

Chapter 1

REFLEXES – Their Impact on Success or Failure in Education

When a child is born, he leaves the cushioning and protection of the womb to enter a world where he is assailed by an almost overwhelming amount of sensory stimuli. He cannot interpret the sensations that envelop him. If they are too strong, or too sudden, he will react to them, but he does not understand his own reaction. He has exchanged a world of equilibrium for one of chaos; he has left warmth for heat and cold. Automatic sustenance is no longer available and he must start to participate in feeding himself. No longer furnished with oxygen from the mother's blood, he needs to breathe for himself, and he must start to seek and to find the fulfillment of his own needs.

To survive, he is equipped with a set of primitive reflexes designed to insure immediate response to this new environment and to his changing needs. Primitive reflexes are automatic, stereotyped movements, directed from the brain stem and executed without cortical involvement.

They are essential for the baby's survival in the first few weeks of life, and they provide rudimentary training for many later voluntary skills. The primitive reflexes, however, should only have a limited life-span and, having helped the baby to survive the first hazardous months of life, they should be inhibited or controlled by higher centers of the brain. This allows more sophisticated neural structures to develop, which then allow the infant control of voluntary response.

If these primitive reflexes remain active beyond 6-12 months of life, they are said to be aberrant, and they are evidence of a structural weakness or immaturity within the central nervous system (CNS). Prolonged primitive reflex activity may also prevent the development of the succeeding postural reflexes, which should emerge to enable the maturing child to interact effectively with his environment. Primitive reflexes retained beyond six months of age may result in immature patterns of behavior or may cause immature systems to remain prevalent, despite the acquisition of later skills. One parent described his child as "having an infant still active within a ten-year-old's body."

Conscious awareness is possible only when the cortex becomes involved in the event.

Perception is the registering of sensory information in the brain.

Cognition is the interpretation and understanding of that information.

Inhibition - suppression of one function through the development of another. The first function becomes integrated within the second.

Disinhibition occurs after trauma or in Alzheimer's disease when reflexes re-emerge in their reverse chronological order.

Depending on the degree of aberrant reflex activity, this poor organization of nerve fibers can affect one or all areas of functioning: not only gross muscle and fine muscle co-ordination, but also sensory perception, cognition and avenues of expression. The fundamental equipment essential for learning will be faulty or inefficient despite adequate intellectual ability. It is as if later skills remain tethered to an earlier stage of development and instead of becoming automatic, can only be mastered through continuous conscious effort.

The primitive reflexes emerge in utero, are present at birth, and should be inhibited by six months of age —twelve months at the latest.

Inhibition of a reflex frequently correlates with the acquisition of a new skill. Thus knowledge of reflex chronology and normal child development may be combined to predict which later skill may have been impaired as a direct result of retained primitive reflexes. In much the same way that the parent used the analogy of an infant remaining active in a schoolboy's body, it may be said that the individual's aberrant reflexes can give us clues as to what is actively hindering later skills.

Detection of primitive reflexes can help to isolate the causes of a child's problem so that remedial training can be targeted more effectively. If the reflex profile is only marginally abnormal, teaching strategies *alone* will usually be sufficient. Children with a moderate degree of reflex abnormality may benefit from a combination of specialized teaching and some motor training designed to improve balance and coordination. If, however, a **cluster** of aberrant reflexes are present, **neuro-developmental delay** is said to exist. In such cases, the child will only be able to sustain long term improvement after following a **reflex stimulation/inhibition program** designed specifically for him to treat the aberrant reflexes still present.

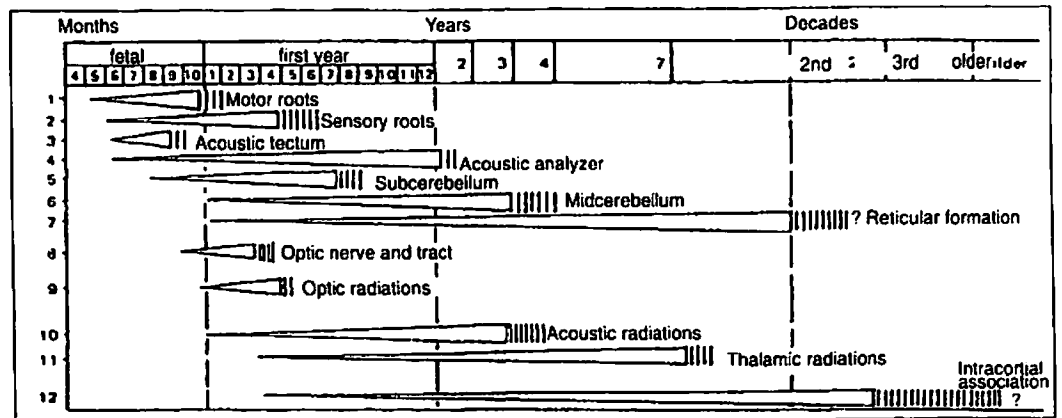


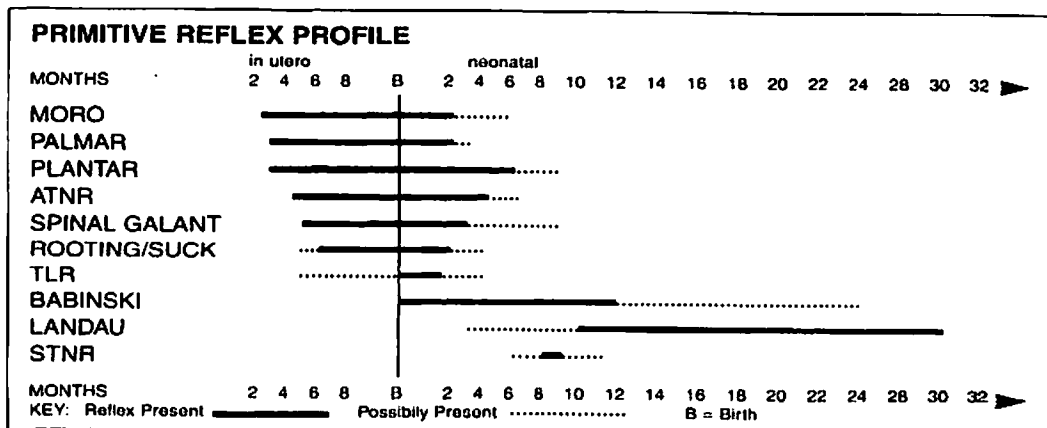
Figure 1: Periods of Intensive Myelination in Different Neural Systems — From before birth to beyond the third decade of life. — from *The Brain* by Mildred Robeck

A *reflex stimulation/inhibition program* consists of specific physical, stereotyped movements practiced for approximately five to ten minutes per day over a period of nine to twelve months. The movements involved are based upon a detailed knowledge of reflex chronology and normal child development. Thelan (1979) observed that all human babies make a series of stereotyped movements during their first year of life. The Institute for Neuro-Physiological Psychology in the United Kingdom and Sweden, maintain that specific movement patterns made in the first months of life contain within them a natural inhibitor to the reflexes, and that if a child has never made these movements in the correct sequence, the primitive reflexes may have remained active as a result. By the application of stylized sequential movements, practiced daily, it is thus possible to give the brain a "second chance" to register the reflex inhibitory movement patterns which should have been made at the appropriate stage in development. As aberrant reflex activity is corrected, many of the physical, academic and emotional problems of the child will disappear.

Each reflex has a vital part to play in setting the stage for later functioning. In order to understand what goes wrong when reflexes become aberrant, it is important to realize what job individual reflexes perform at the time that their presence is normal. To do this, we need to return to the earliest weeks of an embryo's life — just five weeks after conception.

At this time the embryo starts to show signs of response to external stimuli. Gentle touch to the upper lip will cause the embryo to **withdraw** immediately from the stimulus — in an amebic-like response. Only a few days later, this area of sensitivity will be spread to include the palms of the hands and the soles of the feet, until eventually the whole body surface is responsive to touch. At this stage, however, the response is always one of **withdrawal** from the source of contact, and is a total body reaction. As tactile awareness develops, withdrawal upon contact gradually lessens.

*Reflex —
an involuntary response
to a stimulus and the
entire physiological
process activating it.*



It is when the withdrawal reflexes are gradually lessening, estimate 9 weeks in utero, that the first of the primitive reflexes emerge. Moro reflex appears at 9-12 weeks after conception and continues to develop throughout pregnancy so that it is fully present at birth.

Neural development—not chronological age—determines at what time each reflex emerges and at what time it becomes inhibited. Thus the presence or absence of reflexes at key stages in development may be used as diagnostic signposts of central nervous system (CNS) maturity.

MORO REFLEX

Emerges: 9 weeks in utero
Birth: fully present
Inhibited: 2-4 months of life



TRIGGERS TO THE MORO REFLEX:

1. Sudden, unexpected occurrence of any kind
2. Stimulation of the labyrinth by change in head position (Vestibular)
3. Noise (Auditory)
4. Sudden movement or change of light in the visual field (Visual)
5. Pain, temperature change, or being handled too roughly (Tactile)

PHYSICAL RESPONSE TO THE MORO REFLEX.

1. Instantaneous arousal
2. Rapid inhalation, momentary "freeze" or "startle" followed by expiration—often accompanied by a cry

3. Activation of "fight or flight" response, which automatically alerts the sympathetic nervous system and results in :
 - A. release of adrenaline and cortisol into the system
(The stress hormones)
 - B. increase in the rate of breathing, particularly in the apices (upper lobes) of the lungs
(Hyperventilation)
 - C. increase in heart rate
 - D. rise in blood pressure
 - E. reddening of the skin
4. Possible outburst, e.g. anger or tears

LONG TERM RESPONSE

Poorly developed CO² reflex

The CO² reflex causes spontaneous inhalation of the upper and lower part of the lungs. When CO² levels become too high in the blood, chemical changes take place in the medulla, which will then open the arteries to increase blood supply to the brain and at the same time stimulate deep breathing.

The Moro reflex is a composite series of rapid movements made in response to sudden stimuli. It consists of a sudden symmetrical movement of the arms upward—away from the body—with opening of the hands, momentary freeze and then a gradual return of the arms across the body into a clasping posture. Abduction is accompanied by a sudden intake of breath. Adduction facilitates the release of that breath. Moro in 1918 emphasized his belief that it is essentially a "grasping" reflex, analogous to the one seen in young apes who instinctively cling to their mothers. He called it "Umklammerungsreflex" which literally translated means clasping reflex.

Abduction:
*opening of the arms
and legs outward*

Adduction:
*closing of the arms
and legs as if to
embrace or to clasp*

The Moro reflex is an involuntary reaction to threat. The baby cannot yet analyze incoming sensation to assess whether that threat is real or not. The brain stem releases an immediate Moro response as if an emergency trip-switch were triggered automatically. It acts as the earliest form of "fight or flight" response and may be triggered occasionally in later life in situations of extreme danger. Essentially, however, it should be inhibited in its crude form from 2 to 4 months of age to be replaced by an adult startle reflex or Strauss reflex.

Its role as a survival mechanism in the first months of life is to alert, to arouse and to summon assistance. It is also thought to play a major part in developing the baby's breathing mechanism in utero, coinciding with the earliest breathing-like movements observed in the womb. It facilitates the first "breath of life" at birth and helps to open the windpipe if there is threat of suffocation.

If the Moro reflex fails to be inhibited at 2-4 months of life, the child

will retain an exaggerated startle reaction which may result in continued hypersensitivity in one or several sensory channels, causing him to over-react to certain stimuli. Sudden noise, light, movement or alteration of position or balance—any of these—may elicit the reflex at unexpected moments, so that the child is constantly "on alert" and in a heightened state of awareness. The Moro-directed child is poised on the edge of fight or flight through most of his waking moments, caught up in a vicious circle in which reflex activity stimulates the production of adrenaline and cortisol—the stress hormones. These same hormones increase sensitivity and reactivity so that both the trigger and the response are built into the system. Such a child may present a paradox—acutely sensitive, perceptive and imaginative on the one hand, but immature and over-reactive on the other. He may cope in one of two ways: by being the fearful child who "withdraws" from situations, has difficulty in socializing, and can neither accept nor demonstrate affection easily. On the other hand, he may become the over-active, aggressive child, who is highly excitable, cannot read body language and who needs to dominate situations. Either child will tend to be manipulative, as he attempts to find strategies which will give him some measure of control over his own emotional responses.

Adrenaline and cortisol are two of the body's chief defenses against allergy and infection. If they are in constant use as "Leitmotif" in the child's life, they are diverted from their primary function, and there may be insufficient stores available to provide good immunity and balanced response to potential allergens. This may be the child who picks up every cough and cold in circulation and who over-reacts to certain medication. The child may be sensitive to certain foods or food additives, which in turn will affect behavior and concentration. He will also tend to burn up blood sugar quicker than other children, which will further exacerbate swings in mood and performance.

The child who still has a Moro reflex will experience the world as too full of bright, loud and abrasive sensory stimuli. The eyes will be drawn towards changes in light and to every movement within his visual field. His ears may receive too much auditory information. He cannot filter out or occlude extraneous stimuli, so he becomes easily overloaded. He is, in effect, "stimulus bound."

As Arnheim (1969) said, "Too many impressions which arrive from several sensory sources and which fall simultaneously on a mind which has not yet experienced them separately, will fuse for that mind into single undivided object."

What then are the symptoms which a parent or a teacher might recognize as being suggestive of a strongly residual or retained Moro reflex?

LONG TERM EFFECTS OF RETAINED MORO REFLEX.

1. Vestibular related problems such as motion sickness, poor balance and coordination, particularly seen during ball games

In the first 2-4 months of life, at the time when the Moro reflex is active, an infant's visual attention is drawn to the outside edges of shape and form and to sudden movement or change of light on the periphery of vision. If this continues, the child has difficulty ignoring peripheral visual stimuli and maintaining visual attention on the center. This can contribute to distractibility in the older child.

2. **Physical timidity**
3. **Oculomotor and visual-perceptual problems, e.g. stimulus bound effect (cannot ignore irrelevant visual material within a given visual field, so the eyes tend to be drawn to the perimeter of a shape, much to the detriment of perception of internal features)**
4. **Poor pupillary reaction to light, photosensitivity, difficulty with black print on white paper. The child tires easily under fluorescent lighting**

In bright light the pupils should automatically contract to reduce the amount of light entering the eye. In dim light, they should rapidly dilate to allow maximum light to reach the retina. Failure to do this may result in photosensitivity and/or poor night vision.

5. **Possible auditory confusion resulting from hypersensitivity to specific sounds. The child may have poor auditory discrimination skills, and have difficulty shutting out background noise.**
6. **Allergies and lowered immunity, e.g. asthma, eczema, or a history of frequent ear nose and throat infections**
7. **Adverse reactions to drugs**
8. **Poor stamina**
9. **Dislike of change or surprise—poor adaptability**
10. **Poorly developed CO₂ reflex**
11. **Reactive hypoglycemia**

***** While other residual reflexes tend to have an impact on specific skills, it is the Moro which has an overall effect on the emotional profile of the child. *****

POSSIBLE SECONDARY PSYCHOLOGICAL SYMPTOMS.

1. **Free floating anxiety—"Angst" (continuous anxiety seemingly unrelated to reality)**
2. **Excessive reaction to stimuli**
 - A. **Mood swings—lable emotions**
 - B. **Tense muscle tone (body armoring)**
 - C. **Difficulty accepting criticism, as this child finds it so difficult to change**
3. **Cycle of hyperactivity followed by excessive fatigue**
4. **Difficulty making decisions**
5. **Weak ego, low self esteem**
 - A. **Insecurity/Dependency**
 - B. **Need to "control" or "manipulate" events**

The Moro reflex is the only one of the primitive reflexes to be connected in some way to each one of the senses. As the earliest primitive reflex to emerge, it forms a corner-stone in the foundation for life and for living. It is essential for the neonate's survival, but its effects are profound if it fails to be inhibited at the correct time and transformed into an *adult startle response*.

The adult startle response consists of a shrugging movement, followed by a turn of the head to check for the source of the disturbance, and once that has been identified, the infant proceeds with whatever it was doing.