Orienting and Defensive Responses: A Motor Developmental Perspective

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A critical aspect of the SE® model is the restoration of protective responses (orienting and defensive responses). Motor reflexes, which provide for optimal self-protective responses, may be disrupted as a result of trauma, but may also be disturbed in the course of otherwise normal motor development. These developmental disturbances may then be the underlying source of disrupted capacities for self-protection, or may be intertwined with disruptions caused by traumatic incidents. Proper functioning of the sensory systems (visual, auditory, proprioceptive, etc.) is another critical element in the overall mechanism of self-protection. As with motor reflexes, sensory systems may be disrupted due to trauma, or via disturbances in the original developmental process for these systems. In this presentation, the physical processes of orienting and defense, and their underlying developmental progressions, will be applied in the context of the SE model. In particular, we will be exploring sensory and motor development in relation to the threat response cycle.

Orienting and defensive responses cannot be completely separated (e.g., orienting is a primary part of our capacity to defend). Likewise, the sensory and motor functions which are critical for self-protection often serve to support both orienting and defense. However, for ease of discussion in this article, we will first present information about the sensory and physical systems that are primarily involved in the process of orientation. This will be followed by a discussion of the motor development that primarily fuels our capacity for defense and self-protection.

Sensory Development and the Threat Response Cycle

by
Kathy L. Kain

The threat response cycle describes the process by which we orient to our environment when there is a potential threat, assess the level of potential threat, and respond accordingly:

"The threat response cycle is a hierarchy of responses that are triggered, initially, by novelty in the environment. For ease of discussion, each of the phases of the

sequence is presented separately. In actual threat response, the movement from perception of threat into active defense may happen in milliseconds, with no apparent transitional phases. Likewise, in an over-responsive nervous system, startle may be the habituated response to any novelty in the environment, but it won't be followed by specific defense when there is no actual threat. The cycle progresses as follows:

- ***Arrest response/preparatory orienting*** *– When there is novelty, stop, and notice the external environment. Evaluate whether or not the stimulus is threatening.*
- ***Startle*** *– The startle may happen almost simultaneously with the arrest response. The difference between the two is that the startle has a higher level of sympathetic arousal and actively begins the preparation for action. It includes mobilization of the chemical and physical resources needed to respond to threat.*
- ***Defensive orienting response (DOR)*** *– The potential for threat is assessed as being high; orienting is now done in the context of specific threat and the need for more detailed assessment of that threat. Activation level is usually moderate to high.*
- ***Specific defense***
    - *Fight*
    - *Flight*
    - *Freeze*
- ***Completion*** *- If threat does not materialize, physiology returns to resting state after activation level is reduced via normal self-regulatory processes. If threat requires active defense, completion of the fight, flight or freeze sequence (if defense is successful) leads to discharge of the high activation levels of the threat response, and the physiology returns to equilibrium via normal recovery processes.*
- ***Exploratory orienting response (EOR)*** *– relaxed alertness to both internal and external environment; curiosity; gathering information about the environment with a low level of activation."* SE Training Manual, Beginning Module 2, page 3.

In order for the threat response cycle to function properly, the sensory systems and motor functions that contribute to the ability to orient and defend must be integrated, functional, and available. Interruption of the normal development of the sensory systems or early protective reflexes may leave the client with an impaired capacity for defensive movements that pre-dates the current traumatic event. Fortunately, the techniques for restoration of developmental reflexes parallel those for restoration of orienting and defensive responses. The essential repair process for each is similar: gently increase the demand for the missing reflexes until the body brings the appropriate movements into play. This will be discussed more fully in later sections of this article.

The body systems related to orienting and defense must have the appropriate level of function available in order to meet the challenges to those systems. If there has been serious physical damage to any of the systems of orienting and defense, there may be a limit to how fully the orienting and defensive responses can return to full function, even with effective use of SE.

Finally, the client must have an appropriate level of self-regulation in the autonomic nervous system (ANS) to accomplish the work of orienting and defensive response repair. It is the nature of orienting and defending that the triggering of these body responses happens when there is an experience of threat, or potential threat. By extension, there will be more activation of the sympathetic system when the perceived need for orienting and defense arises. If the client has limited self-regulatory capacity in ANS function, the increased activation associated with perceived threat will sometimes overwhelm rather than encourage orienting and defensive responses. Ironically, when orientation and defense are perceived as being successful, it invariably leads to a calming of the sympathetic activation.

The Physical Process of Orienting

Orienting and defensive responses are all of the processes by which we pay attention to our environment and then take care of ourselves based on the information we gather. The gathering or "paying attention" systems can be broken down into the categories described below. All of these systems have the potential to be disturbed by developmental interruptions, injury, or traumatic stress. It is rare that disturbances due to developmental interruption or traumatic stress cannot be repaired at least to some degree. The severity of a physical injury will determine how much dysfunction will remain in any of these systems on a more permanent basis. All of these body systems can be damaged directly by physical injury, or can be disturbed through brain, nerve or spinal cord tumors, injury, inflammation, irritation or disease. There is a lot of overlap in symptomatology with developmental, physical and traumatic stress disturbances.

Vestibular System

The vestibular system detects head acceleration, head position and the pull of gravity. Every time the head moves, the tiny receptors in the inner ear register the direction and rate of the motion.

"Essentially, the vestibular system informs the brain about all changes in the body's position. It counteracts the force of gravity by coordinating all the required muscular activities and adjustments. It regulates the position of the head, torso, and extremities by compensating for and bringing into harmony the forces of

acceleration, deceleration, and other forces exerted upon the body. The vestibular sensory organs convert forces from acceleration of the head or effects of gravity into biological signals. Cerebral control centers use these signals to inform the individual about the orientation of the head, trigger motor reflexes, maintain equilibrium, and coordinate motor functions….Acceleration and deceleration forces following collision activate in a violent and intense way the ciliated cells of the semicircular canals and matrices of the otolithic organs. When the trauma is violent, some ciliated cells may be partially destroyed. More commonly, they are stunned to the point of no longer transforming body movements into electric signals. In some cases, they become hyper-reactive and generate too many signals, such that the over-stimulated cerebellum can no longer provide reliable information to the body."[1]

The vestibular system tells us our position, specifically in relation to the ground. Clients with disturbance in the vestibular system may suffer from dizziness, loss of equilibrium, nausea, poor depth perception, poor visual accommodation, motion sickness, and headaches. They often become easily disoriented.

Proprioceptive System

Proprioceptors (proprio = self; ceptors = perception) are nerve endings that give information about where different parts of the body are in relation to each other, and how fast they are moving. While the proprioceptors are found in the viscera, they primarily lie along muscle fibers and in the tendons and ligaments that connect muscle to bone. The primary proprioceptive beds are located in the ankles, pelvis and the upper neck. The stimulus for proprioception is movement. The more the muscles contract or elongate and the more the joints are compressed, stretched or jarred, the stronger the input. The proprioceptive system supports three main functions: muscle tone, body image and control of effort. These three functions provide the foundation for learning motor patterns which become the skilled movements we call coordination. Physical injury, particularly to muscles and joints, often damages these nerve endings. While re-growth of these nerves does commonly occur, sometimes an injury is severe enough to permanently damage the proprioceptive system. In addition, vestibular system, brain or cranial nerve damage can lead to a syndrome called "Proprioceptive Disinformation Syndrome" in which the brain receives disorganized proprioceptive information, and consequently gives incorrect commands for muscle control and effort. Clients who have difficulty processing proprioceptive messages commonly demonstrate movements that are clumsy and poorly coordinated, and often too fast or too slow. They have difficulty

[1] *Trauma, An Osteopathic Approach,* Barral and Croibier, Eastland Press, 1999, page 133.

noticing their body's self-relationship and organizing movements in relation to their own body positions.

The Tactile System

The skin is the largest organ of the body and registers some of our most basic sensations: touch, pressure and temperature. It is what separates us from the rest of the world, giving us body boundaries that help us to tell "me" from "not me." As such it contributes to the formation of body image, the internal picture we have of our bodies. The tactile system is also strongly involved in the bonding process. In addition, the skin is an information gatherer. Each time we touch or feel something, the skin receptors send information to the brain, indicating:

- Where we have been touched
- How much pressure was against the skin
- Whether the skin hurt (pain and temperature), and
- The identity of the object that was touching us, or that we were touching.

Some clients with tactile disturbances seem insensitive to sensation and seek stronger input; others seem overly sensitive to sensation and avoid touch. Clients with tactile disturbances often have difficulty noticing what hurts and what doesn't, where and how they are being touched, and where the edges of their body are. They sometimes feel over-stimulated by the simplest physical contact.

Auditory and Visual Systems

Our auditory and visual systems act as early warning systems about stimuli which may require our immediate attention. They help manage the "where is it? what is it? and what is its intention?" questions that are essential to self-protection. Our peripheral vision is tuned to respond to movement and angle. Central vision gives us depth perception and detail. In combination with the auditory system, which gives us information about direction, the visual system gives us primary information about spatial relationships, and, therefore, how much time is available for decision-making.

Clients with disturbances in these systems may have specific areas of limitations, such as poor visual perception to the right side, or may have more generalized disturbances, such as not being able to identify the direction from which a sound is coming. Auditory and visual system disturbances will often manifest as a delayed reaction to stimuli as the client takes a longer than normal time to

process spatial information or, conversely, as an overreaction to stimuli due to hypersensitivity in these systems.

Relevance for SE Practice

Physical repair of these orienting systems is a common focus in body therapy modalities. It is standard practice, for example, to do proprioceptive repair and re-training in a classical physical therapy treatment, using hands-on techniques, balance boards and movement exercises. In an SE bodywork context, not only will there be physical recovery of these systems, but their function will be restored in the context of the related traumatic stress symptoms. In a more classical SE setting, knowledge of the specific systems of orienting can help focus the practitioner's awareness of disruption of these systems. If it seems the client has physical limitations that are interfering with integrated restoration of orienting responses, an appropriate referral can be made to a body therapist trained in repair techniques.

Impairment of Orienting and Defensive Responses

Our capacity to gather information about our surroundings, to correctly process that information, and to respond appropriately depends upon proper functioning of all of the orienting systems discussed above. If one of our "paying attention" systems is deficient, we will likely be predisposed to poor assessment and response to potential threat. In addition, lack of healthy ANS self-regulation and poor protective reflex development often means our ability to choose appropriate defensive strategies is impaired. (See the following section on motor development for more information on this topic.) This combination of insufficient orienting and poor defensive response almost guarantees greater likelihood of injury. The irony is that traumatic injury often further impairs the orienting and defensive systems. It is common in both the Failure of Physical Defense and Physical Injury categories of trauma to see this cycle of disruption of orienting and defensive responses, followed by further injury, repeated again and again. After each cycle, the capacity to orient and defend is more limited. When proper orienting and defensive responses are restored, this cycle is interrupted as the client is able to meet future physical challenges appropriately and successfully.

Orienting responses answer the following questions: Where is it? What is it? Is it dangerous, desirable, or neutral? Each of these questions requires the use of some combination of our "paying attention" systems. In addition, the process of

paying attention leads along a continuum of response and decision-making, as will be discussed in the following Assessment section.[2]

In a typical SE session, the observation of disturbance in orienting and defensive responses will happen as a result of the usual tracking process. The work of restoration of these responses happens in the context of the overall trauma recovery. The following information may be used as reference material to help the practitioner identify more precisely what the disturbances may be. This material may also be used as a before and after assessment tool to ensure that full restoration of appropriate body resources has occurred during the normal SE process.

Assessment, Restoration and Repair

Assessing the possible impairment of orienting and defensive responses is, in effect, the assessment of the different "paying attention" systems, in combination with the protective reflexes and responses (the protective reflexes and responses are covered in detail in the motor development portion of this article). To focus on assessing the capacity for orienting, we are essentially focusing on the questions posed above: Where is it? What is it? What is its intention?

The restoration and repair process for these functions seems almost impossibly simple: demand that the functions do their job. Of course, the reality is not that simple. Finding ways to demand the orienting responses, motor reflexes and responses to function is sometimes time-consuming and requires creativity in order to be specific enough about which reflex and which response is damaged – and which we are asking to function. The repair of these functions is a vast field of study in itself and is well beyond the scope of this paper and presentation. However, the material below is included to give some simple ideas of how such repair work can be integrated into a trauma-recovery process for the client.

1. We can assess the client's capacity for attention to space. Attention to space requires integrated functioning of the vestibular, visual, and auditory systems, and sometimes the tactile and proprioceptive systems. Our spatial sense helps us localize the direction from which a stimulus came, and where it is likely to be now. An example of testing spatial sense is for the practitioner to throw a small beanbag on the floor (with the client standing with eyes closed) and have the client, still with her eyes closed, throw another beanbag to match the

[2] The material on "where is it, what is it, intention, time, decision" has been adapted from lectures by Peter Levine and an unpublished paper by Anngwyn St. Just and Darrell Sanchez, *Relative Balance in a Voluble World.*

location of that thrown by the practitioner. This tests the auditory accuracy of the client. Any activities that increase spatial awareness will likely be helpful.

2. To assess the client's ability to manage her own body, as well as her relationship to space and other objects, we would look at how she is weight bearing, how she is managing her movements and equilibrium, and whether her body usage is balanced and symmetrical. In addition, we would look for where she avoids moving, where there is discontinuity of movement or defended space (see motor development section for more information).

Using exercise balls is a simple way to place the client in a mobile environment, which will allow us to assess body coordination. Using a ball that is small enough for the client to easily touch the floor, and having the ball under-inflated, are the safest ways to begin. For most clients, the least frightening position to start on the ball is lying belly down over the ball, with both hands and feet touching the floor. The client can use the ball to explore how she transfers her weight through it onto the floor, using her torso weight, her shoulders, pelvis, arms and legs in turn, to move the ball. If this feels too challenging, the client can sit on the ball, or on the floor on cushions, and make more contained movements into different spatial zones.

It is important for the practitioner to keep in mind that these techniques are being used because the client has impairment of her protective mechanisms. The client's balance may be impaired and her ability to use her hands, feet and other parts of her body may be limited. It is critical in doing this kind of work that the practitioner stay physically close enough to the client to assist as needed to prevent injury. Activation levels must be monitored closely to make sure the client does not lose control of her movements unexpectedly.

3. We can also assess the client's process of determining intention. Is she accurate in her assessment of environmental stimulus, the size and weight of objects, angles of movement? Can she accurately perceive the relationship between "me" and "not me?" Obviously, working with the assessment of intention can be a very provocative process for the client. Keeping the tasks physical can keep the client's activation level manageable and will limit the possibility of traumatic transference between the client and practitioner. Here, objects of varying sizes, weights and textures can be used to help the client differentiate between different kinds of stimulus. The practitioner can roll or slide objects towards the client, away from her and at differing angles past her, while having her anticipate how and where she needs to move to intercept the objects. This can be a safe way to re-introduce the client to the experience of anticipating her relationship to objects moving in the space around her.

4. The time pressure involved in the assessment of a stimulus is often what overwhelms clients with poor ANS regulation. The need to quickly assess multiple stimuli brings the sympathetic activation to a level that then impairs the rest of the assessment process. The greater the time pressure, and the greater the threat, the more compressed the decision-making process will be. In addition, distorted time perception is often a side-effect of traumatically stressful events. Assessing the client's time and space relationship not only gives information about these more immediate time distortions, but also of underlying ANS dysregulation.

Having the client combine more than one of the activities above provides increased challenge and tends to engage both the time sense and ANS response simultaneously. For example, with the client lying belly down on the exercise ball, the practitioner can slide different objects toward the client, asking that the client either move out of the way of the object, stop it with her hands, or slide it back toward the practitioner. The speed at which this process happens can be increased until the client is responding to an object close at hand, while simultaneously anticipating the arrival of another object. Some clients will find this kind of exercise very activating so it is important to keep a close watch on the activation level as the challenge increases.

5. Finally, the specific forms of defensive response can be assessed in relationship to both generalized needs (has good righting responses), and specific challenges (knows that tucking her head under and rolling is a good way to prevent injury when falling). The exercise ball is again a good way to have the client in a physically unstable environment, while still maintaining safety. With the client lying belly down on the exercise ball, slowly and gently roll the ball forward until the client needs to catch herself with her hands. Notice if she uses the appropriate hand for the direction of the roll and whether or not she's equally proficient with both hands. Then, roll the ball back so the client needs to use her feet to catch herself. Again, does she use each foot proficiently? Continue to roll the ball slightly in different directions so the client needs to catch herself in all planes of movement. As mentioned earlier, if there is disruption in developmental reflexes, you may see that the client has difficulty using her hands or feet in this context. In more serious disturbances, the client will use only her torso to try to manage the balancing process, demonstrating only the earliest, spine-oriented defensive reflexes. In effect, she will have little or no use of her limbs available for the righting response. In this case, use of the ball is too advanced for the physical resources available and the challenge needs to be decreased by having the client in a less-mobile environment, such as lying on a cushion.[3]

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[3] Many of these movement exercises are adapted from techniques developed by Danaan O'Lahey and Darrell Sanchez.

PRIMITIVE REFLEXES AND RIGHTING REACTIONS: A LOOK THROUGH THE LENSE OF SURVIVAL

(A Work In Progress)

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Introduction

Physical therapists, physicians, occupational therapists and some somatics practitioners who utilize movement therapies understand and use primitive reflexes (PR) and righting reactions (RR) differently. For example, a pediatric physical therapist might evaluate an infant's motor development by looking at both gross motor patterns (rolling or creeping, for example) and her primitive reflexes or righting reactions to assess developmental level, functional ability and neurological status. A somatics practitioner might look at how well PR and RR are integrated into more mature and complex movement patterns to help direct interventions based on what is missing or inefficient.

It is generally agreed that PR and RR underlie, or form the foundation for, more complex and integrated movement patterns and sequences. This is described clearly by Nancy Start Smith (1). However, I want to propose an additional way of considering the functional importance of PR and RR. I suggest that the PR and RR are hardwired in our nervous systems and underlie flight, fight and bonding strategies so important for our survival.

The first order of being alive, starting from the moment of conception is survival. In order to survive, and thrive, mammals need bonding/attachment with others who nurture them. We also need the physical ability to protect ourselves. The ability to flee a dangerous situation, fight back if threatened, or freeze (shut down in shock if overwhelmed and unable to engage the flight and fight abilities successfully), is also imperative for our survival

If we look at PR and RR through the lens of survival we can understand how they form the foundation for our physical abilities of bonding and defense. In the first part of this article is a description of PR, RR and equilibrium responses (ER). In order to place them in context of gross motor development I have listed the expected ages of some gross motor development patterns of movement.

The second part of this article is a theoretical categorization of the PR and RR based on the functional relationship they have with survival/defensive and bonding strategies.

In the part 3 I detail most PR and RR, describing how they are elicited and how I understand their function based on our need and imperative to survive and thrive.

Part I:

Reflexes, Righting Reactions and Equilibrium Responses

Primitive Reflexes (PR)

Primitive reflexes are stereotypical movement patterns in response to specific stimuli. In other words, each time a stimulus is provided, the same movement pattern is elicited with no or limited variation for typically healthy development. They appear at or before birth, normally developing in utero, while the postural reactions of righting, and movement responses to maintain equilibrium or balance develop later in infancy. Most PR integrate by 4-6 months of age although a few remain as reflexes throughout life. Integration is accomplished when equal and opposite reflexes modulate each other for more variable and mature movements. The PR may not be noticeable in the execution or performance of complex mature movement patterns. During stressful situations, however, they may be distinguishable. An example of this is when a person looks over his right shoulder to determine if it is safe to change lanes on the highway. The car may start to veer to the right because an Asymmetrical Tonic Neck Reflex (ATNR) [see part 3 for details] is present.

PR are mediated at the levels of the spinal cord and brainstem and underlie all movements including righting reactions, equilibrium responses, orienting and survival defensive responses of fight, flight. They are utilized by all movements of the head and neck, underlying orienting and the ability to turn the head.

If PR are absent or deficient, development of more advanced movement patterns will be absent, weak or deficient. This includes survival defensive responses and higher-level complex movement patterns. This can result from trauma in-utero, pre- or perinatally or later on in life and can manifest in a failure of physical defense.

Righting Reactions (RR)

RR develop at or shortly after birth in response to the new environment of gravity. They are most distinguishable at 10-12 months old and remain active throughout life, providing integrated movement between the head and trunk, and the body and gravity. They are under control at the mid-brain level and have to do with the relationship to gravity and the relationships between body segments. They underlie one's ability to orient to our environment and to one's own body.

There are 2 general categories of RR:

1-bringing the head into upright or vertical orientation in space in relationship to gravity
2-bringing the head and trunk into mutual alignment with each other

RR underlie movement transitions from lying to upright and turning in relationship to gravity and space. They are required for head lifting, rolling, sitting, crawling, creeping, standing, walking, running, etc., and maintaining postural alignment or tone. They are automatic reactions to a rapid loss of balance and weight shifting.

Equilibrium Responses (ER)

(While this article proposes a theoretical understanding of the survival functions of RR and PR, a description of equilibrium responses is important as they are directly related to integrating PR and RR, and are a functional outcome of integrated PR and RR)

ER appear around 6 months of age and last throughout life. They appear as the infant is beginning to develop the ability to transition from a horizontal position to vertical or sitting. They are automatic, varied patterns of movement to maintain balance by shifting the center of weight and/or base of support. They are elicited by:

1. Internal change of movement, such as shifting weight from one leg to another while climbing up a flight of stairs

2. External change or movement of support, such as when a rolling stool being pushed by a toddler rolls faster than she can ambulate or when a dancer is lifted into the air and her partner moves along the floor.

3. Outside force on body, such as when a football player is hit while running down the field but stays on his feet to continue running.

4. Enticement outside one's kinesphere, such as when one partner slowly leans in and the other partner is drawn toward an embrace without falling over.

ER underlie and allow or support turning of the body through space and the ability to have a multidirectional relationship with gravity. They are mediated by higher brain centers and coordinate with, or are supported by integrated PR and RR.
Functionally, there may be a coordinated, sequential strategy to reflexes, reactions and equilibrium responses. These three are progressively more complex and allow increasingly varied outcomes, but the progression of functional use may be the opposite from their appearance developmentally. Remember, however, when under stress, we regress. The progression would be

equilibrium responses, righting/orienting reflexes and then primitive reflex, specifically protective extension. The immediacy or speed with which the movement pattern is needed also determines the order in which they will be executed.

For example, a quick fall while ice-skating may allow the skater time to reflexively put her arm out to try to soften the landing (protective extension) as the only physical defensive movement. However, standing upright on a moving train requires continual slow postural adjustments to maintain one's balance (equilibrium responses). As the train accelerates righting/orienting reactions take over to allow the person to stay vertical. If the train suddenly and quickly slows down the primitive reflex of protective extension of the leg and/or will be rapidly elicited.

Gross Motor Developmental Sequence (of some gross motor skills)

As an infant develops the ability to achieve and maintain an upright position such as sitting, s/he develops a new relationship with gravity, the environment, and her capacity to interact relationally. (Typical motor development happens in age ranges, not at a specific age.)

Rolling—beginning of independent mobility:

3 months—begins to roll back to/from front, more incidentally than purposefully

4-6 months—intentional rolling with immature movement patterns. This may correspond with the beginning of Separation/Individuation stages of psychological development called.

6-8 months—mature segmental pattern of rolling with intention and purpose

Crawling (on belly) and Creeping (on all fours) {I know, this sounds backward but it is the accepted conventional lingo}

By 6-8 months purposeful, functional creeping allows independent mobility

Walking—development of the ability to move toward and away from others. Achievement of independent ambulation coincides with the rapprochement and object permanence phases of psychological development.

6 months—bares full weight on legs when held

7 months-may bare full weight independently when holding onto something

9 months—pull to stand and bares full weight

10 months—stands independently and cruises by holding on to something but still cannot get down to sitting independently

11 months—walks holding on to someone's hand

12 months—stands alone well and sits down independently
13 months—walks without support
14 months—steps off 1 step
18 months—runs without falling and climbs down steps. This may coincide with the beginning of autonomy stage of development.

Hopping, Skipping and Running all develop after walking, between 18 and 36 months.

Bowel and Bladder control typically develop between 2 and 3 years old and coincide with autonomy stage of development. It is the first gross motor skill that requires maintaining control, holding it in and releasing at appropriate times.

Part 2:

Functional Relationship of Primitive Reflexes, Righting Reactions with Survival Responses

PR, RR and ER underlie, support and allow the more complex movement for survival defensive responses, attachment, and intimacy. As I suggested earlier, there may be specificity of these relationships if we look at PR and RR through a functional lens of survival.

I. Orienting allow a person to the ability to scan the environment visually, auditorily or with olfaction (smelling). Orienting requires the ability to move the eyes across the visual field, turn the head and neck, raise the head and hear clearly. Bonding and Attachment require these same abilities.

Underlying Orienting: Defensive Orienting, Exploratory Orienting and Bonding/Attachment

Labyrinthine Head Righting
Optical Righting
Body Righting acting on Body or Head
Landau righting
Oral rooting (exploratory and bonding/attachment)
Nuzzling or Neck Mobility Reflex (Exploratory and bonding/attachment)

Startle Reflex

II. Boundaries provide semi-permeable access to one's body, sense of self and spirit. They allow for healthy connection and attachment with others. Like the membrane of a cell, some from outside can enter and some from inside can exit. All touch and tactile sensations provide the building blocks for development of healthy boundaries. (2)

Underlying Boundaries and Bonding

Moro Reflex (bonding)
Asymmetrical Tonic Neck Reflex (ATNR) (boundaries)
Reverse ATNR (hand to mouth)
Pull to sit/pull to stand (bonding)
Palmer Grasp (bonding)

III. Survival Defensive Responses of Flight and Fight require the ability to mobilize one's extremities and stabilize one's trunk or torso simultaneously.

Underlying Flight and Fight
Flexor Withdrawal (both)
Negative Support Reflex (flight)
Extensor Thrust (fight)
Crossed Extension (flight)
Positive Support (both)
Spontaneous Stepping (flight)
Placing Reflex (flight)
Tonic Lumbar Reflex} flight
Lumbar Reach Reflex} "
Asymmetrical Tonic Neck Reflex (ATNR) (fight)
Protective Extension of arms and legs—defense against a fall (fight)

IV. Other Postural Tone Reflexes (provides core stability upon which the extremities can mobilize)

Gallant Reflex
Amphibian (abdominal) Reflex
Anal Rooting Reflex

Part 3:

How to Elicit Primitive Reflexes and Righting Reactions

Name of Reflex or Reaction	Stimulus to Elicit	Movement Outcome	Function
Righting/Orienting Reactions			
Labyrinthine Head Righting	infant is held vertically and tilted off center with eyes covered	infant will maintain head in upright in relation to gravity	underlies the ability to lift the head and rise to vertical since the body follow the head in movement
· Optical Righting	infant is held vertically and tilted off center with eyes uncovered	infant will maintain the head in vertical due to visual information and gravity	underlies orienting
· Body Righting acting on Body or Head	infant's body contacts a supporting surface	the infant will lift its head away from the surface	underlies the ability to protect the head and maintain the alignment of the trunk and head
Landau Righting	the infant is suspended in horizontally (prone)	total body extension with head in vertical (airplane)	underlies the ability to protect the head and maintain the trunk and head in alignment or oriented with each other
Oral rooting	light touch or stroke along the side of the infant's mouth	infant will turn its mouth toward the touch	underlies bonding and exploratory orienting, searching with ears, eyes and nose
Nuzzling or neck Mobility Reflex	touching the infant's neck lightly	the infant will move its head toward or away from the direction of touch	underlies head righting/orienting and bonding

·**Startle Reflex**	a sudden, unexpected introduction of novel stimulus such as a loud noise	arrest of movement, constriction of the pelvic floor, inhalation, constricting of the tongue, raising of arms and shoulders, opening of the chest	underlies initial defensive/prepatory orienting
Boundaries/Bonding and Attachment			
Moro Reflex (2 part startle)	held in slightly backward reclined position infant is quickly lowered backward causing a change in head position in relationship to the trunk	arrest of movement, constriction of the pelvic floor, inhalation, constricting of the tongue, raising of arms and shoulders, opening of the chest followed by flexion of the trunk, lowering or arms and crossing them in front of the body, relaxation of the pelvic floor and tongue, exhalation and crying	underlies boding/social engagement and attachment after a startle
Asymmetrical Tonic Neck Reflex (ATNR)	rotation of the head left or right	arm and leg on the face side extend while arm and leg on occiput side flex	underlies pushing away (fight), boundary development and hand-eye coordination
Reverse ATNR	rotation of the head left or right	arm and leg on face side flex while arm and leg on occiput side extend	underlies hand-eye coordination and boundary development
Pull-To-Sit/Stand	while infant is on her back gently pull up by hands	infant will reflexively put to sitting or standing position	underlies the ability to bring body into upright position (orienting?) and toward another person

Palmer Grasp	place a finger or object in the infant's palm	infant will involuntarily grasp. Attempting to remove the finger or object will elicit a tighter grasp	Underlies the ability to hold on
Survival/Defensive Responses (Flight or Fight)			
Flexor Withdrawal	light touch on the palm of the hand or sole of the foot	withdrawal of the extremity touched	Underlies pulling away from danger; flight inward and may be involved with underlying running
Negative Support	hold infant in standing and bounce gently on soles of feet, then lift off the supporting surface	increase flexion tone of the legs	underlies flight
Extensor Thrust	touching the sole of the foot or palm of the hand	pushing/extension of the leg or arm touched	underlies flight (running) and fight (kicking or pushing away)
Crossed Extension (combination of flexor withdrawal and extensor thrust)	one of the infant's legs or arms is flexed and the opposite one is extended, and someone else passively flexes the extended leg or arm	the initially flexed leg or arm will extend	underlies alternate flexion and extension (reciprocal movement) of the legs and arms and is a precursor for asymmetrical movement for flight)
Positive Support	infant is held in standing with feet in contact with the floor, or infant is held upside down with palms in contact with the floor	increased extension tone of the legs or arms, respectively	underlies pushing off to run (flight) or push away (fight), or to stand one's ground (fight or boundaries)

Spontaneous Stepping	infant is held vertically and inclined or moved slightly forward to displace the center of weight	alternate flexion and extension of the legs	underlies reciprocal movement of the legs for flight
Placing	while the infant is held upright the top of the foot is touched to the edge of a table	the infant's hip and knee will flex and the foot is withdrawn	underlies the ability to run or pull away from danger
Tonic Lumbar Reflex *	the infant's chest in rotated	the chest side arm is flexed and leg is extended	*Taken together the lumbar reflexes underlie crossing of mid-line, reciprocal movements and flight
Lumbar Reach Reflex *	the chest is rotated	the chest side arm is extended and leg is flexed	* see above box
Protective Extension (arms)	center of gravity is quickly displaced beyond head righting reflex and equilibrium response, or infant is quickly dipped head first from upright toward floor while held	arms reach out	fight or physical defense against the impact of a fall
Protective Extension (legs)--also called Downward Parachute	while held upright/vertical the infant is quickly lowered toward the ground	extension of the legs	fight or physical defense against the impact of a fall
Postural Tone Reflexes			
Gallant Reflex **	infant is prone and lightly stroked along the lumbar spine	stroked along the spine on one side results in side bending to that side; stroked along both sides simultaneously results in extension	**taken together these three reflexes underlie the ability to stabilize the trunk for all movements or orienting, flight and fight

		of the lumbar spine	
Amphibian (abdominal) Reflex **	infant is supine and lightly stroked along the umbilicus	stroked along one side results in side bending of the lumbar spine; stroked along both sides simultaneously results in flexion of the lumbar spine or trunk	** see above box
Anal Rooting **	light touch around the anus	movement of the tail and lumbar spine toward the touch	** see above box

- **These reflexes are present as reflexes throughout life**

1. Stark Smith, Nancy. An interview published in "The ABC's of Movement: Primitive Reflexes, Righting Reactions and Equilibrium Responses," by Bonnie Bainbridge Cohen's book, Sensing, Feeling, Action, The Experiential Anatomy of Body-Mind Centering. Contact Editions, 1993.

2. Krueger, D, Body Self and Psychological Self: A Developmental and Clinical Integration of Disorders of the Self. Bruner/Mazel Publishers, 1989