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Introduction:Primitive reflexes are automatic, stereotypical movements that occur in response to specific stimuli during infancy. These reflexes play a crucial role in the early development and maturation of the central nervous system. This comprehensive article aims to provide a deeper understanding of primitive reflexes, including their development, function, and evaluation, to support parents, caregivers, and healthcare professionals in recognizing and interpreting these reflexes during early childhood.Development of Primitive Reflexes:Primitive reflexes emerge during fetal development and are present at birth. They are controlled by the lower levels of the central nervous system, primarily the brainstem and spinal cord. As the child grows and the higher centers of the brain mature, these reflexes are gradually inhibited or integrated into more voluntary movements.Function of Primitive Reflexes:Primitive reflexes serve various important functions during infancy, including:Protection and survival: Many primitive reflexes, such as the Moro reflex or the rooting reflex, help infants respond to environmental stimuli and protect themselves from potential harm.Early motor development: Primitive reflexes provide a foundation for the development of more complex voluntary movements. They help in building muscle tone, coordination, and the integration of sensory and motor systems.Sensory integration: These reflexes facilitate the integration of sensory information and promote the development of sensory systems.Social and emotional bonding: Certain primitive reflexes, such as the sucking reflex during breastfeeding, contribute to the establishment of a bond between the infant and caregiver.Evaluation of Primitive Reflexes:Healthcare professionals use specific tests and observations to evaluate the presence, strength, and integration of primitive reflexes. These assessments can provide valuable information about the child's neurological development. Some commonly evaluated primitive reflexes include:Moro reflex: Triggered by sudden movements or loud noises, this reflex involves extending the arms outward followed by their retraction.Rooting reflex: When the infant's cheek is touched, they turn their head and open their mouth, preparing for feeding.Palmar grasp reflex: Stimulating the infant's palm causes them to tightly grasp the object with their hand.Plantar grasp reflex: Touching the sole of the foot leads to curling of the toes.Persistence or Absence of Primitive Reflexes:As a child grows, primitive reflexes typically become integrated and are no longer present after a certain age. The persistence or absence of these reflexes beyond the expected timeframe may indicate a developmental delay or neurological disorder. In such cases, further evaluation by a healthcare professional is necessary to identify the underlying cause and provide appropriate interventions.Conclusion:Primitive reflexes are an integral part of early development, providing essential functions and insights into a child's neurological maturation. Understanding their presence, function, and evaluation can help parents, caregivers, and healthcare professionals monitor developmental milestones and detect potential issues. Regular check-ups and assessments can ensure timely interventions and promote healthy development in children.Hashtags: #PrimitiveReflexes #EarlyChildhoodDevelopment #NeurologicalDevelopment #MotorSkillsRelated ArticlesAsked by usersRelated SpecialtiesRelated Physiciansand connect with fellow professionals “I have had the privilege of interacting with Dr. Dane on a professional, academic, and personal level. She has proven to be one of my most intuitive, creative, well-rounded, caring and trustworthy colleagues. All doctors need to consult with their colleagues on occasion. I have access to a network of over 600 colleagues, and Dr. Dane is one of the first colleagues that I reach out to for consultation. Her experience, understanding and clinical proficiency is top-notch. My confidence in her abilities is high enough to refer my family members to her practice, without reservation.” Matthew Antonucci, DC, DACNB, IMC www.DrAntonucci.com Primitive Reflexes & Child DevelopmentIf you’re a parent or caregiver of a child with developmental delays or challenges like ADHD or ASD, you may have heard of primitive reflexes. It’s a term that’s been getting a lot more attention in recent years, and for good reason. Retained reflexes are very common in children with a variety of different developmental delays including ADHD, Autism, dyslexia, anxiety and more. So today, I want to talk about what primitive reflexes are, why they matter, and how they might be linked to developmental issues like ADHD.Let’s start with the basics. Primitive reflexes are automatic movements that babies are born with. They’re controlled by the brain stem, which is the most basic part of the brain. Think of it as the “lizard brain”—its job is to ensure survival. Babies rely on these reflexes to help with the birth process and to keep them alive after birth. Humans are born pretty early compared to other mammals. For example, a baby horse can stand and walk within hours of birth, but human babies can’t control their bodies like that. That’s where these reflexes come in.For the first few months, babies rely almost entirely on these reflexes for movement, as they don’t have control over their muscles yet. But these reflexes aren’t just for movement—they’re also essential for the brain and body to develop properly. Take vision as an example. Babies are born with very immature vision, seeing only a few inches in front of them. But certain reflexes help guide their eyes, which is the first step in developing more advanced visual skills. The same is true for lots of other developmental milestones.Infant Moro (startle) Reflex Infant Palmer (grasp) ReflexPrimitive reflexes play a huge role in a baby’s early brain and body development. They help build the foundation for skills that will come later—things like coordination, balance, and even social skills. The cool thing about these reflexes is that they follow a pretty predictable timeline. Reflexes start to disappear during the first year of life, and this orderly progression helps guide a child’s development.When these reflexes stick around longer than they should it is a clinically significant indicator that there has been a disruption in development. It tells us that their nervous system has not developed the way it should. It also give us a good place to start helping a child mature. So why do we care if primitive reflexes stick around? Well, there are a couple of reasons. First, these reflexes are rooted deep in the brain stem, meaning they’re low-level responses that happen before the more advanced areas of the brain have a chance to kick in. This can disrupt a child’s day-to-day functioning because the brain isn’t responding in the most efficient way.The bigger concern is that the brain develops in a very orderly manner. When these reflexes don’t integrate properly, it can create gaps in a child’s overall development. This can affect everything from memory to impulse control to how well a child interacts socially. For example, the Moro reflex (the startle reflex) is crucial for how a baby reacts to stress. But as children grow, their stress response should mature into a more adaptable one. If it doesn’t, it can have a big impact on how the emotional and attention circuits in the brain develop and function.So lets look at how all of this connects to ADHD and Autism Spectrum Disorder (ASD). These diagnoses are based on symptoms, but they don’t explain why these symptoms are happening or what’s causing them. This is where primitive reflexes can come in.Research has shown that kids with ADHD or ASD are significantly more likely to have retained primitive reflexes. In fact, studies from the Institute of Neuro-Physiological Psychology (INPP) show a strong correlation between these reflexes and developmental challenges. While not every child with ADHD or ASD will have retained reflexes, it’s something worth checking out.The good news is that there are exercises and therapies specifically designed to help integrate these reflexes. For some kids, this can be a game-changer. Once the reflexes start to integrate, the brain and body begin to catch up, and it’s like watching a domino effect of positive changes. For other kids, it’s a slower process that requires support in various areas, including nutrition, family therapy and more. It’s also important to recognize that environmental stress can make it harder for children to integrate their reflexes. For example, if a child’s home life is unstable or if a parent is struggling with uncontrolled anxiety, it can be tough for the child to make progress. In these cases, it’s crucial to address the stress and provide a safe, supportive environment before working on reflex integration.Primitive reflexes are just one piece of the puzzle. If you’re concerned about a child’s development, a more holistic approach can help provide a clearer picture of what’s going on. For example, when children are diagnosed with ADHD or ASD, a more thorough screening should also include checks for things like vestibular function, balance, coordination, and even metabolic factors (like how well they methylate and process toxins). Sleep patterns, breathing, and family dynamics also play a huge role in overall development and health.Unfortunately, these comprehensive screenings aren’t usually part of ADHD or ASD diagnoses, and many of the tests aren’t covered by insurance. But if we had access to a broader set of evaluations, it could lead to better-targeted interventions that truly address the child’s needs.Primitive reflexes are a critical, yet often overlooked, aspect of early childhood development. By understanding their role and the impact they can have on a child’s brain and body development, we can better support children with developmental delays or conditions like ADHD and ASD.If you’re concerned about retained reflexes in your child, I highly recommend seeking a professional evaluation. We offer free screenings and consultations to help identify if primitive reflexes are at play. If you’d like more information, feel free to visit www.earlyrootstherapy.com The primitive reflexes are a group of motor reflexes found in new-born babies. They develop in utero and share the characteristics of being present at birth in a full-term, healthy baby and are mediated or arise from the brainstem. A reflex is an immediate involuntary response evoked by a given stimulus. All reflex responses are involuntary and are not cognitive or actively set off. A stimulus which triggers a reflex always results in the same response. Primitive reflexes are motor/movement reflexes and a specific stimuli will lead to the same pattern or sequence of movements. A large number of reflexes are found in the brainstem – a very old area of the brain positioned between the spinal cord and the cerebral hemispheres. The first of the primitive reflexes to emerge in utero is the Moro reflex, which appears between nine – twelve weeks after conception. In the first year of life, as a child grows and matures, the primitive reflexes are integrated or absorbed and replaced by the postural reflexes. Primitive reflexes never disappear but can be activated deliberately and they might gradually re-emerge with aging. Following head injury or cerebral insult or disease, they may dramatically re-appear. The role of primitive reflexes is two-fold: firstly, to help with survival in those delicate early months when the baby’s nervous system is not fully connected and secondly, to assist the baby to move. As previously mentioned, reflex movement is patterned, consistent and involuntary movement but this movement helps to make the baby aware of his body and his surroundings. Gradually, as the primitive reflexes retreat or are integrated, conscious voluntary movements will be established. The primitive reflexes can be divided into three groups – the multisensory reflex, primitive reflexes of position and the primitive tactile reflexes. The Multisensory Reflex – the Moro Reflex The Moro reflex is the only one of the primitive reflexes which can be triggered by all the senses; that is head position (vestibular), touch, sight (visual), sound (auditory), smell (olfactory) and movement factors such as baby’s kicking or sneezing. It is the matriarch of the early reflexes – the first to develop in utero and the first to be integrated. In a normal, full-term infant this will be within the first four months of life. When activated, the Moro reflex causes the baby to throw his arms open and away from his body (extension and abduction) and his hands open. His legs also abduct but not quite so markedly. At the same time, he takes in a sharp, sudden breath (inspiration). There is a short pause and then the limbs are drawn back into the body. He may well cry (the expiration phase) or be visibly upset. The purpose of the Moro reflex is protective and it assists survival in a neonate whose fight/flight mechanisms are too immature to be of benefit. The arousal caused by an activated Moro reflex and the sympathetic nervous system responses of increased heart rate, rates of breathing and raising of blood pressure, together with crying will attract the mother’s attention and help. The Moro reflex is one of the reflexes tested after birth. If it is not elicited, this may indicate that the baby is heavily sedated or that there has been a prenatal or perinatal event. It may be difficult to elicit a response in some premature babies and babies with altered tone may not show a Moro, especially those with increased tone – hypertonia. An asymmetrical response may be due to an Erb’s palsy, a fractured clavicle or humerus, or to hemiplegia. What happens if a Moro reflex is retained? A child with a retained Moro is likely to be hypersensitive to sensory input. By the time a child is of school age, all the primitive reflexes should be integrated and the postural reflexes present. This stage of neurological development indicates that the unconscious brainstem- triggered response to all sensory stimulation has been replaced by higher, cognitive responses. The Moro reflex is multisensory – it can be triggered by many or all of the senses – and because of this characteristic, where the Moro is retained, there can be profound motor and physiological effects in a child. It is unlikely that a child with a retained Moro will be hypersensitive to all sensory stimulation but some may. To ‘protect’ himself from this overload, a child with a retained Moro will be constantly alert and on guard against his little body which can trip him into exaggerated reactions to certain stimuli. Vestibular hypersensitivity may trigger responses such as motion sickness, intolerance of fairground rides, poor coordination particularly with hand/eye movements and balance insecurity (perhaps compounded by poor postural reflexes). Hypersensitivity to touch can lead to a child who is startled by unexpected physical contact, tickling or close physical contact and ‘invasion’ of body space. Visual hypersensitivity can lead to several issues; visual-perceptual problems such as stimulus bound effect (eyes being drawn to the edges of shapes, scenes, pictures to the detriment of understanding of the whole image), poor reaction to light (pupil responses) and tiring under florescent lighting, photosensitivity, immature eye movements and slow reaction to fast-approaching objects such as balls. Hypersensitivity to auditory input may result in an inability to discriminate sounds or to closing out background noise. Distractibility may be profound due to auditory overload and this can lead to fatigue. Physiological and emotional effects of a retained Moro in a child result from the constant fight/flight preparedness and, as he matures, the learnt anticipation of his body’s nasty reaction to much of life. As a result, a child may not match his peers in apparent maturity and might develop one of two coping strategies. He may be shy and fearful, poor at peer-group relationships and coping with affection and loathing of sport or he may be aggressive, excitable, unable to read the body language of his peers and be dominating. A child with a retained Moro hates change and is unable to be flexible or adaptable to situations, especially those over which he perceives he has no control. The biochemical effects of a Moro leads to an over-production of the stress hormones, cortisol and adrenalin. This is a double hit because these hormones are designed to increase sensitivity and reactivity. Thus a Moro child is in a loop of over-reaction to stimuli and a hormonal state which is designed to heighten such a response. Also these hormones assist the body’s defence against infection and allergy but in a child with a retained Moro, there may be a lowering of the efficacy in the immune responses and so the child is more likely to suffer from allergies, to pick up every cold going at school and perhaps have food or additive sensitivities. His glucose metabolism may be fast, also resulting in sudden onset of fatigue and mood swings. All these effects compound an already challenged situation in both the classroom and the child’s academic performance. Primitive reflexes of position There are three primitive reflexes of position – the Tonic Labyrinthine Reflex (TLR), the Asymmetrical Tonic Neck Reflex (ATNR) and the Symmetrical Tonic Neck Reflex (STNR). These reflexes affect all four limbs. The TLR is vestibular in origin; that is, it is affected by head position and activated by the labyrinthine apparatus of the ear. The tonic neck reflexes (ATNR and STNR) are activated by cervical spine position or the position of the neck, so by default the position of the head as well. The Tonic Labyrinthine Reflex (TLR) The TLR has two components – the TLR forwards or into flexion and the TLR backwards or into extension. The TLRf develops in utero at about 12 weeks gestation and flexus habitus, the flexed position of a baby in the womb, is thought to be the first manifestation of this reflex. The TLR into extension is present at birth and plays an active part in a normal vaginal delivery. It is not possible in the tight space in utero for a neonate to extend his spine until he emerges from the birth canal. The TLR in flexion and extension should be present at birth and TLRf is usually inhibited by the age of 4 months. The TLR into extension takes longer to integrate – perhaps three and a half years. This is due to the processes involved in establishing the postural reflexes and their assimilation. To activate the TLRf, the baby’s head is brought to his chest. His arms bend into his body and his hips flex and knees bend, as his legs are drawn into his tummy. The TLR into extension is shown by letting the baby’s head drop below the level of his spine. His back will arch up, his shoulders retract and his arms straighten and move back away from his body. The purpose of the TLR is to provide a mechanism for altering tone in the neonate. Muscle tone is also reflex in origin but it is primarily a stretch reflex. Tone is maintained and adjusted to meet the requirement of posture and movement and needs to be high enough to resist the effects of gravity but low enough to allow movement to take place – the Goldilock zone. The nervous system in a full term neonate is not yet mature enough for normal tone to be reliably established. The TLR allows switching between flexor and extensor tone depending on the position of the baby’s head. The new-born infant is a very flexed and curled up little person but over the first few weeks of life, extension/straightening out occurs in the hips and legs. The first area to come ‘under control’ is the head and the first movement the baby will make voluntarily is lifting his head from prone (when he is on his tummy). The neck has the largest number of proprioceptors of any area in the body – these ‘sensors’ feedback information on position, movement and balance. The more that head control in extension is established, the more the TLR in flexion is integrated. By the time there is no head lag (dropping back of the head) when the baby is pulled up into sitting – at about 4 months – the TLRf should be inhibited. The TLR into extension takes longer to be absorbed because it has a role to play as each new position is mastered by the growing and developing child. The learning of these postures places a (normal) stress on a child until the new position is firm and reliable and so hints of the TLF may be present fleetingly. By the time a child is three and a half, the TLR should be integrated in both its forms. What happens if the TLR is retained? There are two main effects of a retained TLR – a vestibular effect and that on tone. The vestibular effects may present as motion sickness, poor balance, visual-perception problems (the ability to correctly interpret information received through sight), issues with spatial concepts (complex cognitive skills which allows a child, for example, to know: right from left, up/down, on/in, was from saw, how to fill a sheet of paper with information). Specific visual problems may include a lack of near-point convergence and figure-ground effect (the ability to work out which is the object and which the background). The child may also have poor sequencing skills and a poor concept of time. The effects on tone are dependent on which TLR is retained. TLR in flexion or forwards may cause hypotonus – lower than normal tone which can manifest as weakness, poor posture and slumping. A retained TLR in extension may cause hypertonus/ increased tone and presents as the lack of smooth movement or toe-walking. The Asymmetrical Tonic Neck Reflex (ATNR) The ATNR is a well-recognised primitive reflex and is also known as the fencing reflex. It emerges at about 18 weeks post conception. This is about the time that the mother becomes aware of the baby moving in utero. The baby uses the ATNR to reposition himself in the womb in response to the mother’s changes in position. The ATNR should be fully present at birth – in fact it is an important component in a normal vaginal delivery and the baby activates the ATNR to assist with moving down the birth canal. The ATNR is usually integrated by the age of six months. This reflex is triggered by rotation of the head – turning the head from left to right – not flexion/extension – moving backwards and forwards. If a baby’s head is turned to the right, his right arm and leg will extend or straighten and tone will be slightly increased on this side. His left arm and leg bend or flex. Turning his head to the left elicits the same pattern but this time there is extension in the left limbs and flexion in the right. The purpose of the ATNR is firstly to assist in the process of a normal delivery. The ATNR will also help the neonate who is prone (on his tummy) to free his mouth and nose for breathing. It makes the baby aware of homolateral movement; that is, movement on the same side of the body. As the baby grows, it is believed that the ATNR strengthens hand-eye coordination. A new infant has a fixed gaze distance of about 6½” or 17 cm and his eyes are drawn to the periphery of objects close to him. The ATNR alerts the baby to the existence of his hand – when he turns his head to one side his hand will appear on that side and the movement will catch his eye – and it allows the baby to alternate between near point peripheral vision, when his head is centrally placed and his hands in front of his face, to focal vision when he follows his hand and focuses at arm’s length. As full head control develops and the nervous system and cerebral cortex mature, the ATNR should be inhibited and the Symmetrical Tonic Neck Reflex will appear. What happens if the ATNR is retained? A child with a retained ATNR can present with one or more of several issues, most as a result of the interference caused to normal physical development and the subsequent effects on learning. An ATNR child is always being forced into the pattern of the ATNR, albeit in a slight and perhaps unobvious fashion, rather than being able to undertake voluntary movement desired. This can be frustrating for the child and compromises his full physical development. The inability to roll over or commando crawl results because the retained ATNR prevents head rotation and flexion/bending on the same side. If you turn your head to the right, you need to be able to bend your right arm and leg to roll over to the right. Commando crawling requires the ability to have the right arm and left leg flexed/bent at the same time and then pushing through to extension/straightening of these limbs to propel oneself forwards. A retained ATNR may result in homologous movement instead – both arms are used together to pull the body forwards and the legs may just drag behind or are used together too. Crawling and creeping, important for cross-pattern development which enhances hand-eye coordination and integration of vestibular information, will be compromised with a retained ATNR. Balance is affected – in standing a child will feel unstable and insecure unless his head is held still and in the midline. Turning his head will make his leg on the opposite, occipital side (the back of the head side) feel weak due to slight lowering of tone. In all other positions, the effect will be the same, although perhaps not so marked. When walking, the child’s gait may look strange especially if he swings his left arm forward with his left leg (rather than opposite arm and leg) in a homolateral/one sided pattern. Difficulty crossing the midline causes a series of issues. A child needs to learn, through movement, that both sides of the body, the page, the pathway across the carpet of his car can be traversed through the midline. There may be difficulties in: manipulating an object with both hands and passing the object between hands which may not be learnt properly: writing is compromised, as is reading, because it is necessary for the hand to go to the other side of the page and for eyes to scan and track across a page in unison: cross-laterality or mixed laterality is a consequence – the child does not have a dominant side, so has to consciously think which hand to use rather than automatically using the dominant hand. Visual-perceptual difficulties, such a symmetrical presentation of figures or symbols on a page, may be seen. Poor visual-motor integration – hand-eye coordination – can be marked in a child with a retained ATNR because, whilst the child may be able to cope with reading by compensating for eye movements alone, writing needs both hand and eye movements to be accurate and controlled. A child may quickly learn coping strategies for reading and writing; he may sit differently with his arm out straight; he may turn the paper or book to an angle which suits him better rather than having these usually aligned; his pen grip may be very tight or unusual to override the desire for his hand to open when the head is turned towards it. Awkwardness or a slightly different way of moving in comparison to his peers may cause the ATNR child angst. His ball skills may be below par and he might appear clumsy when catching or kicking a ball. In the swimming pool, his backstroke will be fine (his head is kept in the midline) but his front crawl may only be half right – as he turns his head to breathe, the arm on that side will want to move away from his body, not go smoothly towards his ear in line with his body. If he has not developed dominance, he may be fractionally slower than his peers in various school situations while he has to actively choose between right or left. His motor planning skills – the desired intent from a movement – and the reaction of his body will be poorly matched because the ATNR kicks in following his turning/rotation of his head before he has time to think. Cognitive effects may be seen. The subconscious effect required to override a retained ATNR is energy-sapping. A child with an ATNR may be very capable orally in the classroom but, when writing is required or under stress, such as in an exam, he may well appear to ‘let himself down’ or perform below the level expected of him. The fluency required to think and write at the same time seems to be blocked. This is frustrating for all concerned but is a true effect of a retained ATNR and is not the child’s ‘fault’. The Symmetrical Tonic Neck Reflex (STNR) The STNR is difficult reflex to categorise. Strictly speaking, it is not a true primitive reflex because it is not present for any length of time at birth. Nor is it a postural reflex because it should not be retained. It is, however, a reflex of position and sequentially the last of these reflexes to appear. Like the TLR, the STNR has two types – the STNR into flexion and the STNR into extension. Both appear between six and nine months of age and should be inhibited by the time the child reaches his first birthday. The STNR is triggered by neck position and flexion/extension of the head. Unlike the TLR, the STNR does not cause a whole body response of flexion/extension but the reflex separates the body into two halves at the waist – two opposite patterns of movement happen to the top and bottom halves of the body. When the chin lifts, the arms go into extension/straighten and the hips and legs flex/bend; conversely, when the head goes down the arms flex/bend and the legs extend/straighten. The STNR is beautifully demonstrated by a toddler standing in his cot – his mother comes to lift him out and he looks up and raises his arms and promptly sits down because his lower limbs have gone into flexion. The purpose of the STNR is to inhibit the TLR and allow the child to get into a position to creep or crawl. This is seen when a child raises his head and shoulders when in prone/on his tummy – his arms extend and knees and hips flex and this helps him get onto his hands and knees. The STNR is inhibited by crawling because this is a movement in which the limbs must move contra-laterally/in opposites and independently of head position. The rocking movement, used by infants as they attempt to crawl, is thought to help break down the STNR. By the time the STNR appears, the child should be able to sit unaided; he is rolling and getting himself into sitting. The strength in his legs is improving – his legs are always behind his arms due to the cephalo-caudal (head to toe) sequence of development. Now he wants to stand. He will use the STNR to help him get up from sitting to standing. If he keeps his head down and arms bent as he pulls upwards, his legs will extend, helping him upright. The STNR is also thought to help develop visual accommodation – the ability to maintain a clear image of an object as its distance changes. The ATNR has assisted in focusing to arm’s length. Now the STNR in flexion brings the focus back to near distance (between the knees) and, as the head is lifted and the STNR is seen in the posture, both active and static. If the STNR pattern has not been inhibited, head position will still affect the tone of the upper and lower body differently. When walking, the gait may have simian/monkey-like quality. In standing, the posture is slouched with shoulders rounded and the chin forward. In sitting on the floor, a child may adopt a ‘W’ position. Sitting cross-legged on the floor is almost impossible if the STNR is strong because, with the head flexed/bent, the legs want to be extended/straight. Sitting on a chair at a desk also causes problems because again, if the arms are flexed/bent and the chin down, the legs want to be straight. The child may end up lying on his desk when writing. He may also tuck his feet under his bottom or hook his feet round the legs of the chair to lock his legs and keep them ‘under control’. As a result of the issues caused by posture, a STNR child may have problems with concentration and attention. He may appear to be fidgety and unable to sit still, all because it is too uncomfortable to be so. A retained STNR will have affects on vision – on accommodation and also on vertical tracking. The child may find actions like catching a ball difficult, as his ability to focus correctly on a moving object (especially one moving towards him) may be compromised. He will also find it awkward to copy from a blackboard or white board as switching from far to near vision quickly will be slower for him than that of his peer group. Vertical tracking, where the eyes move from top to bottom, has been shown to be impaired in STNR children. This affects tasks such as lining up information or numbers in columns and can lead to trouble assessing height, such as walking onto a descending escalator or when standing on the edge of a diving board or cliff. A child with a retained STNR may be a messy eater and end up wearing his food rather than getting it into his mouth. He may also find swimming a challenge – whenever he raises his head above the water his lower limbs will bend, so this is a child who likes to swim under water. Primitive tactile reflexes There are many primitive tactile reflexes and, as their name suggests, these reflexes are triggered by touch. They are also classified as grasp reflexes. Six will be discussed here. In order of their appearance, these are the palmar, plantar, Spinal Gallant, rooting, suck and swallow, and Babinski reflexes. The palmar grasp reflex The palmar reflex emerges at 11 weeks in utero and should be present at birth. It is a reflex of two parts – the grasp and the response to traction or the effect of pulling. If an object such as a finger is placed in the palm, the fingers close round the object (the grasp). If the fingers are then drawn gently upwards, the grip is reinforced (the traction effect) and it would appear that the baby could support its own weight if so suspended. If the baby’s head is not in the midline, the grasp will be strongest on the occiput side/the side nearest the back of the head. The purpose of the palmar reflex is deep-rooted; it helps the neonate cling to his mother for safety. In the first post-natal months, there is a connection between the palmar reflex and sucking and vice versa, such that there is reciprocal elicitation of these reflexes. This specific link is known as the Babkin reflex – the palmar-mandibular response. When pressure is applied to the palms, the neonate may flex and/or rotate his head and open his mouth. The Babkin response demonstrates the hand-mouth sensorimotor links which are present in the early months. An exceptionally strong palmar reflex may be found in an infant with kernicterus and hypertonic cerebral palsy. It will be unilateral in hemiplegia. The palmar reflex should be inhibited in the first three to six months of life. A baby losing his palmar reflex will drive his parents mad by his incessant dropping of an object and the resultant demands that this is retrieved and handed back – only for it to be dropped again. The child is learning to ‘let go’ of an object previously held in an uncontrolled fashion because the reflex dictated it be so. Once he learns to release the object, a child can start to develop more mature hand movements, the most important and useful of which is opposition. What happens if the palmar reflex is retained? If a child has not learnt how to release objects, his manual dexterity and fine motor use of his hand will be compromised. He will use a pencil, feeding tools and items such as scissors inappropriately. This leads to the need for increased effort to perform tasks and the likelihood that these tasks are performed inefficiently and with reduced accuracy. There may be overflow and lack of separation of hand/mouth movements so that the child uses his mouth when he writes or overuses his arms and hands when he talks. In severe cases, the development of speech may be affected because articulation is affected by a continuing Babkin response. Hypersensitivity in the palm of the hand and intense dislike of touch in the hand is a nuisance and can prevent correct use of implements. The plantar grasp reflex The plantar reflex, like the palmar grasp reflex, emerges at 11 weeks in utero but it is inhibited a little later, usually by the time the infant learns to stand. The reflex is tested by gently stroking the sole of the foot behind the toes. The toes will curl/flex downwards towards the stimulation and the foot will plantar flex/moves away from the shin. The plantar reflex is a grasp reflex but in the human infant only weakly so. Its purpose is to complement the palmar reflex and assist the neonate in grasping onto his mother. Its presence allows for movements of the toes and foot and helps stimulate movement of the whole leg. One of its most important roles is to inhibit the Babinski reflex within the first year of life. What happens if the plantar reflex is retained? Gravitational insecurity in standing is a major casualty of a retained plantar reflex. If foot placement when walking or foot position in standing is incorrect, the child will feel unstable and will not like being upright. A child may suffer from hypersensitivity to touch on the soles of the feet and find uneven surfaces impossible to negotiate. If balance is shifted away from the soles of the feet to the balls of the feet, the child may be a toe-walker. The Spinal Galant Reflex The Spinal Galant reflex emerges at 20 weeks in utero and should be inhibited by about six months of age. It may also be classified as a spinal reflex and is tested with the child either prone/on his tummy or held in ventral suspension/face down. Stimulation of the skin on one side of the spine will cause flexion/bending towards the side of the stimulus. (Stimulation to both sides of the spine from the pelvis to the neck simultaneously will cause the child to flex/bend both arms and legs, extend his head, cry out and probably empty his bladder. This is the Perez del Pulgar Marx reflex.) The purpose and value of the Spinal Galant reflex is not fully understood but it is believed to assist with the birth process. It can also help with priming trunk movement and the initiation of the amphibian reflex, both necessary for commando crawling, crawling on hands and knees and hip rotation in walking. What happens if the Spinal Galant reflex is retained? A child with a Spinal Galant reflex beyond the age of one will be unable to sit still and may appear to have ‘ants in his pants’. He will fidget, squirm and not remain quietly in one position. He may dislike labels in his clothes, belts, anything round his waist and be hypersensitive to all clothing round his middle. Distractibility, as a result of the unwanted sensations above, means that this child may have a poor attention and concentration span. As he dislikes sitting, he may prefer to work on the floor on his tummy. Nocturnal enuresis or bed-wetting may be associated with a school aged child with a retained Spinal Galant reflex. Poor bladder control might be as a result of motor developmental delay and may also be triggered by the Spinal Galant reflex or the Perez reflex, which can be triggered when the child lies on his back or rolls over in bed. The rooting reflex The rooting (searching) reflex is one of many oral reflexes, which gradually appear from about twelve weeks in utero and should be present at birth. The rooting reflex emerges at about 24 weeks post-conception and is seen in utero when stimulation of the side of the mouth or cheek results in turning of the head towards the stimulus. The rooting reflex is strongest immediately after birth and it is important that the neonate’s earliest attempts are gratified. The newborn will root or search and the reflex is triggered on contact or touch at the side of the mouth, cheek or nose. The baby turns his head towards the stimulus, opens his mouth and extends his tongue. The nipple or teat in his mouth makes contact with the roof of the mouth and this contact sets off rhythmic suckling movements – thus the ‘feeding reflex’ is put into action. If, for medical reasons, the baby is not able to feed orally immediately after birth, he may go on to have difficulties feeding at a later stage. The rooting reflex is best tested when the baby is hungry – after a feed it may be harder to demonstrate. The purpose of the rooting reflex is obvious. There is a need for an innate pattern to search for food before vision is developed. As the baby grows, his responses become conditioned and the sight of the breast or bottle will have him turn his head to the necessary position and he will open his mouth with no physical contact. What happens if the rooting reflex is retained? Hypersensitivity round the mouth area may be an issue with a retained rooting reflex. Poor fine muscle control of the internal and external mouth area may lead to problems with correct and full articulation needed for speech. The tongue position may be too far forward making, swallowing and chewing difficult resulting in poor control of food in the mouth and dribbling. The suck and swallow reflexes These reflexes gradually appear from about twelve weeks in utero and should be present at birth. The first to be seen in utero is the swallow, followed by sucking and complementary tongue movements. Ultrasound observation of foetuses has shown that suck and swallow together appears from about 23 weeks but may not be effective until at least 34 weeks – premature babies born before 34 weeks often have difficulties with efficient oral feeding. The mechanics of sucking and suckling are different, although the terms are often used indiscriminately. Suckling describes a combination of jaw movements (up and down) and tongue movements (forwards and backwards). Sucking is a more mature movement with less jaw action and a marked improvement in lip seal, allowing for negative pressure to be built up within the mouth. Suckling has an inhibitory effect on the ATNR, regardless of the baby’s head position. It is thought that suckling may help train monocular/one eye vision. This may only be seen in breast-fed babies – one eye will be obscured during feeding on one side and vice versa. In bottle-fed babies, the baby is usually held to the same side – a right-handed person will usually hold a baby in their left arm to feed. The action of feeding is not only nutritional. The combination of suckling, swallowing and breathing and the coordination of these is a complex sensori-motor skill essential for the development of speech. What happens if the suck and swallow reflexes are retained? The sucking of fingers, thumb and clothes may continue if these reflexes are retained because there is a need for oral stimulation. An immature swallow pattern may lead to problems will the correct development of the palate. Poor control of muscles around the mouth may result in speech and articulation issues. There may be a retained links with hand and mouth movement, especially if the palmar or Babkin response is also present. The Babinski reflex The Babinski reflex is also known as the extensor plantar response and is not to be confused with the plantar grasp reflex, which is a reflex of flexion/bending. It is present at birth and is demonstrated by stroking the outer border of the sole of the foot (on the side of the little toe). The foot will dorsiflex/the ankle will bend upwards and the toes straighten and fan out, especially the big toe. It is normal to see this reflex in an infant of a year or perhaps two years of age and it is seen in this group only because a certain part of the nervous system, which connects the spinal cord and the brain, is poorly wired up – this is specifically described as poor myelination of the corticospinal tract. The Babinski can be seen working with the plantar grasp reflex in babies who have yet to stand. Reflex feet and toe movements can be seen in an excited child or just before the child makes a sound, babbles or talks. A crawling baby may illicit the Babinski response and dig his big toe into the floor to help with pushing through with his foot and leg. The Babinski reflex is thought to be inhibited by the plantar grasp reflex and the presence of the adult plantar reflex. What happens if the Babinski reflex is retained? A retained Babinski in older children and adults is considered pathological and is a sign of neurological abnormality, which merits immediate investigation. It is possible to see a temporary Babinski in sever hypoglycaemia/low blood sugar. This will be reversible on administration of intravenous glucose. Share on PinterestAs soon as your baby’s born, you’ll notice their primitive reflexes — although you might not know them by name.Case in point: Nothing in the world produces the same amount of wonder that you feel when your newborn baby wraps their teeny fingers determinedly around your pinky. So what if it’s only a primitive reflex? Your heart is aflutter.These reflexes — also called newborn reflexes — help babies survive and thrive. The grasping reflex described above is one of the motions that babies produce involuntary: Your baby’s central nervous system (CNS) — their brain and spinal cord — automatically orders your baby’s muscles to react.By the time your baby reaches 4 to 6 months of age, their brain should have matured and replaced these involuntary movements with voluntary ones. Here’s a list of primitive reflexes that you can look out for in the meantime. The grasping reflex that we already spoke about is one of the first reflexes that you’ll notice. See how your baby’s fingers close around your pinky? The palmar grasp reflex (that’s what your doc calls it) disappears at around 5 to 6 months of age. The grasp is so strong that they will hang onto something even as you pull it gently away!Lay your baby on a safe, flat surface (like their crib mattress), offer both your pinkies for your baby to grasp, and slowly lift them up a couple of inches. Because this reflex is involuntary, your baby won’t let go at will. (But watch out, because when they get tired, they’ll suddenly let go and fall back!)The plantar reflex is actually present in most people. But in babies, it’s known as the extensor plantar reflex. What happens when you stroke the bottom of your newborn’s foot? Keep your stroke firm as you run your finger up the outer part of their sole. You’ll notice your baby’s big toe flex up and out. The other toes follow suit. This is called the Babinski sign.You’ll notice this reflex in this form from the time your baby is born until they reach about 1 to 2 years. After that, thanks to your baby’s developing central nervous system, this reflex evolves into what’s called the normal plantar reflex, or the toe curling down.Here’s another reflex that you’ll notice right after birth. Put a nipple or your clean finger into your baby’s mouth, and they’ll start to suck rhythmically. It’s no surprise — your baby started practicing in the womb as a 14-week-old embryo.Getting the sucking reflex right is important not only because your baby needs to eat to survive, but also because it helps your baby to coordinate breathing and swallowing. By the time your baby reaches 2 months old, they’ll have learned to control this sucking reflex, and it will become more voluntary. Your baby needs to be able to find their food source. Since about 32 weeks gestation, they’ve been practicing doing just that. As a newborn, your baby will turn their head toward anything that touches their cheek — a nipple or a finger.This reflex comes in especially handy for breastfed babies. Watch how they turn their head in search of your nipple when their cheek touches you breast.As your baby becomes more aware (at about 3 weeks), they’ll stop rooting and will be able to move towards your breast without the failed attempts at honing in. By 4 months old, the only thing that will remain of this reflex is a cute memory. This is another reflex you may notice at birth, but it’s also hard to elicit unless you watch your pediatrician do it. Until your baby reaches 4 to 6 months, when, say, a doctor holds your baby face down over the doctor’s hand and strokes the skin along the side of baby’s back, your baby will shift toward the side that was stroked.This reflex helps to develop range of motion in your baby’s hip so that they’ll be ready to crawl and then walk. Thank Russian neurologist Galant for pointing it out.It’s easy to see how the Moro reflex (take a bow, Ernst Moro) helps your baby survive. Although you’ll only notice this reflex at birth, your baby has been hard at work perfecting the moves since 28 weeks gestation. The reflex — also known as the startle reflex — reaches a peak when your baby reaches 1 month and begins to disappear when they turn 2 months old.Several things may set off this reflex:a sudden change in the position of your baby’s headan abrupt temperature changea startling noiseWatch how your baby’s legs and head stretch out and how their arms jerk up and out. Then your baby brings their arms together, clenches their hands into fists, and may yell in protest. If it seems your baby got a fright — give them a hug.By the time your baby reaches 3 to 4 months of age this reflex will have disappeared. Late bloomers will hold on to the reflex till about 6 months of age. Yes, as long as you support your newborn, they can actually walk! You’ll have to help your baby by holding them up under the arms. Remember to support the head too. And then, watch what happens when the soles of their feet touch a flat surface. They’ll put one foot in front of the other in an attempt to walk.This reflex disappears at around 2 to 5 months old. But it doesn’t mean that it’s forgotten. Your baby draws on the residual memory of this reflex when they learn to walk at about a year old.ATNR is present at birth. In fact, your baby has been doing this since 35 weeks gestation. Turn your baby’s head sideways and watch how the arm and leg on that side straighten while the opposite arm and leg bend. This reflex helps your baby turn their head when they’re lying on their stomach. It’s also the start of hand-eye coordination, so thank ATNR when your baby starts reaching for their rattle.By 3 months old, this reflex will have disappeared. TLR is also present at birth. There are two parts to this reflex — forward and backward.To see this reflex at work, lay your baby on their back and tilt their head forward above the level of the sp