related to that situation.

Thinking about gender pluralism has changed a lot over time, and defining gender as something that is not just determined to genitals but also something that is now seen as experiential, socially and culturally constructed. It is good to remember that each of us has the right to self-determination and to try to move away from normative dichotomous thinking about gender. It is also important to recognise and validate that gender is just one human characteristic among others. The most important thing is not what I already know or don't know about the subject, but that we want to develop in a gender-sensitive encounter. This makes our clients feel safer and more appreciated as they are.

One way to increase sensitivity in communication is to use language that is sensitive to gender diversity, avoiding gendered terms such as "girls come here and boys go there". Some people of other genders or non-binary people prefer to use neutral language. However, the only way to be sure about this is by asking the client themselves. It is important to try to avoid making assumptions of your own in encounter situations, even if they are well- intentioned. If our assumptions are wrong, it can be very difficult for the client to revisit the issue and correct our assumptions. It is therefore good to remind oneself regularly that gender identity is not visible.

It is important to remember that each of us also has the right not to identify our gender and this can be expressed to the client, for example, when discussing confidentiality in a client situation. You can also think about whether asking about gender is always necessary for the issue or whether it is irrelevant, in which case it can be left unasked. If gender must be asked, it is always a good idea to give a brief explanation of why the information is needed. If you are communicating in a different language, always ask what personal pronoun they wish to use.

The use of one's own name, even it is informal, in an interaction is very relevant to the experience of being encountered. For a gender-conflict sufferer, the use of one's own name can, for example, reduce suicidal thoughts. It is important to be heard and encountered in a validating interaction. Validating interaction means, for example, that you clearly express that you understand and believe what the other person is saying and experiencing, or that you accept what the other person is saying without judging and that you link what you are saying to what the other person has just said. So, in a gender-sensitive interaction, empathy, acceptance, presence, listening, asking open questions and neutral language are important.

(Gender Diversity and Intersex centre of expertise)

References:

Gallahue, D., Ozmun, J. & Goodway, J. 2012. Understanding Motor Development – Infants, Children, Adolescence, Adults. Seventh edition. McGraw-Hill.

Department of Health and Human Services, centers for disease control and prevention, visited 18.3.2024 (https://www.hhs.gov/)

Kuchler O`shea, Roberta, 2009, Pediatrics for the physical therapist assistant, Elsevier

Piper, M. C, Darrah J, 2022, Motor Assessment of the Developing Infant, Elsevier

Salpa, Pirjo. 2007. Lapsen liikkumisen kehitys. Ensimmäinen ikävuosi. Tammi.

Salpa, P. & Autti-Rämö, I. 2010. Lapsen ensimmäinen vuosi: kehitys ei etene odotetusti, mitä tehdä? Helsinki: Kustannusosakeyhtiö Tammi.

Shumway-Cook , A, Woollacot, M. 2001. Motor control. Theory and practical applications. Lippincott williams & wilkins.

Sheridan, M.D. 2008. From birth to five years. Children's developmental progress. 3. edition. London & New York: Routledge.

Sukupuolen moninaisuuden osaamiskeskus, (Gender Diversity and Intersex centre of expertise) SETA, Visited 9.1.2024, (https://sukupuolenosaamiskeskus.fi/ammattilaisille/sukupuolen-moninaisuus-asiakastyossa)

Tecklin, J.S. 2015 Pediatric Physical Therapy. 5. edition. Lippicott Williams & Wilkins: Wolters Kluver