Ayres’ Clinical Observations Handbook
Ayres’ Clinical Observation

For administration of all items, the items are demonstrated first, using the method described and then the tester says,

1. “Do this” or “Copy me” with related prompts eg Prone Extension “Can you count for me” or Schilder’s Arm extension “Hold it there”.

   If the person struggles do it once more with only minimal verbal prompting – “Try again” or “Have another go”

2. Only then, do you use hand over hand or place the body parts eg Prone Extension and Diadokokinesis practice to allow the person to make an attempt.

3. Verbal instructions or prompting happen only after first failed attempts with copying and hand over hand - as these are not tests of Praxis on Verbal Command.

If hand over hand or verbal prompting is required, the person cannot score a full score of 3 and this must be noted.

Adapted from Observations Based on Sensory Integration Theory
Erna Imperatore Blanche
Pediatric Therapy Network, 2010
Diadokokinesis – Alternation forearms

Description
The ability to copy the examiner in rapid, repetitive forearm rotations with each arm individually, then with both arms at the same time

Administrative and Observational Guidelines
Smoothness and fluidity of the movement
Number of rotations alternating between pronation and supination
Bilateral coordination when both arms rotate simultaneously

Normative and Developmental Guidelines
Kindergartners generally perform 2 to 4 rotations in 10 secs (Dunn 1981). Skill matures 7-8 years (Levine 1980). Score included in COMPS (Wilson 2000) for children age 5 years to 15 years 11m

Interpretation
Traditionally considered a test of cerebellar integrity. This measure can be an indicator of motor planning, sequencing and processing of somatosensory information.

Scale
3 - Typical - smooth, controlled complete rotation at correct speed
2 - Probable difference - slightly irregular speed and quality, mild lack of control but complete rotation
1 - Definite difference - significantly irregular, poor control or incomplete rotation
Finger Thumb

Description
The ability to sequentially oppose the thumb to each of the other fingers, index to little finger and back

Administrative and Observational Guidelines
Observe:
- Fluidity of movement
- Timing and sequencing
- Ability to move the fingers independently from each other, from the rest of the hand and from the upper extremity

Normative and Developmental Guidelines
Infants develop the ability to touch the thumb to the index finger in a pincer grasp within the 1st year of life (Exner 2001). Isolate finger movements are difficult for children less than 3 years of age. A significant increase in hand function occurs between 3 and 6 years of age (Penhoski 1995). Increase in ability 5 to 7 years but plateaus age 8 (Denkla1973,74)

Interpretation
Traditionally considered a test of cerebellar function, this activity is also used to assess somatosensory processing needed to isolate finger movements for sequencing that is required for motor planning

Scale
3 - Typical - smooth co-ordinated movement in the correct sequence
2 - Probable difference – slightly irregular movement with some hesitancy but maintaining sequence
1 - Definite difference – problems with sequence flow and or isolation of movement.
Finger Nose

Description
The ability to copy the examiner in the action of bringing and extended index finger from a position of lateral arm extension to the tip of the nose by flexing the arm towards the face.

Administrative and Observational Guidelines
Observe:
- fluidity and smoothness of movement
- right/left differences in action
Associated movement of the head and trunk

Normative and Developmental Guidelines
Five year old children are expected to touch within 1cm of tip of nose without looking (Dunn 1981). By 7 years should not miss contact with either nose or finger more than once (Towen 1979). Included in COMPS. Miller Assessment for Preschoolers (MAP) (Miller 1998) included normative data 2 to 5 years.

Interpretation
Traditionally a measure of cerebellar integrity. This task also assess the ability to process somatosensory information and to copy simple actions that involve motor planning

Scale
3 - Typical smooth co-ordinated movement with accurate localisation within 1cm
2 - Probable difference – slightly irregular movement with some hesitancy or insistency with locating target within 3cm
1 - Definite difference – problems with sequence, flow and pronounced difficulty locating target and/or peeking
Ramp Arm Movements

Description
The ability to copy the examiner move from flexion to abducted extension and back to flexion onto shoulders in a smooth and graded manner.

Administrative and Observational Guidelines
Observe:
- fluidity and smoothness of movement
  - right/left differences in action
  - Associated movement including of the head and trunk
Side flexion

Normative and Developmental Guidelines
Five year old movement should be smooth accurate and symmetrical though speed may vary. Neurodevelopmental base involves integration of postural responses plus: - insufficient feedback from proprioceptive system. Cerebellum and basal ganglia Integration of bilateral processing (corpus callosum and or other levels of decussation)

Interpretation
Requires gradual co-ordinated modulated movement difficulty may reflect proprioceptive problems and poor co-ordination. May indicate poor motor planning ability. Asymmetry may indicate limited bilateral integration

Scale
3 - Typical smooth slow symmetrical co-ordinated movement in correct time between 12 and 16 seconds
2 - Probable difference – slightly irregular and or mild asymmetry
1 - Definite difference – jerky and irregular, too fast or too slow, poorly sustained or asymmetrical
Visual Pursuits – Smooth

Description
The ability to use the eyes in a coordinated manner. Automatic eye movements occur in response to the coordination of the two eyes relative to the position and movement of the head in space.

Administrative and Observational Guidelines
Observe:
- Ability to move both eyes together
- Smooth movement of the eyes across midline
- Convergence and divergence
- Ability to stabilize the eyes
- Fluidity of bilateral ocular movement

Normative and Developmental Guidelines
The ability to coordinate the eyes moving together is typically attained by 2 – 6 months (Erdhart 1986).

Interpretation
Automatic eye movements are related to visual, vestibular and proprioceptive function. Stabilizing the eye during head and body movement requires dynamic postural control.

Scale
3 - Typical smooth pursuit in all directions, well disassociated from head movements
2 - Probable difference – mildly irregular movement, occasional midline avoidance and or some eye/head dissociation difficulty
1 - Definite difference – significantly irregular movement, clear midline avoidance and/or inability to dissociate from head movement.
Visual Pursuits – Rapid Localisation

Description
The ability to use the eyes in a coordinated manner. Consciously directed eye movements include general pursuits, saccades and quick localization.

Administrative and Observational Guidelines
1. Move target horizontally, vertically and diagonally.
   Observe:
   - Measure visual focus on the target
   - Moving eyes smoothly, efficiently and planning the coordination of eye movements with head and neck mvt.

2. Target still head moving horizontally and vertically.
   Observe:
   - Stabilize the eyes while moving the head
   Moving the eyes and head independently
   Moving the eyes smoothly
   Coordinating both eyes together

Normative and Developmental Guidelines
5yr olds expected to perform in smooth and coordinated way (Dunn 1981)
The ability to maintain a stable field while the head is passively moved is typically attained by 6 to 8 moth(Erdhart 1986)

Interpretation
Smooth eye movements while localizing a moving target requires visually mediated ocular control. It depends on a stable posture, adequate head control, and the ability to tolerate visual movement. Visual searching and quick localization requires ocular motor planning. Active mvt of the head while maintaining a stable visual field requires vest-prop processing and post stability.
Eye-head-hand co-ordination required by the MAC

Scale
3 - Typical quick accurate localisation
2 - Probable difference – some difficulty or inconsistency in locating the target
1 - Definite difference – pronounced difficulty in locating target
Schilder’s Arm Extension 1 & 2

Description
Schilder’s Arm Extension 1:
The person stands with arms in extension at shoulder height and on closing eyes attempts to maintain the position.
‘Stay like this, now close your eyes – try to stay the same’

Schilder’s Arm Extension 2:
The person’s head is passively moved while the arms are maintained in a forward extended position with eyes closed

Administrative and Observational Guidelines
Observe:
- ability to maintain the arms in an extended forward position with eyes closed

Note:
- Whether head can be moved easily
- Tremors or writhing of the hand or fingers
- Shoulder stability
- Segmentation of head, neck and trunk movement
- Differences between r and l upper extremity in maintaining the position
- Balance with eyes closed

Normative and Developmental Guidelines
Among 5 yr olds, 84% are able to maintain their arms in position with their eyes closed. Normal behaviours include rotating upper trunk and arms as much as 45 degrees towards the side of the head being turned (Dunn 1981)

Interpretation
This measure is traditionally considered a neurological test of cerebellar integrity. In SI theory, the ability to disassociate the head from the upper extremities has been related to vestibular proprioceptive processing.

Scale
3 - Typical no deviation from original arm position, no involuntary movement
2 - Probable difference – slight changes in arm position and/or minimal finger movement
1 - Definite difference – significant changes in arm position and/or clear involuntary movement
Supine Flexion

Description
Total body flexion specifically when lying on back

Administrative and Observational Guidelines
Observe:
- Ability to assume the position, including whether or not the flexion of the upper and lower body occur simultaneously
Note:
- quality of joint contraction
- length of time that the person can maintain the flexed position
- whether or not the person uses other strategies for maintaining the position, such as trying to stabilize with other parts of the body

Normative and Developmental Guidelines

<table>
<thead>
<tr>
<th>Age</th>
<th>Means</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>37</td>
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<td>7</td>
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<td>4</td>
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<tr>
<td>8</td>
<td>104</td>
<td>67</td>
</tr>
</tbody>
</table>

(Frazer 1983)
This observation is included score for in a total COMPS and the MAP

Interpretation
In SI theory, the flexor pattern has been associated with somatosensory processing. Fisher (1991) found this posture (esp the position of the neck) to be ass with somatodyspraxia. Performance on this observation may also be related to tactile/prop discrimination as well as motor planning. Particularly difficulty with neck flexion in the supine position maybe also related to a postural problem

Scale
3 - Typical holds complete flexion with moderate exertion or against slight resistance
2 - Probable difference – holds position with great exertion or unable to hold against resistance
1 - Definite difference – unable to assume or hold posture
Prone Extension

Description
Ability to simultaneously lift head, arms, upper trunk, and extended legs up against gravity from the prone lying position. Assess lying on stomach.

Administrative and Observational Guidelines
Observe:
- Ability to assume the position
- Length of time the position is maintained
- Ability to hold oneself against resistance
  - Quality of extension in the head and shoulder girdle
  - If and how much the upper torso and thighs are off the ground

Note:
Whether or not the person can sustain extension of the entire body

Normative and Developmental Guidelines
Age Range  Mean SD
4  0-30  18.15  13
6  0-30  28.93  6
8  30  30  0

In normative studies 8yr olds able to maintain 30s (Bowman 1984, Gregory-Flock1984, Harris 1981). Included in COMPS. Dunn 1981found does not discriminate well among 5 year olds

Interpretation
In SI Theory prone extension is associated with vestibular function and is often considered in conjunction with other measures of vestibular proprioceptive function. Ability to assume antigravity positions may also be related to motor planning. The inability to assume and maintain tonic postural extension against gravity is one indicator of postural occular movement disorder (Fisher 1991, Ayres1972)

Scale
3 - Typical holds maintains complete extended position with moderate exertion
2 - Probable difference – holds good position with great exertion - eg grimacing, inability to count, decreased hip extension, increased knee flexion, head and or arm lowering, excess shoulder extension
1 - Definite difference – cannot achieve or hold position at all
Equilibrium Reactions including Righting reactions

**Description**

Postural control inc the ability to regulate the body’s position in space for the dual purpose of stability and orientation. Dynamic postural reactions are part of postural control

Reactive Postural Control response to an externally imposed force, such as the postural response when the surface on which the person is sitting on is moved.

Anticipatory Postural Control when a movement is self-initiated, such as when reaching for a toy or catching a ball.

**Administrative and Observational Guidelines**

When moving the supporting surface on which the person is sitting or standing, such as a large ball or balance board.

Observe:

Postural reactions
Compensatory postural adjustments made as a result of the demands of the activity. Note awareness of body position

**Normative and Developmental Guidelines**

Normative data is available for standing on one foot, kneeling and other positions (Crowe 1990). Dunn 1981 reports a range of equilibrium responses in 5 yr olds. SWB in SIPT provides normative information 4-8 years and MAP 2 – 5 years.

**Interpretation**

Equilibrium reactions contribute to postural control and may occur in response to an external imposed force (reactive) or in response to a self initiated (anticipatory) movement.

IN SI theory postural control is considered in relation to processing visual, vestibular, and proprioceptive input. Anticipatory control is dependent on the integration of vestibular and proprioceptive input

**Scale**

3 - Typical fast, automatic, appropriate degree of adjustment
2 - Probable difference – slight inconsistency in degrees and speed of adjustments
1 - Definite difference – absent or very slow; excessively exaggerated or inappropriate response.
Protective Extension – Saving Reactions/Protective stepping

Description
Extension of the extremities in response to a fall for protective purpose

Administrative and Observational Guidelines
Quickly move person forward (usually over large ball)
Observe:
- protective reaction of the arms in the direction of the fall
Note: speed and effectiveness of the person’s ability to bring the arms out in a protective motion

Normative and Developmental Guidelines
Protective extension should be fully developed by 1 yr of age (Nichols 2001)
Dunn 1981 found that most 5 yr olds were able to predictably extend arms as a protective response

Interpretation
Protective reactions depend upon processing vestibular input. Immature or poor responses maybe related to decreased vestibular functioning.
Scale
3 - Typical fast, automatic, fast efficient saving
2 - Probable difference – slight delay, but largely effective or some inconsistency
1 - Definite difference – absent, significantly delayed or inefficient
Co-contraction – Proximal Joint Stability

Description
The ability to stabilise proximal joints so that precise movement can occur in distal joints. This dynamic process requires contraction of agonistic and antagonistics around joint.

Administrative and Observational Guidelines
During weight-bearing

Observe:
- Hand adjustment
- Scapula position (winging) locking elbows and/or lordosis of trunk

Note locking of the elbows

Normative and Developmental Guidelines
Dynamic weight bearing on the upper extremities develops in the 1st year of life

Interpretation
In SI theory poor proximal joint stability in the shoulder girdle and neck area has been assoc with poor vestibular and proprioceptive processing. Poor proximal joint stability in other parts of the body may be associated with decreased muscle tone and inadequate proprioceptive processing.

Scale
3 - Typical can sustain position, showing adaption to displacement
2 - Probable difference – can obtain required position but unable to sustain it – winging of scapula
1 - Definite difference – marked difficulty, unable to resist
Gravitational Security

Description
Excessive anxiety or distress caused by inadequate modulation or inhibition of sensations that arise when the gravity receptors of the vestibular system are stimulated by head position or movement. (Ayres 1979)

Administrative and Observational Guidelines
Where feet of ground or head moves backwards
Observe:
- Level of anxiety or fear response
Note
- Extreme need to hold on during head movements to feel safe
- Differences in reactions to movement in varying directions, speed, heights and amount of active versus passive motion

Normative and Developmental Guidelines
The Gravitational Insecurity Assessment (May Benson and Koomar 2007) measures children’s performance on nine tasks, and has established norms to assess the person’s performance

Interpretation
Gravitational insecurity may be related to modulation of vestibular, proprioceptive and visual information, as well as to autonomic nervous systems function (Weisburg 1984)

Scale
3 - Typical feels comfortable and may even enjoy movement
2 - Probable difference – seems to dislike movement but tolerates it to a degree
1 - Definite difference – definite aversive response, physical or verbal
Anticipatory Postural Control

Description
Ability to formulate a plan of action by anticipating the action before the movement needed to be initiated

Administrative and Observational Guidelines
During unstructured activities such as standing and catching a ball or running to catch or kick a ball observe:
- person’s coordination, speed and accuracy of effort
- ability to anticipate and prepare his/her body for the required motor response

Normative and Developmental Guidelines
Norms are available on tasks that measure interaction with moving objects e.g. Ball using tools such as Bruninks- Oseretsky Test of motor proficiency

Interpretation
Poor anticipation of actions in motions may be related to vestibular-proprioceptive processing. It may be related to sequencing praxis when the activity involves bilateral motor co-ordination. Children with somatodyspraxia also have difficulty in this area. Many motor planning components such as sequencing and timing are involved

Scale
3 - Typical able to catch or kick ball, automatic, and smooth co-ordinated movements.
2 - Probable difference – some difficulty catching ball or drops ball or fails to kick more than once, movements appear awkward or effortful, incorrect use of force includes associated reactions, excessive movements required to catch or kick
1 - Definite difference – unable to catch ball, cannot throw ball into required space, does not respond or refuses task
Bilateral Motor Co-ordination

Description
The ability to coordinate both sides of the body during symmetrical, alternating or asymmetrical tasks

- Star Jumps/Jumping Jacks
- Reciprocal Strides – same arm same leg (marching)
- Non Reciprocal Strides Spotty Dog – different arm different leg
- Skipping

Administrative and Observational Guidelines
BMC can be formally assessed during the administration of standardised test such as BMC of SIPT or BOT2 or during unstructured tasks e.g. Swings, bikes, star jumps, cutting paper with scissors observe:
Coordination of 2 side of body, front and back of body and upper and lower parts of body. Also not
- Body awareness, postural control and praxis, depending on the difficulty and novelty of the task

Normative and Developmental Guidelines
BMC of SIPT
BOTMP

Interpretation
BMC has been associated with vestibular and/or proprioceptive deficits. Bilateral coordination and sequencing are also associated with somatodyspraxia. With older children BMC needs to be assessed in more demanding tasks.
Mailloux 2011 found association between BMC on SIPT with other measures of vestibular function

Scale
3 - Typical - fast, automatic, appropriate degree of adjustment with symmetry
2 - Probable difference – slight inconsistency in speed, rhythm and slightly irregular symmetry
1 - Definite difference – unable to perform required movements, very slow; excessively exaggerated or inappropriate response with lack of symmetry or rhythm
Responses to Sensation

Description
Response to types and intensities of sensation esp. Tactile, vestibular and proprioceptive. Ability to hold the body up against gravity, know where and how the head is positioned in space and monitor head and neck movements relative to body movement. Ability to tolerate a variety of types and intensities of touch to the skin and know the location, duration and type of stimuli.

Administrative and Observational Guidelines
1. Observe stability and mobility through movement
   - maintenance and awareness of body position
   - balance and postural adjustment
   - Response to movement and gravity
   - co-ordination of head, neck, eyes and body during mvmt.
2. Response to tactile observe
   - ability to determine where touch is applied, what shape and textures are being touched without vision
   - Tendency to explore touch using hands
Note:
- registration of touch sensation
- comfort with different kinds of tactile experience
- accuracy of tactile discrimination

Normative and Developmental Guidelines
SIPT
SPM
Sensory Profile

Interpretation
Modulation and discrimination of single and multiple sensory sources affects emotion, cognition, motor performance, attention and behaviour
Poor registration or hyporesponsiveness to vest-prop sensation. Dif holding still may still indicate hypo to the pull of gravity. Dif with postural control during mvmt may indicate dif rapidly and efficiently processing information from the vestibular system.
Poor registration or localization may indicate hypo reaction to tactile information.
Withdrawing from stimuli or excess anxiety or discomfort may indicate tactile defensiveness or modulation.

Scale
3 - Typical – Typical responses to sensation, notices but not discomfort
2 - Probable difference – some discomfort with sensation, notices but able to remain regulated
1 - Definite difference – discomfort with sensation, unable to remain regulate

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Play Preferences

Description
Play or Occupation preferences provide information about the person’s intrinsic motivation and occupational choices when not directed by adults or the environment.

Administrative and Observational Guidelines
Provide the person with opportunity to interact freely with the social and physical environment, observe:
- Choice of equipment or activity
- Person’s imagination and creativity
- Person’s playfulness

Normative and Developmental Guidelines
Knox Pre School Play Scale

Interpretation
The person’s choice can provide information about the person’s intrinsic motivation and sensory preferences. The person’s choices offer valuable information regarding ideation, motor planning skills, sensory preferences, motor and social skills.

Observations only
Praxis

Description
The ability to conceptualize, organize and execute non-habitual motor tasks (Ayres 2005, 1989)

Administrative and Observational Guidelines
Provide opportunity for engaging in novel and unfamiliar activities. Observe:
- planning, timing, imitation, sequencing, ability to transfer verbal directions into action
- amount of trial and error
- need for direction, guidance and demonstration
- avoidance of new activities

Normative and Dev. Guidelines
SIPT

Interpretation
According to SI theory, praxis has both conceptual and motor function. Good praxis skills are thought to be dependent on adequate and efficient sensory perception, especially tactile, proprioceptive and vestibular sensory processing.

Observations only
**Ayres’ Clinical Observations**

Structured Sensory Integration Clinical Observations were developed by Jean Ayres in the 1960's and updated by Blanche et al. They are routinely used to assess behaviours indicating sensory and praxis dysfunctions. They enable the OT to distinguish different subtypes of SI dysfunction, primarily in people with motor coordination difficulties. The items are quick to administer and non-invasive, they also highlight dysfunction in other areas; behavioural, cognitive and emotional responses.

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<td>Interview</td>
<td>Focusing can be hard. Remembering is easy. Writing is hard, takes long</td>
</tr>
<tr>
<td>Automatic Eye Movements</td>
<td>unremarkable</td>
</tr>
<tr>
<td>Consciously Directed Eye Movements</td>
<td>Slower than anticipated</td>
</tr>
<tr>
<td>Visual Pursuits – Smooth</td>
<td>Slower, with difficulties crossing the midline</td>
</tr>
<tr>
<td>Visual Pursuits – Rapid Localisation</td>
<td>Slower than anticipated</td>
</tr>
<tr>
<td>Schilder’s Arm Extension: 1</td>
<td>Fixes – struggles to maintain with eyes closed</td>
</tr>
<tr>
<td>Schilder’s Arm Extension: 2</td>
<td>Some Drift 90 degrees plus</td>
</tr>
<tr>
<td>Diadokokinesisa</td>
<td>Concentrates and focusses, some dysrhythmic unilateral R&gt;L</td>
</tr>
<tr>
<td>Finger Thumb</td>
<td>Slow and inaccurate – associated mouth movements</td>
</tr>
<tr>
<td>Finger Nose</td>
<td>+1cm L and R - asymmetrical</td>
</tr>
<tr>
<td>Ramp Arm Movements</td>
<td>Slow and asymmetrical - ? attention and focus R&gt;L</td>
</tr>
<tr>
<td>Supine Flexion</td>
<td>15s with effort – but strong</td>
</tr>
<tr>
<td>Prone Extension</td>
<td>3s with extreme effort – breath holding</td>
</tr>
<tr>
<td>Reactive Postural Control</td>
<td>Slower ? arousal level…? Better once moving</td>
</tr>
<tr>
<td>Anticipatory Postural Control</td>
<td>Poor anticipation</td>
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<tr>
<td>Equilibrium/Righting Reactions</td>
<td>Slow, delayed</td>
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<tr>
<td>Protective Extension UL</td>
<td>slow – ?low arousal – poor vestibular</td>
</tr>
<tr>
<td>Protective Extension LL</td>
<td>Slow - ?low arousal – poor vestibular</td>
</tr>
<tr>
<td>Proximal Joint Stability</td>
<td>?wings scapula in crawling</td>
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<tr>
<td>Gravitational Insecurity</td>
<td>? will PRN be low – likes vestibular input</td>
</tr>
<tr>
<td>Bilateral Motor Co-ordination/ Sequencing</td>
<td>Very poor in star jumps, marches and reciprocal strides – timing and sequencing a challenge</td>
</tr>
<tr>
<td>Projected Action Sequences</td>
<td>Tricky – sequences hard to time well</td>
</tr>
<tr>
<td>Responses to Sensation</td>
<td>Likes heavy touch, dislikes loud sounds and bright lights</td>
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<tr>
<td>Play Preferences</td>
<td>Low arousal and poor attention – plays alone often</td>
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<tr>
<td>Praxis</td>
<td>Sequences slow …. poor planning and tricky execution -</td>
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