

# CHOP INTEND

## Manual of Procedures



### **Testing environment:**

- Ideally test first thing in the AM or same time of day, about 1 hour after feeding, when sated and alert but not fussy.
- Test on a firm padded covered mat (ie. fabric or paper sheet)
- Clothing: in a diaper only, unless the infant is cold where you can use a sleeveless “onesie” garment.
- Test with rattle or purple hippo to encourage participation
- May use pacifier only if needed to maintain state 4 or 5 (see definition, below).
- Allow parent to be present and give rest period especially to calm the infant if upset. Aim to complete the entire test without a pause.

### **Behavioral State:**

Include a rating of Brazelton behavioral state for each test item. The optimal state for testing is state 4 and 5. If a subject cannot be tested for an item due to an adverse behavioral state, score as “CNT” (can not test) and not a zero. Directly quoted descriptions for each state from the Brazelton text (T. Berry Brazelton, Neonatal Behavioral Assessment Scale, 2<sup>nd</sup> ed. Clinics in Developmental Medicine No 88, Spastics International Medical Publications, London 1984):

**State 1 = deep sleep**

**State 2 = light sleep**

**State 3 = “drowsy or semi-dozing”**

- eyes may be open but dull and heavy-lidded or closed, eyelids fluttering. Dazed look when infant not processing information and is not “available”.
- activity level variable, with interspersed, mild startles from time to time reactive to sensory stimuli, but response often delayed. State change after stimulation frequently noted. Movements are usually smooth.

**State 4 = “alert, with bright look”**

- seems to focus invested attention on source of stimulation, such as an object to be sucked or a visual or auditory stimulus impinging stimuli may break through, but with some delay in response.
- Motor activity is at a minimum.
- There is a kind of glazed look, which can be easily broken though in this state.

**State 5 = eyes open**

- **considerable motor activity, with thrusting movements of the extremities, and even a few spontaneous startles**
- reactive to external stimulation with increase in startles or motor activity, but discrete reactions difficult to distinguish because of general activity level.
- Brief fussy vocalizations occur in this state.

**State 6 = Crying**

- Characterized by intense crying which is difficult to break through with stimulation
- Motor activity is high.

## **Testing and Scoring:**

- All items can be scored either with spontaneous movement or active movement depending on the cognitive level and age of the subject.
- Up to 3 good attempts should be made to elicit the maximum performance with either verbal encouragement or use of toys. A good attempt means adequate positioning, subject engagement and environment.
- Perform each test item in the order listed unless otherwise noted.
- Make a note in the margin of any comments about performing or scoring an item
- If in doubt in scoring between two responses, “score down”.

### **Item 1: Spontaneous movement (upper extremity)**

Start Position: This item can be observed throughout the test and can be observed in any position. An initial period of observation in supine should be completed with the child in an alert awake state.

Stimulus: The examiner may support the arm or leg and observe the hand or foot without the friction of the surface. The examiner may stroke the hand or foot to elicit a response if none is observed.

Scoring Criteria:

- Score 4 Antigravity shoulder movement (elbows off surface in supine)  
Score 3 For active antigravity elbow movement (hand and forearm off surface in supine)  
Score 2 For active wrist movement  
Score 1 For isolated finger movement  
Score 0 For no movement of limbs

Score both sides and select the maximum score for the best score.

### **Item 2: Spontaneous movement (lower extremity)**

Start Position: This item can be observed throughout the test and can be observed in any position. An initial period of observation in supine should be completed with the child in an alert awake state.

Stimulus: The examiner may support the arm or leg and observe the hand or foot without the friction of the surface. The examiner may stroke the hand or foot to elicit a response if none is observed.

Scoring Criteria:

- Score 4 Antigravity hip movement (feet and knees off surface in supine)  
Score 3 Active antigravity hip adduction/internal rotation (knees off surface in supine do not give credit if maintained only due to range of motion loss)  
Score 2 Active gravity eliminated knee/hip movement (extension and flexion in abduction and external rotation)  
Score 1 Isolated ankle movement  
Score 0 No movement of limbs

Score both sides and select the maximum score for the best score.

### Item 3: Hand Grip

Start Position: Supine with arm and forearm on the surface of testing mat and in pronation with the wrist extended.

Stimulus: Place your “pinkie” (or a toy of the same diameter for infants without a grasp reflex) in the infant’s hand until a grip response is secure, then slowly lift the arm and hand, creating traction on the arm at 90<sup>0</sup> to the support surface, then continue to draw shoulder off the mat. Record score when the child loses grip. May repeat 3 times to make sure the child’s best effort is obtained. Repeat for the other arm. Provide verbal encouragement for older infants.

#### Scoring Criteria:

- Score 4 Maintains handgrip with shoulder off bed
- Score 3 Maintains grip with elbow just off bed but shoulder on surface
- Score 2 Maintains grip with forearm off surface but elbow still supported
- Score 1 Maintains grip only with no traction
- Score 0 No grip or rattle or pen slips out

Score both sides and select the maximum score for the best score



### Item 4: Head in midline

Start Position: Supine head midline

Stimulus: Visual stimulation with a bright object at midline. If the infant maintains midline for 5 seconds then turn the infant’s head 90 degrees to the right and provide visual stimulation to encourage return to midline, then repeat to the left. Note: If the infant’s head cannot be turned passively at least 60 degrees off midline, due to a neck contracture, then this side cannot be tested and should be indicated as “CNT” (Can Not Test) on the source and scanning sheet.

#### Scoring Criteria:

- Score 4 Rotates from 90<sup>0</sup> back fully to midline
- Score 3 Actively turns head part way from 90<sup>0</sup> towards midline
- Score 2: Maintains head within 15<sup>0</sup> of midline for 5 or more sec.
- Score 1: Maintains within 15<sup>0</sup> of midline for less than 5 sec.
- Score 0 Head falls to side and no attempt to regain midline is noted

Score both sides and select the maximum score for the best score.



### **Item 5: Hip adductors**

Start Position: Supine, with hips at 45<sup>0</sup>, knees at 90<sup>0</sup>, feet hip width apart, remove diaper. Can remove sheet or paper beneath feet to allow a non-slip surface.

Stimulus: Position legs in neutral with thighs parallel and release; observe response of legs. A downward stimulus may be included to elicit movement. Avoid squeezing knees together.

Scoring Criteria:

Score 4 Maintains knee off surface of bed more than 5 sec. or lifts feet off surface

Score 2 Keeps knee off surface of bed 1 to 5 seconds

Score 0 No attempt to maintain knees off surface

Score both sides and select the maximum score for the best score.

*Note: may score item based on regaining adducted position and maintaining for prescribed time after a fall to the surface or maintaining adduction.*



### **Item 6: Rolling: elicited from the legs**

Start Position: Supine arms at sides

Stimulus: Holding infant's lower thigh, flex hip and knee and adduct across midline of the body to stimulate rolling. Pause with hips at 90<sup>0</sup> to surface to allow infant to attempt to derotate body against the fixed distal leg, continue to maintain tension on the leg as the infant derotates the upper body against it.

If the infant rolls to side continue to apply traction at diagonal to body to maintain tension on the leg. Do not passively pull the child across to prone but observe the active de-rotation of the trunk against the stabilized lower extremity with the hips vertical and then the head control and ability to clear the weight bearing shoulder as the child rolls to prone and frees the arm and brings the head across the arm.

Scoring Criteria:

Score 4 When traction is applied at the end of the maneuver, rolls to prone with lateral head righting

Score 3 Rolls through side lying into prone without lateral head righting (clears weight bearing arm completely to finish roll)

Score 2 Pelvis, trunk and arm lift from support surface, head turns and rolls onto side (arm comes through to front of body)

- Score 1 Pelvis and trunk lift from support surface and head turns to side. Arm remains behind trunk  
 Score 0 Pelvis lifted passively off support surface with no active participation  
*Score both sides and select the maximum score for the best score.*



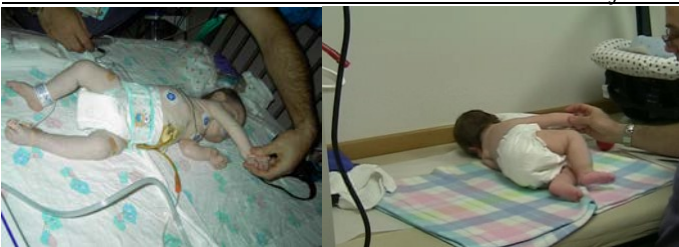
**Item 7: Rolling: elicited from the arms**

Start Position: Supine arms at side

Stimulus: Hold infant at the elbow and move across midline toward opposite shoulder to elicit rolling pause with shoulders 90° to surface and maintain traction on limb and allow infant to de-rotate. Pause with shoulders vertical and wait for trunk to de-rotate and lower extremity and hips to come to side-lying do not passively pull the infant to prone. Continue to apply traction to arm and observe head control and ability to free arm and complete roll to prone.

Scoring Criteria:

- Score 4 Rolls into prone with lateral head righting (infant lifts head laterally off the support surface to complete the roll to prone)  
 Score 3 Rolls into prone without lateral head righting (Clears weight bearing arm completely to finish roll)  
 Score 2 Rolls onto side (leg comes through and adducts bringing the pelvis vertical)  
 Score 1 Head turns to side and shoulder and trunk lift from surface  
 Score 0 Head turns to side; body remains limp or shoulder lifts passively without active participation  
*Score both sides and select the maximum score for the best score.*



**Item 8: Shoulder flexion and elbow flexion and horizontal abduction**

Start Position: Side-lying with upper arm supported on body in 30 degrees of elbow flexion and shoulder extension. The dependent arm should be restrained along the trunk.

Stimulus: Prompt reaching for a toy presented at arm's length at shoulder level (hold the lower arm to prevent the child from reaching with that arm). You may touch the infant's hand with the toy to encourage reaching. Any spontaneous upper extremity movements should be scored; intent is not required.

Scoring Criteria:

- Score 4 Clears hand from the surface while reaching (the infant demonstrates any antigravity horizontal abduction)  
 Score 3 Able to flex shoulder to 45 degrees (the infant demonstrates gravity eliminated shoulder flexion)  
 Score 2 Flexes elbow after arm comes off body

- Score 1      Able to get arm off body
  - Score 0      No attempt (the arm remains on the infants trunk)
- Intent is not necessary and spontaneous movement may be scored*  
*Score both sides and select the maximum score for a final score.*



**Item 9: Shoulder flexion & elbow flexion**

Start Position: Sitting (slightly reclined about 20°) on parents or other study team members lap straddled over examiners leg, with support for trunk and posterior head, child’s arm dangling at side and not obstructed by the person holding the child.

Stimulus: Present toy at midline and at shoulder level (May touch the infant’s hand with toy to stimulate movement).

Scoring Criteria:

- Score 4      Abducts or flexes shoulder to 60 degrees
- Score 3      Abducts or flexes shoulder to 30 degrees
- Score 2      Any shoulder flexion or abduction
- Score 1      Flexes the elbow only
- Score 0      No attempt to lift arm

*Intent is not necessary and spontaneous movement may be scored*  
*Score both sides and select the maximum score for the best score.*



**Item 10: Knee extension**

Start Position: sitting on parents or other study team members lap in straddle position on one leg, with approximately 20 degree recline of the subject’s torso. The subject’s lower leg should be positioned vertically and free from contact with any surface or person.

Stimulus: Tickle plantar surface of the foot or gently pinch the toe.

Scoring Criteria:

- Score 4      If the infant extends the knee greater than 45 degrees. Make sure this is not due to passive swinging of the leg from examiner’s repositioning.
- Score 2      If the infant extends knee 15 to 45 degrees

Score 1 If any visible knee extension is noted

Score 0 If no visible knee extension is noted

Score both sides and select the maximum score for the best score.



### **Item 11: Hip flexion and foot dorsiflexion**

**Start Position:** To attain this test position the examiner may start with the subject in supine, hold him with your non dominant hand under the chin and roll the infant to prone over your hand then place your dominant hand across the infants abdomen lean forward and lift the child against your chest. Support the infant's back against the parent or caregiver's or other study team members chest and with the support provided by the examiner across the subject's abdomen with their dominant arm, with the legs dangling unsupported. Tickle, or have the parent tickle, the child's foot and observe the child's response.

**Stimulus:** Stroke plantar surface of foot.

**Scoring Criteria:**

Score 4 If hip flexion or knee flexion > than 30<sup>0</sup>

Score 3 If any hip flexion or knee flexion is noted

Score 2 If only dorsiflexion is observed

Score 0 If no active hip, knee, or ankle motion is noted

Score both sides and select the maximum score for the best score.



### **Item 12: Head Control**

**Start Position:** Sitting facing the examiner in ring sit, with the examiner supporting with both hands at the shoulders on the anterior and posterior surface. Position the infant's trunk in an erect position with shoulders and trunk neutral. Try to get the infant positioned with the head erect. This may take some repositioning as many infants only have tenuous head control and have a very limited cone of stability.

Stimulus: If the infant cannot be positioned with head erect allow the head to fall forward and support the chin with your thumbs at end range to keep the chin off the chest.

Scoring Criteria:

- Score 4 Attains upright head position at least once from flexion and moves the head freely with control
- Score 3 Maintains head upright for greater than 15 seconds
- Score 2 Maintains head in midline for >5 sec. with the head tipped in up to 30<sup>0</sup> of forward flexion or extension
- Score 1 Actively lifts or rotates the head twice within 15 seconds (This may not be scored only on head movement with breathing effort)
- Score 0 No response, head hangs

*Evaluation of scores of 1 and 4 can be delayed till the end of the test to maintain calm*

**Item 13: (Elbow Flexion, Score with item 14)**

Start Position: Supine

Stimulus: Traction response: initiate “pull to sit” with arms extended at 45 degree angle until shoulders are lifted off the surface, to point of nearly lifting head off the surface.

Scoring Criteria:

- Score 4: Active elbow flexion
- Score 2: Visible biceps contraction without elbow flexion
- Score 0: No visible biceps contraction

Score both sides and select the maximum score for the best score.

**Item 14: (Neck Flexion, Score with item 13)**

Start Position: Supine

Stimulus: **Traction response:** Initiate “pull to sit” with arms extended at 45 degree angle to trunk until shoulders are lifted off the surface, to point of nearly lifting head off the surface.

Scoring Criteria:

- Score 4 Lifts head off bed
- Score 2 Visible muscle contraction of SCM
- Score 0 No visible contraction



**Item 15: Head/Neck extension (Landau)**

Start Position: Ventral suspension: prone, held in one hand over upper abdomen/lower rib cage. For larger infants, if necessary, the head and knees are allowed to rest on the mat.

Stimulus: Stroke the paraspinal muscles bilaterally along spine from neck to sacrum.



Scoring Criteria:

The coronal axis of the head when parallel to the bed surface = 0 degrees (horizontal)

Score 4 If the head is extended to or above the horizontal plane.

Score 2 If the head is extended partially, but not to the horizontal plane.

Score 0 If no active head extension is noted.



**Item 16: Spinal incurvation (Galant)**

Start Position: Prone over examiners hand supported at the upper abdomen or lower thorax. For larger infants, if necessary, the head and knees are allowed to rest on the mat.

Stimulus: Stroke right then left throacolumbar paraspinal muscles with thumbnail, from sacrum to mid-thoracic level (**Galant's reflex**). For older children tilt them to facilitate righting reaction, tickle them at the side or foot or ask them to wiggle their buttock.

Scoring Criteria:

Score 4 Twists pelvis toward stimulus off axis

Score 2 Visible paraspinal muscle contraction

Score 0 No Response

Score both sides and select the maximum score for the best score.