

# Motor Function in Disorders of Consciousness



Please ensure the patient has adequate arousal (eye opening) and attention prior to providing an intervention or assessing level of consciousness. Utilize *Arousal Facilitation Protocol* (see handout) if the patient has sustained eye closure or has a change in behavioral responsiveness.

## COMA

When a patient is in a comatose state, he/she only demonstrates reflexive and postural responses.

## VEGETATIVE STATE/UNRESPONSIVE WAKEFULNESS

When a patient is in a vegetative state, he/she may demonstrate **posturing** or **withdrawal** from **noxious tactile stimulation** and **nonpurposeful movement**. Noxious tactile stimulation involves mechanical input to the body which can potentially injure the tissue (e.g. pinching).



### Possible Responses to Noxious Stimulation:

- Posturing: abnormal flexion (bending) or extension (straightening) of limbs with a presentation of noxious stimulation
- Withdrawal: isolated attempts to remove/withdraw stimulated limb from presentation of noxious stimulation
- Nonpurposeful movement: movement of the body or of the extremities of an individual not under voluntary control of that person. Examples include: non-stimulus driven motor restlessness, tremors (shaking), spasms (involuntary muscle contractions), myoclonus (involuntary and irregular muscle jerks)



### Suggested Activities for Eliciting Response and Increasing Body Awareness of Touch, Pressure, Pain, Temperature and Vibration:

- Apply pressure to nail beds using fingers or hard objects
- Apply deep pressure to the muscle bodies of the cheeks, arms, legs, torso, etc.
- Rub arms, legs or face with different textures such as a feather, toothbrush, mini massage, surgical brushes, etc. \*Can refer to the DOCS for additional stimuli.
- Play music and place speaker on arms, chest, legs or face to allow the patient to feel the vibrations
- Touch ice, or heat packs, to the arms, chest, legs or face
- Hold patient's hand

(over)

## MINIMALLY CONSCIOUS STATE

When a patient is in a minimally conscious state, he/she may demonstrate **localization** to noxious stimuli. Be sure to provide the appropriate support to the limbs in order to set the patient up for success.



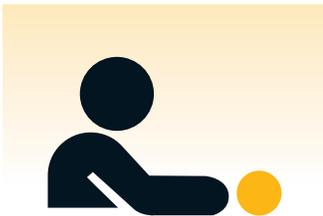
### Possible Responses for Localization to Noxious Stimulation:

- Moves unstimulated limb to make contact with stimulated limb in an attempt to remove stimuli and/or self-soothe (e.g. if you apply pressure to the right middle finger nail bed and the patient moves his/her left arm/hand to make contact with the right arm/hand)

### Suggested Activities for Eliciting Response:

- Apply pressure to nail beds using fingers or hard objects
- Apply deep pressure to the muscle bodies of the cheeks, arms, legs, torso, etc.
- Touch ice or heat packs to the arms, chest, legs or face

The patient may also demonstrate reaching for, or holding/touching of, objects when in a minimally conscious state.



### Possible Responses for Interaction with Objects:

- Reaches towards target object
- Moves limbs to grab objects (e.g. takes a ball from you, grasps and/or manipulates pen)

### Suggested Activities for Eliciting Response:

- Place an object near the patient's hand and ask him/her to take it
- Place objects (e.g. pen, spoon, toothbrush, iPhone, etc.) in the patient's hand and ask him/her to demonstrate use of each object
- Roll a ball on the dorsal (back) side of the patient's hand and ask him/her to take it

**Automatic motor movements** may also be seen when a patient is in a minimally conscious state.



### Possible Responses for Automatic Motor Movements:

- Scratches leg, face, etc.
- Wipes mouth
- Pulls at clothing or bedding
- Waves
- Opens mouth with presentation of spoon, toothbrush, etc. (without contact)
- Puts arms down to catch himself/herself
- Repositions himself/herself

### Suggested Activities for Eliciting Response:

- Place object in the patient's hand and ask him/her to demonstrate use of the object
- Wave at the patient
- Tickle patient's face with a feather or tissue
- When the patient is seated, rock them to the edge of the mat
- Present spoon, fork, toothbrush or straw towards patient's mouth
- Play thumb war
- Place a cloth on patient's face
- Remove patient's limbs from supportive position (e.g. off of the armrest or footplate) and see if he/she replaces it

(over)

## CONSCIOUS STATE

When a patient is fully conscious, he/she will consistently demonstrate **functional object use**. This means that he/she is able to produce a movement which shows that he/she understands what the object is and how it is used. Performance may be impacted by presence of *aphasia* (an impairment in understanding and/or expression of language), *apraxia* (difficulty with motor planning) and/or neuromuscular constraints (e.g. spasticity).



### Examples of Functional Object Use:

- Brings pen to paper and moves hand/fingers to mark on paper when pen is placed in hand
- Brings cup towards mouth
- Brings telephone towards his/her ear or presses buttons on the phone purposefully
- Brings brush/comb towards head
- Opens mouth, or puckers lips, when spoon/cup/straw is held in place by patient's mouth
- Brings articles of clothing towards appropriate limbs in attempt to dress
- Plays musical instrument appropriately (e.g. strums guitar, beats drum, blows whistle, etc.)

### Suggested Activities for Eliciting Response:

- Present different objects and ask the patient to show you how to use them. Provide assistance and physical support as needed based on his/her motoric abilities. Try to avoid telling them how the object should be used. For example, say "Show me how to use the pen." vs "Show me how to write with the pen." If he/she does not demonstrate object function independently, you can then provide more cues (tell him/her what it is used for, demonstrate hand-over-hand how to use it, etc.) to assist with the learning process.

Bodien YB, Chatelle C, Taubert A, Uchiano S, Giacino JT, Ehrlich-Jones L. Updated Measurement Characteristics and Clinical Utility of the Coma Recovery Scale-Revised Among Individuals With Acquired Brain Injury. *Arch PMR* 2021; 102 (169-70)

Giacino, J. T., Fins, J. J., Laureys, S., & Schiff, N. D. (2014). Disorders of consciousness after acquired brain injury: the state of the science. *Nature Reviews Neurology*, 10(2), 99-114. doi:10.1038/nrneurol.2013.279

Giacino, J & Kalmar, K. (2006). Coma Recovery Scale- Revised. *The Center for Outcome Measurement in Brain Injury*. <http://www.tbims.org/combi/crs>