جَـامعة
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MANARA UNIVERSITY

ATNR

What Is the Asymmetrical Tonic Neck Reflex (ATNR)?

- The Asymmetrical Tonic Neck Reflex (ATNR) is a primitive reflex pattern, typically emerging in utero (at approximately 18 weeks) that is fully present at birth and integrates at approximately six months after birth.
- It is an involuntary reaction in response to the head turning to the right or left .
- At the beginning of the infant's life, the head may turn from side to side reflexively, but, as the infant develops and grows, he/she will begin to respond to sensory stimuli, such as touch, sound, or sight. These sensory stimuli can initiate the head turning to the side, triggering the ATNR pattern.
- Sensory stimuli that may cause the head to turn include:
- sound (auditory),
- light (vision),
- touch (tactile).

- **The Asymmetrical Tonic Neck Reflex becomes triggered when the head turns to the right or to the left**

Image #1: The Asymmetrical Tonic Neck Reflex Pattern

Motor responses include:

- extension of the arm and leg that the head turns toward
- and flexing of the opposite arm and leg from which the head turns away.

Additional physical responses include the following:

- the ear (auditory) and the eye (sight), the head turns toward, become acutely focused.
- the ear (auditory) and the eye (sight), the head turns away from, become slightly dormant.
- the vestibular system, located in the inner ear, which affects balance and orientation, will be influenced by the movement of the head.

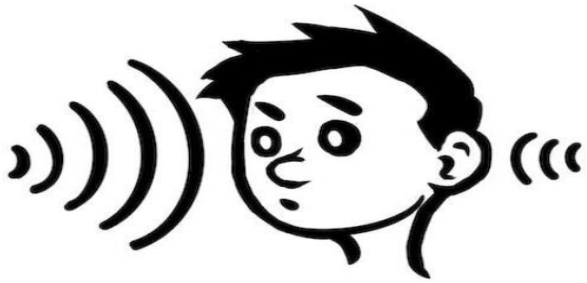

Image #2: The ear and the eye the head turns toward become acutely focused.

BENEFITS OF THE ASYMMETRICAL TONIC NECK REFLEX (ATNR)

- The Asymmetrical Tonic Neck Reflex (ATNR), also known as *the learning reflex* , is an essential reflex pattern which directly and indirectly affects early life experiences and developmental skills.
- **Birthing Process**
- The ATNR is a primitive reflex pattern that emerges in utero and is present during birth. For example, the kicking movement pattern, which resembles the ATNR, is frequently observed in utero through ultrasound. During the birthing stage, the ATNR prepares the infant for transitional movement through the birth canal and, in conjunction with other primitive reflexes, assists in passing through the birth canal.

Crossing Midline

- Crossing midline is the body's ability to cross the middle of the body to reach the opposite side, which includes using the arms, legs, vision (sight), hearing (auditory), and vestibular system.
- Crossing the midline is essential to the development of movement coordination, spatial awareness, cognitive development, and brain development of a child.
- When performing a movement task that requires both parts of the body to move together, the right and left sides of the body need to cross the midline to coordinate a movement pattern, such as crawling, walking, brushing teeth, dressing, combing hair, reading, writing, sports, and more. The right and left sides of the brain have to communicate well to organize and coordinate a specific movement.
- When primitive reflexes are retained, there will be a lag in movement, delayed responses, confusion, or inability to perform the task entirely.
- The Asymmetrical Tonic Neck Reflex (ATNR) also influences the coordination of the left and right hemispheres of the brain, and the development of one-side dominance (think right- or left-handedness). Oneside dominance is critical for motor learning and the ability to take actions without concentrating on them (called "automaticity"). Without automaticity, movements must be consciously executed making them cumbersome and tiring. For example, if there is lack of one-side dominance, a child may continuously switch hands when writing, relying on conscious memory for letter formation. In this way, the child will spend additional time relearning letter formation rather than understanding what he or she is writing. Failure to develop one-side dominance can also lead to fatigue, lack of focus, lack of language fluency, and frustration.

Visual Skills

- The **visual perceptual skill** is the brain's ability to understand what the eyes see and interpret it appropriately, including depth, figure-ground (distinguishing objects from the background), location, visual closure (recognizing a familiar object when it is partially obscured), and more.
- **Visual acuity** is the eye's ability to see clearly. Note that a person can have high visual acuity (i.e., 20/20 vision) and still have difficulty with visual perception.
- **Visual fixation** is the eye's ability to maintain gaze on an object for an extended period of time. Visual fixation is the first critical skill to develop before more advanced visual skills. Once the eyes can fixate, they can learn to track a moving target. There are two visual tracking skills: smooth pursuit and saccade.

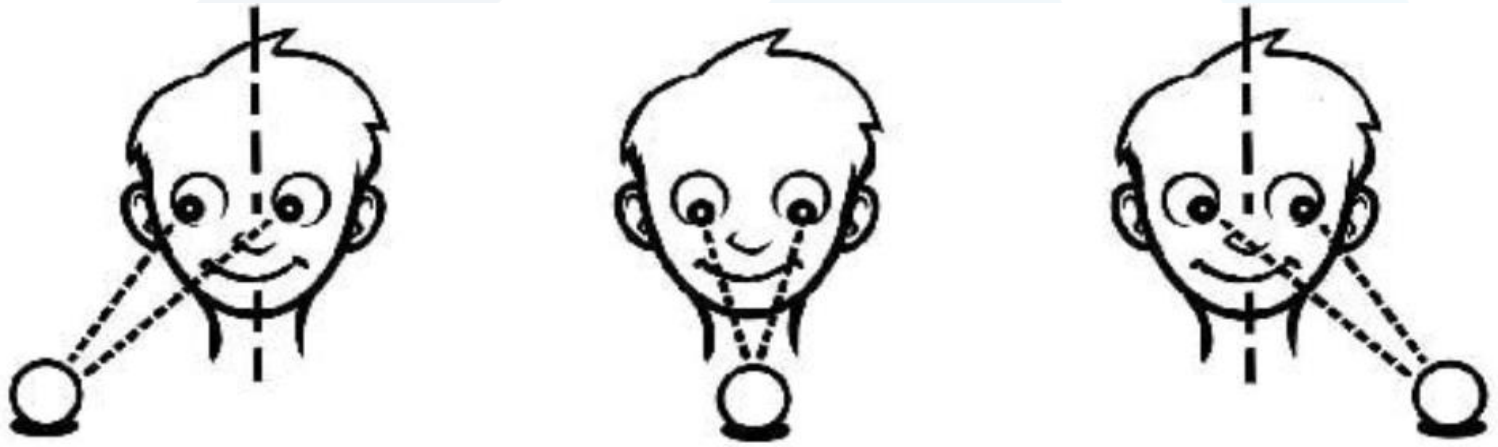

Image #3: Visual fixation and visual tracking

Visual Skills

- **Binocular vision** is the ability to move and use both eyes equally and effectively. When binocular vision is poor, it can cause disorders such as amblyopia (also known as “lazy eye” with one eye having less acuity) and strabismus (crossed or misaligned eye).
- **Saccade** is the eye’s ability to accurately jump back and forth between targets.
- **Smooth pursuit** is the eye’s ability to smoothly and accurately track a moving object or line. For instance, while copying from a whiteboard, the eyes need to follow a straight line (*smooth pursuit*) to read what is on the board and look down quickly from the board to the paper without losing their place (*saccade*). Similarly, when we read our eyes follow a straight line (*smooth pursuit*) from left to right, then quickly jump to the second line of the first letter on the left side (*saccade*). During this process, both eyes have to cross the midline and work together .

Auditory Skills

- **Auditory figure-ground** is the ability to hear specific sounds in a noisy environment. For example: your child will be able to respond to your call amid all the noise at the playground or while watching TV.
- **Auditory localization** is the ability to perceive and locate from where a sound is coming. For example: the child can turn toward the sound and locate the source.

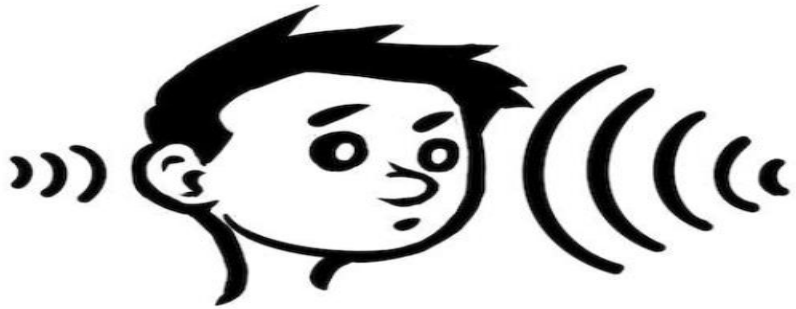

Image #4: Child turns head toward a source of sound.

- **Binaural hearing** is the ability to hear with both ears equally, and **receptive language** refers to the ability to understand and interpret sounds, words, and sentences accurately.

Vestibular Skills

- The **vestibular system** is a sensory organ, located in the inner ear . It is located in both the right and left inner ears, and gives feedback to the brain regarding the head position, motion, balance, posture, and spatial relation. Similar to the visual and auditory system, any reflex pattern that moves the head, including the ATNR, affects the vestibular system.

Image #5: Location of the vestibular system

BENEFITS OF THE ASYMMETRICAL TONIC NECK REFLEX (ATNR)

- The Asymmetrical Tonic Neck Reflex (ATNR), also known as *the learning reflex* , is an essential reflex pattern which directly and indirectly affects early life experiences and developmental skills.
- assists with the birthing process;
- assists with reaching and exploration;
- influences auditory processing skills (hearing), such as depth, distance, localization, and figure-ground perception;
- assists with cross-lateral movements in early development, such as rolling, creeping, crawling, and walking;
- influences the visual skills (sight), such as depth perception, visual fixation, binocular vision, tracking, and more;
- helps with fine motor skills and eye-hand coordination;
- influences the vestibular system, which affects balance, spatial orientation, and posture;
- influences gross motor coordination;
- is critical for one-sided movement pattern and dominance (eye, ear, arm, and leg);

BENEFITS OF THE ASYMMETRICAL TONIC NECK REFLEX (ATNR)

- assists with speech and language development;
- assists with overall motor coordination (movement);
- enables asymmetrical-sided motor coordination between our right and left brain, and our ability to cross the midline of the body and coordinate both parts of the body to perform a functional task (known as “right- and left-side discrimination”); and
- allows development of other reflexes, such as the Symmetrical Tonic Neck Reflex (STNR), also known as a learning reflex. The STNR contributes to the organization and perception of the binocular vision and binaural hearing.

RETAINED ASYMMETRICAL TONIC NECK REFLEX(ATNR): SIGNS, SYMPTOMS, AND BEHAVIORS

When the ATNR is active (retained) in the body past the integration stage, it creates a host of issues in the child's *fine motor and gross motor development, auditory processing, visual, vestibular, focus, and attention skills.*

Signs and Symptoms of a Retained Asymmetrical Tonic Neck Reflex (ATNR)

- **Gross motor challenges**, such as:
  - difficulty rolling; difficulty crawling;
  - lack of balance, instability; lack of coordination;
  - challenges with crossing the midline;
  - difficulty following multiple step movement instructions; problems and frustrations with sports;
  - may appear clumsy (e.g., constantly dropping objects);
  - mixed laterality: does not have a right- or left-side dominance (eye, ear, foot, and hand);
  - the body might look robotic when running or crawling. Instead of the opposite arms and legs coordinating for a smooth movement pattern, the right arm and leg move together and vice versa .

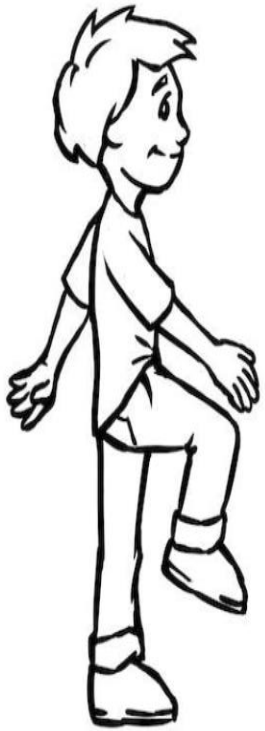

Image #6: Robotic movement pattern: one-sided movement (e.g., right leg and arm move together and vice versa when running)

Image #7: Cross-lateral, oppositional movement; opposite sides moving in unison

- **Fine motor skills challenges**, such as:
  - challenges with eye-hand coordination;
  - inability to coordinate both hands in unison to perform a task;
- **handwriting difficulties**:
  - presses hard on the paper, rips paper, and has difficulty erasing mistakes. Every time the child crosses the midline, there might be a slight opening of the hand. Most children accommodate by holding their pencil firmly and pressing hard, seldom breaking pencils.
  - hands cramp up and fatigue easily; loses place on the page;
  - possibly develops an adverse behavioral reaction to handwriting;
- **mixed laterality**: no right- or left-side dominance (eye, ear, foot, and hand).
- **Poor speech production**

- **Visual skills challenges**, such as:
  - difficulty/challenges with binocular vision;
  - difficulty with spelling and reading skills (e.g., Dyslexic tendencies); poor visual-motor skills (e.g., handwriting, dressing, feeding, etc.); poor ability to copy from paper or a whiteboard;
  - difficulty with visual tracking; unable to follow a moving target; may complain of fatigue and losing place when reading;
  - Dyscalculia (challenges with math)
- **Auditory skills challenges**, such as:
  - difficulty localizing sound; may have a hard time understanding from where a sound is coming;
  - difficulty tuning out background sounds; easily distracted;
  - difficulty following or remembering multiple verbal instructions; may pick up only the last one or two instructions and miss what was said first;
  - appearing easily distracted or “tuned out.”

- **Attention and concentration challenges**, such as:
  - poor speech and language development,
  - difficulty with concentration and attention,
  - lack of focus and attention (Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD) tendencies).

Screen 1: Standing Head Turn with Straight Arms

- 1. Have the child stand up straight, and raise both arms in front of them to shoulder heigl
- 2. Instruct the child to keep elbows straight as much as possible.
- 3. Stand behind the child and gently turn the head to the right.
- 4. Notice what the rest of the body does.
- 5. Ask the child to hold the head position for a few seconds while you
- observe.
- 6. Repeat on the other side.

GOAL

- 1. Elbows, shoulders, hips, and knees are able to remain straight while
- the head moves to one side.

OBSERVATION AND SIGNS OF ATNR RETENTION

- The elbow the head turns away from bends.
- The knee the head turns away from bends.
- The entire body moves with the direction of the head

Screen 2: Zombie Marching in Place

- 1. Raise both arms to shoulder height with the head turned to the left, while marching in place.

- 2. Ask the child to keep arms and elbows straight as much as possible.

- 3. Repeat on the other side.

GOALS

- 1. Elbows are able to stay straight.
- 2. The child is able to lift both knees to the same height.

OBSERVATION AND SIGNS OF ATNR RETENTION

- Child has difficulty keeping the arms straight the entire time.
- The elbow the head turns away from bends.
- Child is unable to bring both knees up to the same height.
- The body shifts with the direction of the head.

Screen 3: Head Turns on All 4s

1. Have the child get down on all fours (hands and knees) with elbows straight, maintaining a “tabletop” position.

2. As much as possible, the child’s head should be parallel to the floor and not dropping or extending so as not to trigger another reflex pattern.

3. Gently hold the child’s head, and slightly turn it to the left or the right.

4. Observe the body, specifically the elbows.

5. Repeat on the other side.

GOALS

- 1. The child is able to move the head without moving any part of the body.
- 2. Elbows, shoulders, hips, and knees are able to remain still.

OBSERVATION AND SIGNS OF ATNR RETENTION

- The elbow the head turns away from bends.
- The entire body shifts or turns toward the direction of the head.
- The child is unable to maintain balance and stability.
- **Self-initiated head turn**
- Now, ask the child to keep the elbows as straight as possible while turning (self initiating) the head from side to side.

OBSERVATIONS

- Check to see if one side is more challenging than the other.
- Check if the child can self-correct when the body is moving.

B. ACCOMMODATIONS

- A child with a retained ATNR may have delayed verbal and visual responses. For a classroom or workstation, choose one or more of the following accommodations to meet the child's needs:

1. Position the child in front of the classroom board.
2. Place materials to copy on the child's desk to minimize head-turning during copying.
3. Break down verbal instruction:

a. Provide written instruction for review.

b. Have the child repeat the first instruction before adding additional instructions.

4. For movement activities, accommodate right- and left-side confusion by providing the following:

a. visual cues to help differentiate the right and left sides of the body,

b. a picture or video to imitate,

c. a breakdown of the steps.

5. Provide movement breaks from the exercises described in this book to help promote ATNR integration.
6. Do not force games and sports; the child may not be ready for advanced movements without breaking down the steps.
7. If reading is difficult, try the following strategies:

a. Have the child track letters with fingers.

b. Use a ruler or visual cues under the line the child is reading.

c. Cover all text except the line being read.