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Primitive Reflexes: Why Are They Important?

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Outcomes

≥ 92% of participants will know the seven reflexes, the ages, and a way to integrate the reflexes.

Objectives

At the end of this course, participants will be able to:

1. List seven of the primitive reflexes.
2. Outline what typically occurs during the discussed primitive reflexes.
3. Summarize the correct age range by which reflexes should be integrated.
4. Summarize at least one way to support the integration of these primitive reflexes.
5. Recognize at least one disability that could occur due to reflexes that are not integrated.

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Introduction

Primitive reflexes are an essential part of a child's development. They are uncontrolled or spontaneous movements linked to a child's development. Primitive reflexes are to be tested during a child's check-ups. This course will discuss seven primitive reflexes: Moro, rooting, palmar grasp, asymmetric tonic neck reflex (ATNR), spinal Galant, tonic labyrinthine reflex, and symmetric tonic neck reflex. The course will also include the ages at which reflexes should be integrated and ways to facilitate the acquisition of these reflexes for therapists in different settings.

When primitive reflexes are not integrated, a child's neurodevelopment is affected. More research about integrating primitive reflexes when they are school-age is emerging. This is a recent area for therapists to explore and to keep up with the research. A child without integrated reflexes may present difficulties in various areas of life, including eating and drinking, playing, education, mobility, and sleep. The areas could be affected by a weak trunk, difficulty crossing midline, poor eye-hand coordination, cognitive function concerns such as dyslexia, and trouble in sports. If there are concerns about a child's primitive reflexes, a developmental specialist should be sought out for evaluation, diagnosis, and an intervention plan, which can include occupational and physical therapists (Martello, 2023). Many interventions discussed with specific reflexes can be implemented in various settings, including the home for early intervention patients, outpatient clinics, and schools.

Moro Reflex

The Moro reflex is present from birth until about two months. This reflex is also known as the startle or embrace

reflex. This reflex typically occurs when the infant's head suddenly moves, or there is a loud sound. When the head moves suddenly or noise occurs, the infant's arms and legs will fling out or extend, and they will start crying; this is a flight or fight response (Chandradasa & Rathnayake, 2019). This response is a protective response and is used to protect the infant from injury (see Image 1). When this reflex is not integrated, it can cause oversensitivity to light and sounds, mood swings, trouble with changes, and impulse control (Martello, 2023).



Save 1

Image 1: Moro Reflex

Occupational and physical therapists can support the infant and the families by integrating this reflex by assisting with calming strategies when the child is upset and reassuring the parents that the infant is okay when they are upset. Additionally, swaddling, rocking the infant, and slowly reassuring them. Finally, gradually introduce the infant to different head positions and noises through age-appropriate games, such as peek-a-boo, swinging the infant, and placing them in an infant swing.

Rooting and Sucking Reflex

The rooting reflex is present at birth and should disappear between three months (Martello, 2023). This reflex occurs when the infant turns their head towards what is touching their cheek or the corner of their mouth, for example, a breast or a nipple on the bottle with nutrients or food if the child is developmentally ready. This reflex is closely related to the sucking reflex (see Image 2). This is when something touches the roof of their mouth, and they start sucking and hopefully swallowing (Chandradasa & Rathnayake, 2019). Infants who have trouble with rooting and sucking may have difficulty with food textures, speech, and articulation (Martello, 2023).



Save 1

Image 2: Rooting and Sucking Reflex

Therapists can support the rooting reflex by ensuring the infant is awake and gently stroking the side of the cheek from the ear to the corner of the mouth. Do not always touch the same spot or the same cheek. Go slowly to allow the child time to respond. Additionally, use different textures, such as a finger, a cotton shirt, a nipple from a bottle, and a bib, to name a few. When the child is very young, ensure a hand, arm, the floor, or other

supportive equipment supports the child's head. Since they are very young, they cannot independently hold their head up or turn them against gravity; but, as the child grows and can hold their head up, giving less physical support to the head and having the infant turn their head towards the light touch. To support sucking, therapists can have the infant suck on age-appropriate and safe objects that may have different textures, for example, a human nipple, finger, bottle nipple, pacifier, thumb, or toy. Therapists can also lightly touch or run the object over the corner of the child's mouth to work on the rooting and sucking. Giving the child eye contact and reassuring body language during the activities and time together will help build a relationship and reassure the child. You may want to reach out to a lactation specialist as well if the child is having trouble with rooting, sucking, and getting nutrition.

Palmar Reflex

The palmar reflex or grasp occurs between birth and three months (Martello, 2023). This reflex occurs when a finger or object is placed in the infant's palm or hand on the ulnar or pinkie finger side, and the fingers close around the object, pulling it into the infant's palm when the infant is awake (see Image 3). The thumb is not affected by the movement (Anekar & Bordoni, 2022). When infants have trouble with the palmar or grasping reflex, they may have trouble picking up different-sized items, writing, grasping, and releasing items. They also may fatigue quickly when completing fine motor activities.



Save 1

Image 3: Palmar or Grasp Reflex

Therapists can assist infants with this reflex by placing objects and toys of different sizes and textures in the infant's hands. Games can be played with the toys; for example, keep away to increase engagement and speed the infant closes their fingers. To assist with the grasping motion, the therapist can gently assist the infant with the movement of closing their hand into a fist for the muscles to flex and extend open. Gentle rubbing or massaging of the fingers and palm can assist with sensation and wake the muscles for movement.

Asymmetric Tonic Neck Reflex (ATNR)

The ATNR appears between the ages of one to four months. This reflex is also called the fencing reflex (see Image 4). The reflex occurs when the child's head is turned to one side, and the arm on the same side straightens while the arm on the opposite side bends in (Arcilla & Vilella, 2023). This movement and reflex is a precursor to crawling, eye-hand coordination, and reaching for objects (Chandradasa & Rathnayake, 2019). Infants with trouble integrating this skill could have trouble crawling and movements with alternating arm or leg movements. Examples of alternating arm-leg movements include kicking and throwing a ball, swimming, skipping, and writing (Martello, 2023).



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Image 4: Asymmetric Tonic Neck Reflex

To work on this reflex, the therapist should use play, the child's primary occupation, to imitate the looking and reaching movement. For instance, if the child cannot sit independently, place an item to one side. Then, shake or bang the item on the floor to get the child's attention and have them reach for it. If the child is learning or working on sitting, give them a stable base of support with pillows, the therapist's legs, or other devices and place the item to the side, having them look or scan for the item and reach for it. It is important to remember to work on both sides, even if there is a side that is preferred. Real food is also motivating for some children at this point in development, and reaching for food while sitting appropriately in a highchair is also a good way to work on this skill. A ball could be used, rolled, or thrown to the child to work on timing and reaching. Placing the child in a quadruped position and having them look and reach for items slightly out of reach. Yoga could be used if the child is older; a few poses include seated twists, bird dog, and warrior poses.

Spinal Galant Reflex

The Spinal Galant occurs between birth to nine months. In this reflex, the side of the back is rubbed top down, and the child leans to that side, flexing their body (see Image 5). This reflex is important for rolling and reaching side to side for items (Chandradasa & Rathnayake, 2019). If there are integrating concerns, the child will have trouble sitting for extended periods, fidgeting, bed-wetting issues as they age, and poor concentration (Martello, 2023).



Save 1

Image 5: Spinal Galant Reflex

Therapists can assist children with this reflex by facilitating the rotation of the hips from side to side while the infant is lying prone. Additionally, therapists can place toys or preferred items to the side and have the child roll or initiate rolling to get the item to play with. Rolling down wedges and hills is a fun way to work on the spinal Galant Reflex. When the child is rolling, facilitate rolling in a segmented manner, not like a log. As the child ages, an additional activity is to have the child lie on their back and slowly make snow angels. This means starting with arms down at the side and legs together, then slowly moving the arms up above the head and spreading the legs simultaneously. This is similar to the star position in yoga, which can be done standing, sitting, or lying on the floor. Another activity is to have the child sitting straddling a peanut therapy ball. The child rotates back and down to one side to pick up a piece of a shape sorter and then rotates back and to the other side to place the shape in the shape sorter container.

Tonic Labyrinthine Reflex

The tonic labyrinthine reflex starts at birth and should be gone by the time the child is three and a half years old. This reflex is sometimes called Superman (see Image 6). The child is on their stomach on the floor; their head is lifted back, arms are off the floor, and scapulas are pulled back, so the arms are pulled back and the hips and legs are straight and lifted off the floor (Chandradasa & Rathnayake, 2019). If the tonic labyrinthine reflex is not integrated, the child may have difficulties with posture, holding their head up, difficulty walking, joint mobility, and order of tasks (Martello, 2023).



Save 1

Image 6: Tonic Labyrinthine Reflex

Therapists can assist infants with this reflex by educating and modeling tummy time. Parents, caregivers, and therapists can lay on their tummy facing the child and make noises with their mouths or toys to have the infant lift their head. The toys used can include noises and lights. Therapists can lift the shoulders and legs by first assisting with lifting off the ground with a slight touch. They can then let go to see if the infant requires assistance initiating the start of the movement and can continue and sustain it. If the infant or child requires more support, the therapist can initiate the engagement of the muscle groups and hold it for a few seconds to see if the muscles can hold the position independently. An infant or child could also be placed on a therapy ball. When placed on the therapy ball, the infant or child typically curves into the ball. The therapist, who is behind the child and the ball, slowly rolls the ball forward, and the infant or child's head slowly lifts, then slowly rolls forward a little more, and the arms and the arms should extend, then the legs. If they do not initiate the head lift, gently place fingers near the neck on the clavicle and see if a light pressure will initiate it. The therapy ball is helpful because it removes some of the gravity felt when the child is on the floor. If the child is older, the therapist could use a scooter board and a platform swing to integrate this reflex and strengthen the core and neck. On the scooter board, the child lies on their stomach, has their head up, and uses their arms to push and pull around the space. The same idea is true on the platform swing, where the student pushes to spin or to reach for items on the floor and place them next to them or in a container.

Symmetric Tonic Neck Reflex

The symmetric tonic neck reflex starts between 6 – 9 months and is developed around one year. During this reflex, the infant is on their back and flexes their head, and the upper extremities (arms) flex inward as the lower extremities (legs) extend. The opposite occurs when the head is extended. The upper extremities (arms) extend outwards, and the lower extremities (legs) flex (Chandradasa & Rathnayake, 2019). If this is not integrated, the child may have trouble with sitting and standing positions, including “W” sitting and poor eye-hand coordination (Martello, 2023).



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Image 7: Symmetric Tonic Neck Reflex

A therapist can support and work on integrating this reflex by having the child on all four hands and knees and supporting them in arching up their back and flexing or tucking their head (cat yoga pose) and then doing the reverse and tucking their tailbone and dropping the spine while extending or bringing up their head (cow yoga pose). If the child needs more support, this could be done on a therapy ball with head extension and flexion.

Research

Multiple articles have examined the impact of the reflexes that are not yet integrated. Harjpal et al. (2023) completed a systematic review of the importance of primitive reflexes in premature infants and how to prevent brain imbalance.

The main reflexes that they researched in the NICU were the Sucking, Moro, and Babinski. There were 101 articles selected; 32 met the criteria, and the authors reviewed 11. None of the articles promoted the integration of primitive reflexes in the NICU. The review found that assessing and providing interventions for primitive reflexes in the NICU will assist with increased integration of primitive reflexes and decreased developmental delays (Harjpal et al., 2023).

A study completed by Pecuch et al. (2021) considered the non-integration of primitive reflexes in preschool and school-aged children and whether these children had developmental issues, including reading, writing, math, coordination, and attention. Their research question was: does a child have decreased motor performance with decreased integrated primitive reflexes? The participants included 112 children between the ages of four and six in Poland, and the children were motor-typical. Children were assessed using the primitive reflex test and the motor proficiency test. The authors found a relationship between integrated primitive reflexes and motor skills. They also found that tasks do not work smoothly when reflexes are not integrated properly, for example, motor skills, school, and learning (Pecuch et al., 2021).

Kalembe et al. (2023) completed a pilot study examining primitive reflexes that are not integrated and children

having trouble reading the clock. The participants included 28 children, an average age of 8.14 years old. The students' reflexes were tested on six reflex assessments, including the Romberg test. A clock test was also completed that assessed the student's ability to read a clock and count between two different times. The results showed that children who got fewer answers correct on the clock test had primitive reflexes that were not fully integrated (Kalemba et al., 2023).

Case Study A

Avery is six years old and in first grade, and she has an individualized education plan for a developmental delay. She has trouble sitting up for long periods in class, fatigues quickly in physical education, and falls a lot on the playground. As a physical therapist, you noticed that Avery could not hold the tonic labyrinthine reflex or Superman pose for more than a second during your evaluation. There is a yoga group that happens once a week, and you include her in the yoga group. During the yoga session, the therapist includes poses that focus on her core, working against gravity and controlling her head like a cat, cow, and upward-facing dog. During PT sessions, the therapist works on activities in a tall kneeling position and reaches out to the sides. On the swing and scooter board, she pulls herself back with her arms and then lifts them, allowing the swing or scooter board to go forward, grabs items, and then pushes herself back to place the item in the container and then releases it again. Avery could also benefit from activities outside of school, such as swimming lessons and gymnastics.

Case Study B

Elizabeth is a 2-year-old who was seen in her home for early intervention with her mom present. During your occupational therapy session, you notice that when she looks to one side and is lying on her back, she does not reach out for items on that side. Elizabeth is not crawling on all fours but is up on her hands and knees and rocking. During your therapy session, you place Elizabeth on the therapy ball on her stomach and have another adult in front of her, holding her favorite toys to the side. This is for Elizabeth to turn her head and look and reach for. Another intervention on the therapy ball can be done while Elizabeth is seated facing the therapist. You bounce her gently on the therapy ball and sing Humpty Dumpty. When the therapist says the word fall, Elizabeth goes backward on the ball, controlled. Students with poorly integrated reflexes often use their core muscles and come straight up the middle toward the therapist. The rocking of the therapy ball side to side increases head turning and engagement of the lateral muscles. When Elizabeth is looking to the side, assist her with using the arm on that side to push up and do the same thing again on the other side. Over time, Elizabeth will gain increased strength in her core muscles, neck, and arms, and it will get easier. Typically, students have one stronger side, and they prefer to turn to it, but it is important to work on both sides.

Conclusion

Primitive reflexes are an important part of a child's development and, when not integrated, can affect many parts of a child's life, including play, school, eating, drinking, and mobility. Consistent monitoring and motivation of the child and interventions are important factors for reflexes to become integrated. Occupational and physical therapists must be aware of the primitive reflexes, the ages at which they are integrated, and ways to assist families and children with integrating them in various settings.

Select one of the following methods to complete this course.

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Pass an exam testing your knowledge of the course material.

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