All learning occurs in the brain, but the body is the vehicle for acquiring knowledge

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Introduction
The brain (as wonderful as it is) is not capable of generating its own information; it relies on the senses to provide it with information. The brain, senses and muscles are all linked together by the Central Nervous System, but the brain and muscles rely on the senses for input.

The senses (both near and far) gets stimulated by something or somebody and sends its information to the brain via the emotional centres to learn about the something or somebody and to be able to respond using muscle reactions. For example when a baby smells mommy the receptors in the nose gets excited and sends the information to the brain, the brain responds by ‘saying’: “Have I smelled this before? Was that good or bad? YES, it was good, ok, hang on!” Baby hangs on using its mouth, hands and feet to get a grip and be comforted.

If the brain says: “NO this is not good!” the HELP ME response in the baby’s brain is triggered and baby starts moving away, crying and fling the arms wide open. So the instinctive emotional reaction when the baby does not know something is to move away.

Why is the learning process important?
While baby is in utero, the uterus acts as a warm and cushioned environment with muted sounds and no light. Baby has an on-line food and oxygen supply and can move, sleep and feed when it wants to. So in a nutshell, all the baby’s needs are being met.

When baby is born all this changes and baby needs to quickly adjust to a world with bright lights, feeling cold, hearing sharp sounds, being touched and needing to learn quickly how to breathe. Without the ability to learn (receive
information from the senses and respond via muscle reactions) the baby is danger of not surviving.

To survive the baby is born with a series of primitive reflexes that enable the senses and the muscles to work together without having to think about what to do. A reflex is an instinctive, automatic and stereotyped muscle movement with the purpose of doing what is necessary to help the baby survive. Straight after birth part of the Abgar test is to determine if some of the primitive reflexes are able to take over from life in utero. Without these reflexes a baby is not able to breathe, suck, grasp or adjust in a way that will ensure its survival.

The learning process develops during the nine months in utero to prepare baby for birth. Because baby has no teacher in utero, nature equips baby to learn through reflexes that enable the CNS to wire the senses and muscles together.

**Primitive Reflexes**

There are two kinds of reflexes: primitive reflexes and postural reflexes. Postural reflexes build on primitive reflexes and therefore needs the primitive reflexes to do its job properly. If the primitive reflexes do not do its job properly the postural reflexes will build walls on sandy foundations and cracks may appear later. These ‘cracks’ indicate neurological immaturities and may affect the growing child in such a way that mile stones are not reached.

**About primitive reflexes:**
- It is essential for survival
- It develops in a sequence
- Through repetition of simple movements it ‘wires’ the senses, brain and muscles together
- It builds firm foundations for complicated skills later like balance, fine and gross motor control, co-ordination, perception, confidence and a positive sense of self
- It has a limited life time and should go to rest between 6 and 12 months after birth
- If it doesn’t go to rest (inhibit) it stays functioning and in so doing prevent the brain from taking over control. Movement and reactions then stays a reflexive reaction with first call on brain response and may be one of the causes of ADD/ADHD.
- In a nutshell it develops the equipment needed for learning and without good quality equipment, the mechanics of learning and its results tend to be faulty.
- It works like a relay race where the one reflex’s job is to develop ‘n skill and once the skill is acquired, the reflex goes to rest and like a relay race passes the baton on to the next reflex for more advanced development.
• NB. For a reflex to inhibit, enough repetitions are needed in the right sequence.

The most commonly known Primitive Reflexes are:
- The Withdrawal Reflex
- The Moro Reflex
- The Palmar Reflex
- The Plantar Reflex
- ATNR (Asymmetrical Tonic Neck Reflex)
- Spinal Galant Reflex
- Rooting Reflex
- TLR (Tonic Labyrinthine Reflex)
- Landau Reflex
- STNR (Symmetrical Tonic Neck Reflex)

Which of the senses develops first?

Because the brain needs information from the senses, reflexive sensory stimulation is a priority. The near sense of balance is at the core of all functioning and the first to develop. It starts developing around 16 weeks in utero and is well-established and myelinated at birth.

The sense of balance gives baby a sense of direction and orientation that makes baby feel safe and secure. It is like when you are looking for a house in an unfamiliar area and you phone for directions, the first thing the other person asks is: “Where are you?” Knowing where you are, signals the body to relax and explore.

The vestibular system in the inner ear works with the reflexes to develop balance. This mechanism works like a combination of a spirit level and a snow globe. The spirit level needs movement to get the bubble in the middle and while the head is moving to get the bubble in the middle, the snow is being shaken. Once the snow settles down the baby finds its sense of balance and security.

Movement is baby’s first language

To promote movement and develop balance the baby needs to move. Movement is initiated from 5 weeks in utero as a result of the Withdrawal Reflex. If anything comes close to the tiny little embryo, it instinctively moves away from contact to protect itself from harm. In other words the baby’s first reaction to touch is to withdraw. This withdrawal stimulates movement, which get the development of the vestibular system going. The first areas of sensitivity to touch are the lips, the palms of the hands and the soles of the feet. The sensitivity then spreads to the whole body making the skin the largest sensory organ.

Between 9 and 12 weeks (just as mom realizes that she is pregnant) mom instinctively touches her tummy to welcome baby. The little embryo changes direction and starts moving towards the hand. This is the baby’s first contact with the outside world and an opportunity to learn that touch is pleasant.
The value of touch
Between the second and third trimester the sense of touch matures from withdrawal to grasping. Touch then becomes associated with acceptance, safety, security and nourishment. The absence of loving touch may leave the baby in a withdrawal state and an instinctive negative reaction to touch and contact, which often leads to tactile defensive behavior in children and adults. Because touch precedes vision and hearing as a way of learning, a positive association with touch is important to enable the brain to grow and develop. The skin is perfectly equipped with tiny hairs (with touch receptors at the base of every hair on the body) that send messages to the brain to alert the baby of changes. The brain reads these messages to determine if things are fine and if baby can relax and enjoy the sensation or to alert baby if things are not fine. Ayres distinguish between 2 kinds of touch receptors in the skin: protective receptors and discriminative receptors. Protective receptors reads the fine/not fine messages and stimulates a response, while the discriminative receptors teaches the brain about new sensations and makes the brain grow. Without a positive reaction to touch the baby may therefore grow and develop slower. Research on mice by Schanberg and Field in the USA illustrated this point with their research on mice. They showed that when mice are removed from their mommy’s touch, their stress hormones signal the body to conserve energy, because it doesn’t know when next it would get fed. The result is a drop in weight and less brain growth. When the mice were again placed with mommy, the stress hormones decreased the moment mommy mouse started licking her pups. Touch (her licking) was the signal that said: All is fine, you are safe and you will get fed again.

Research by Goddard indicates that babies who are touched have stronger immune systems, gain weight better and have lower levels of stress hormones. On the other hand babies who are not touched often results in babies stimulating their own senses through what is generally known as institutionalized rocking.

What can I do to inhibit the Withdrawal Reflex and stimulate the Grasping Reflexes?
As long as the Withdrawal Reflex is active, a baby may find it difficult to grasp onto mommy with its mouth (Rooting and Sucking Reflexes), hold onto mommy with its hands (Palmar and Moro Reflexes) and find its footing (Plantar Reflex).

1. Start off with putting your hands against the soles of the feet so baby can feel something solid. This makes baby feel safe.
2. Gently unfold baby’s ear lobes to develop the vestibular system as well as hearing.
3. Place baby on your lap with its back against your chest. Open baby’s arms wide and then cross over the chest as though to give itself a hug.
4. Join a BabyGym class or contact the Association for Infant Massage to learn how to massage baby from head to toe inhibiting the Withdrawal reflex as you go.
   
   Touch and movement is brain food, Give alot of it!

Bibliography