

# CRS-R

## COMA RECOVERY SCALE-REVISED

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### Administration and Scoring Guidelines

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# JFK COMA RECOVERY SCALE - REVISED ©2004

## Record Form

*This form should only be used in association with the "CRS-R ADMINISTRATION AND SCORING GUIDELINES" which provide instructions for standardized administration of the scale.*

<b>Patient:</b>	<b>Diagnosis:</b>	<b>Etiology:</b>
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<b>Date of Onset:</b>	<b>Date of Admission:</b>
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	Date																		
	Week	ADM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		

### AUDITORY FUNCTION SCALE

4 - Consistent Movement to Command *																			
3 - Reproducible Movement to Command *																			
2 - Localization to Sound																			
1 - Auditory Startle																			
0 - None																			

### VISUAL FUNCTION SCALE

5 - Object Recognition *																			
4 - Object Localization: Reaching *																			
3 - Visual Pursuit *																			
2 - Fixation *																			
1 - Visual Startle																			
0 - None																			

### MOTOR FUNCTION SCALE

6 - Functional Object Use †																			
5 - Automatic Motor Response *																			
4 - Object Manipulation *																			
3 - Localization to Noxious Stimulation *																			
2 - Flexion Withdrawal																			
1 - Abnormal Posturing																			
0 - None/Flaccid																			

### OROMOTOR/VERBAL FUNCTION SCALE

3 - Intelligible Verbalization *																			
2 - Vocalization/Oral Movement																			
1 - Oral Reflexive Movement																			
0 - None																			

### COMMUNICATION SCALE

2 - Functional: Accurate †																			
1 - Non-Functional: Intentional *																			
0 - None																			

### AROUSAL SCALE

3 - Attention																			
2 - Eye Opening w/o Stimulation																			
1 - Eye Opening with Stimulation																			
0 - Unarousable																			

### TOTAL SCORE

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Denotes emergence from MCS<sup>†</sup>  
Denotes MCS<sup>\*</sup>

# BRAIN STEM REFLEX GRID ©2004

## Record Form

<b>Patient:</b>		<b>Date:</b>					
<b>Pupillary Light</b>	Reactive						
	Equal						
	Constricted						
	Dilated						
	Pinpoint						
	Accommodation						
<b>Corneal Reflex</b>	Absent						
	Present Unilateral						
	Present Bilateral						
<b>Spontaneous Eye Movements</b>	None						
	Skew Deviation						
	Conjugate Gaze Deviation						
	Roving						
	Dysconjugate						
<b>Oculocephalic Reflex</b>	None						
	Abnormal						
	Full						
	Normal						
<b>Postural Responses (Indicate Limb)</b>	Abnormal Extension						
	Abnormal Flexion						

**NOTES**

# AROUSAL FACILITATION PROTOCOL ©2004

## GUIDELINES

- 1) The goal of this intervention is to prolong the length of time the patient maintains arousal (i.e. eye opening)
- 2) The protocol is administered anytime the patient is observed to:
  - Exhibit sustained eyelid closure **AND/OR**
  - Stops following commands for a period of at least one minute.
- 3) Readminister the arousal facilitation protocol when:
  - Sustained eye closure re-occurs **OR**
  - Behavioral responsiveness ceases despite sustained eye opening.

## INTERVENTIONS

### ***Deep Pressure:***

- 1) Present deep pressure stimulation unilaterally to the face, neck, shoulder, arm, hand, chest, back, leg, foot, and toes. The muscle should be firmly grasped at its base between the thumb and forefinger. While squeezing the muscle firmly, it should be "rolled" back and forth through the finger tips three to four times. This procedure should be repeated sequentially working from the facial musculature to the toes. The examiner should assure that there are no internal lines, local injuries (e.g., fractures, contusions, decubiti) or systemic complications (e.g., heterotopic ossification) before administering deep pressure.
- 2) Administer same on contralateral side.

# AUDITORY FUNCTION SCALE ©2004

Score	Item	Method	Response
4	<b>Consistent Movement to Command</b>	<p>1. Observe frequency of spontaneous movement for a one minute interval (See <b>Baseline Observation</b> and <b>Command Following Protocol</b> on page 5).</p> <p>2. Choose at least 1 object-related and 1 non-object related command from the Command Following Protocol. The type of command chosen (eye, limb, oral) should be based on patient's physical capacity and should be of low spontaneous frequency. If time permits, more than one type of command from each category may be used. The command should be repeated once during the 10 second response interval.</p> <p><b>a. Object-Related Eye Movement Commands:</b> Present 2 common objects simultaneously and approximately 16 inches apart within the patient's field of view. Ask the patient to look at the object named (i.e. "Look at the [name object]"). Next, reverse the positions of the 2 objects and ask the patient to look at the <b>same</b> object again (i.e. "Look at the [name object]"). Administer two additional trials using the same 2 objects and repeat the above procedure with instruction to look at the <b>other</b> object on both trials. Two trials per object should be administered for a total of 4 trials.</p> <p><b>b. Object-Related Limb Movement Command:</b> Present 2 common objects simultaneously and approximately 16 inches apart within the patient's field of view and within arm's (or leg's) length and ask the patient to touch the object named with their hand (or foot). Next, reverse the positions of the 2 objects and ask the patient to touch the <b>same</b> object again. Administer two additional trials using the same two objects and repeat the above procedure with instruction to touch the <b>other object on both trials</b>. Two trials per object should be administered for a total of 4 trials.</p> <p><b>c. Non-Object Related Commands:</b> Select at least 1 eye movement, limb movement or oral movement/vocalization command and present it over 4 trials at 15 second intervals. The same command should be used for all 4 trials. Movements that occur between commands (ie: after the response interval has elapsed) should be noted but not scored.</p>	<p>Clearly discernible and accurate responses occur within 10 seconds on all 4 trials administered.</p> <p>This item is credited only when <b>all 4 trials</b> of <b>2 different</b> commands are passed.</p>
3	<b>Reproducible Movement to Command</b>	Same as above	3 clearly discernible responses occur over the 4 trials on any one of the object <b>or</b> non-object related commands.
Continued			

## AUDITORY FUNCTION SCALE ©2004

Score	Item	Method	Response
2	<b>Localization to Sound</b>	Standing behind the patient and out of view, present an auditory stimulus (eg. voice, noise) from the right side for 5 seconds. Perform a second trial presenting the auditory stimulus from the left side. Repeat above procedure for a total of 4 trials, 2 on each side.	Head and/or eyes orient toward the location of the stimulus on <b>both trials</b> in at least one direction. This item is scored when there is clear evidence of head and/or eye movement. It is not dependent on the degree or duration of movement.
1	<b>Auditory Startle</b>	Present a loud noise directly above the patient's head and out of view. Administer 4 trials.	Eyelid flutter or blink occurs immediately following the stimulus on at least 2 trials.
0	<b>None</b>	See above	No response to any of the above

# BASELINE OBSERVATION AND COMMAND FOLLOWING PROTOCOL ©2004

Commands	Baseline	Trial 1	Trial 2	Trial 3	Trial 4
	1 minute frequency count				
<b>I Object Related Commands</b>					
<b>A. Eye Movement Commands</b>					
Look at the <i>(object #1)</i>					
Look at the <i>(object #2)</i>					
<b>B. Limb Movement Commands</b>					
Take the <i>(name object #1)</i>					
Take the <i>(name object #2)</i>					
Kick the <i>(name object #1)</i>					
Kick the <i>(name object #2)</i>					
<b>II Non-Object Related Commands</b>					
<b>A. Eye Movement Commands</b>					
Look away from me					
Look up <i>(at ceiling)</i>					
Look down <i>(at floor)</i>					
<b>B. Limb Movement Commands</b>					
Touch my hand					
Touch your nose					
Move your <i>(object/body part)</i>					
<b>C. Oral Movement/ Vocalization Commands</b>					
Stick out your tongue					
Open your mouth					
Close your mouth					
Say "ah"					
<b>Spontaneous Eye Opening</b>		<b>Yes:</b>		<b>No:</b>	
<b>Spontaneous Visual Tracking</b>		<b>Yes:</b>		<b>No:</b>	
<b>Resting Posture</b>					
<b>RUE:</b>					
<b>RLE:</b>					
<b>LUE:</b>					
<b>LLE:</b>					

# VISUAL FUNCTION SCALE ©2004

Score	Item	Method	Response
5	<b>Object Recognition</b>	Same as Consistent Movement to Command on Auditory Function Scale, Section 2a and b (p. 3).	3 to 4 clearly discernible responses occur over the 4 trials administered.
4	<b>Object Localization: Reaching</b>	<ol style="list-style-type: none"> <li>1. Identify the arm or leg with the greatest range of movement.</li> <li>2. For upper extremity reaching, select common ADL objects (e.g. comb, toothbrush, etc.). For lower extremity assessment, select a ball suitable for kicking.</li> <li>3. Present the object approximately 8 inches to the left or right of the limb's resting position. The object should be placed in a position that is not obstructed from view. The patient should be instructed to "Touch the (<i>name object</i>)" with the appropriate arm or leg.</li> <li>4. The command may be repeated once within the assessment interval. Do not provide any tactile cues, as these may stimulate random limb movement.</li> <li>5. Present an object twice to the left of the limb and twice to the right of the limb, in random order for a total of 4 trials.</li> </ol>	<p>Score the <b>direction</b> in which the limb <b>first</b> moves within a 10 second observation period, or score as no movement. The limb does not need to make contact with the object, only to move toward it;</p> <p style="text-align: center;"><i>and</i></p> <p>Movement must occur in the correct direction on 3 of the 4 trials administered.</p>
3	<b>Visual Pursuit</b>	<p>Hold a hand mirror 4-6 inches directly in front of the patient's face and verbally encourage the patient to fixate on the mirror.</p> <p>Move mirror slowly 45 degrees to the right and left of the vertical midline and 45 degrees above and below the horizontal midline.</p> <p>Repeat the above procedure so that a total of 2 trials are administered in each plane.</p>	<p>Eyes must follow the mirror for 45 degrees <b>without loss of fixation</b> on 2 occasions in any direction.</p> <p><i>If above criterion is not met, repeat the procedure assessing one eye at a time (using an eye patch).</i></p>
2	<b>Fixation</b>	Present a brightly colored or illuminated object 6 to 8 inches in front of the patient's face and then rapidly move to upper, lower, right and left visual fields for a total of 4 trials.	Eyes change from initial fixation point and refixate on the new target location for more than 2 seconds. At least 2 episodes of fixation are required.
1	<b>Visual Startle</b>	Present visual threat by passing finger 1 inch in front of patient's eye. Be careful not to touch eyelashes or create a breeze (manually open eyes if necessary). Conduct 4 trials per eye.	Eyelid flutter or blink following presentation of visual threat on at least 2 trials with <b>either</b> eye.
0	<b>None</b>	See above	No response to any of the above.



# MOTOR FUNCTION SCALE ©2004

Score	Item	Method	Response
6	<b>Functional Object Use</b>	<p>Select 2 common objects (e.g. comb, cup). Place one of the objects in the patient's hand and instruct the patient to "Show me how to use a [name object]." Next, place the second object in the patient's hand and restate the same instruction.</p> <p>Repeat the above procedure using the same objects so that a total of 2 trials are administered with each object.</p>	<p>Movements executed are generally compatible with both object's specific function (e.g. comb is placed on or near the head) on all 4 trials administered.</p> <p><i>If the patient is unable to hold the object because of neuromuscular involvement, this should be noted on the record form and the item should <b>not</b> be scored.</i></p>
5	<b>Automatic Motor Response</b>	<p>Observe for automatic motor behaviors such as nose scratching, grasping bedrail that occur spontaneously during the examination.</p> <p>If spontaneous automatic motor behaviors are not observed, present a familiar gesture (e.g. wave) in association with the following series of alternating commands:</p> <ol style="list-style-type: none"> <li>1) "Show me how to wave" (<b>demonstrate gesture</b>).</li> <li>2) "I'm going to wave again. Do not move at all. Just hold still." (<b>demonstrate gesture</b>).</li> <li>3) "Show me how to wave" (<b>demonstrate gesture</b>).</li> <li>4) "I'm going to wave again. Do not move at all. Just hold still." (<b>demonstrate gesture</b>).</li> </ol> <p>For patients with limited ability to move the limbs, objects associated with oromotor activity may be used (e.g. spoon). Place the object in front of the patient's mouth <b>without making contact</b>. Administer the following series of alternating commands:</p> <ol style="list-style-type: none"> <li>1) "Show me how to use (<b>name object</b>) .</li> <li>2) "I'm going to show you (<b>name object</b>) again. Do not move at all. Just hold still."</li> <li>3) "Show me how to use (<b>name object</b>). "</li> <li>4) "I'm going to show you (<b>name object</b>) again. Do not move at all. Just hold still."</li> </ol>	<p>At least 2 episodes of automatic motor behavior are observed within the session and each episode can be clearly differentiated from a reflexive response.</p> <p>Patient performs the gesture (e.g. waves) <i>on trials 2 and 4</i> (regardless of performance on trials 1 and 3).</p> <p>Patient performs the oral movement pattern (e.g. mouth opening occurs when spoon is brought to mouth by examiner) <i>on trials 2 and 4</i> (regardless of performance on trials 1 and 3).</p>
Continued			

## MOTOR FUNCTION SCALE ©2004

Score	Item	Method	Response
4	<b>Object Manipulation</b>	<p>Place a baseball size ball on the <b>dorsal</b> surface of one of the patient's hands. Roll the ball across the index finger and thumb without touching the undersurface of the hand or fingers. While moving the ball, instruct the patient to, "Take the ball."</p> <p>Repeat the above for a total of 4 trials.</p>	<p>The following criteria must be met on 3 of the 4 trials administered:</p> <p><b>1.</b> The wrist must rotate and the fingers should extend as the object is moved along the dorsal surface of the hand;</p> <p style="text-align: center;"><i>and</i></p> <p><b>2.</b> The object must be grasped and held for a minimum of 5 seconds. The object cannot be held by means of a grasp reflex or increased finger flexor tone.</p>
3	<b>Localization to Noxious Stimulation</b>	<p>Extend all four extremities. Apply pressure to the finger or toe of an extremity (use best extremity on each side of the body) for a minimum of 5 seconds (ie. squeeze the finger or toe between your thumb and index finger). Administer 2 trials on each side for a total of 4 trials.</p>	<p>The non-stimulated limb must locate and make contact with the stimulated body part at the point of stimulation on at least 2 of the four trials.</p>
2	<b>Flexion Withdrawal</b>	<p>Extend all 4 extremities. Apply deep pressure to nailbeds of each extremity (ie. press the ridge of a pencil into the cuticle). Administer 1 trial per extremity.</p>	<p>There is <b>isolated</b> flexion withdrawal of at least one limb. The limb must move <b>away</b> from the point of stimulation. If quality of response is uncertain, the trial may be repeated.</p>
1	<b>Abnormal Posturing</b>	<p>Observe response to above method</p>	<p>Slow, stereotyped flexion <b>or</b> extension of the upper and/or lower extremities occurs immediately after the stimulus is applied.</p>
0	<b>None/Flaccid</b>	<p>Observe response to above method</p>	<p>There is no discernible movement following application of noxious stimulation, secondary to hypertonic <b>or</b> flaccid muscle tone.</p>

## OROMOTOR/VERBAL FUNCTION SCALE ©2004

Score	Item	Method	Response
3	<b>Intelligible Verbalization</b>	<p>1. Tell patient "I would like to hear your voice." This should be followed by an attempt to directly elicit speech using the verbal prompts shown below. At least one prompt should be selected from the Aural Set and at least one from the Visual Set.</p> <p>2. A maximum of 3 trials should be administered for each prompt chosen from the Aural and Visual Sets. Prompts should be administered at 15 second intervals.</p> <p><b>Aural Set:</b></p> <p>a) "What is your name?"                      b) "How are you today?"                      c) "Where do you live?"</p> <p><b>Visual Set:</b></p> <p>a) "What do you call this thing?" (Hold up common object in front of the patient's right and then left visual field for 10 seconds).                      b) "How many fingers am I holding up right now?" (Hold up 1 finger in front of the right and then left visual field for 10 seconds).                      c) "What part of my body is this?" (Point to your nose while positioned at the patient's visual midline).</p>	<p>Each of the following criteria must be met:</p> <p>1. Each verbalization must consist of at least 1 consonant-vowel-consonant (C-V-C) triad. For example, "ma" would not be acceptable, but "mom" would. Make sure objects chosen have a C-V-C sequence;</p> <p style="text-align: center;"><i>and</i></p> <p>2. Two different words must be documented by the examiner to ensure that a repetitive word-like sound is not mistaken for a word. Words need not be appropriate or accurate for the context, but must be fully intelligible;</p> <p style="text-align: center;"><i>and</i></p> <p>3. Words produced by writing or alphabet board are acceptable.</p> <p><i>Verbalizations that occur spontaneously or at other times during the assessment and meet the above criteria should also receive a score of 3.</i></p>
2	<b>Vocalization / Oral Movement</b>	<p>Observe for non-reflexive oral movements, spontaneous vocalizations or vocalizations that occur during administration of vocalization commands (see page 5).</p>	<p>At least one episode of non-reflexive oral movement and/or vocalization occurs spontaneously or in response to application of sensory stimulation.</p> <p><i>Yawning is scored as reflexive oral movement.</i></p>
1	<b>Oral Reflexive Movement</b>	<p>Present tongue blade between patient's lips and/or teeth</p>	<p>There is clamping of jaws, tongue pumping, or chewing movement following introduction of tongue blade into mouth.</p>
0	<b>None</b>	See above	No response to any of the above.

# COMMUNICATION SCALE ©2004

(if there is no evidence of reproducible command following or spontaneous communicative behavior,  
the Communication subscale is not administered)

Score	Item	Method	Response
2	<b>Functional: Accurate</b>	Administer the 6 Situational Orientation questions from the Communication Assessment Protocol (page 12). The examiner may use the Visual set, Auditory set or both sets, if appropriate.	Clearly discernible and accurate responses occur on all 6 of the Visual <b>or</b> Auditory Situational Orientation questions from the Communication Assessment Protocol (see page 12).
1	<b>Non-Functional: Intentional</b>	Same as above	<p>A clearly discernible communicative response* (e.g. head nods/shakes, thumbs up) must occur within 10 seconds on at least 2 of the 6 Situational Orientation questions (irrespective of accuracy).</p> <p><i>*The examiner must determine that this response occurs more frequently following verbal prompting (e.g. questions) than when non-specific auditory stimulation (e.g. hand clapping) is administered.</i></p>
0	<b>None</b>	See above	No discernible verbal or non-verbal communication responses occur at any time.

# COMMUNICATION ASSESSMENT PROTOCOL ©2004

## Situational Orientation

Visually Based				Aurally Based		
Am I touching my ear right now? (do not touch ear)				Am I clapping my hands right now? (do not clap)		
Am I touching my nose right now? (touch nose)				Am I clapping my hands right now? (clap)		
Am I touching my nose right now? (touch nose)				Am I clapping my hands right now? (clap)		
Am I touching my ear right now? (do not touch ear)				Am I clapping my hands right now? (do not clap)		
Am I touching my nose right now? (do not touch nose)				Am I clapping my hands right now? (clap)		
Am I touching my ear right now? (touch ear)				Am I clapping my hands right now? (do not clap)		
			<b>Date</b>			
<b>Score</b>						
of 6	of 6	of 6		of 6	of 6	of 6
			<b>Date</b>			
<b>Score</b>						
of 6	of 6	of 6		of 6	of 6	of 6

## AROUSAL SCALE ©2004

Score	Item	Method	Response
3	<b><i>Attention</i></b>	Observe consistency of behavioral responses following verbal or gestural prompts.	There are no more than 3 occasions across the length of the evaluation in which the patient fails to respond to a verbal prompt.
2	<b><i>Eye Opening w/o Stimulation</i></b>	Observe status of the eyelids across length of assessment.	Eyes remain open across the length of the examination without the need for tactile, pressure or noxious stimulation.
1	<b><i>Eye Opening with Stimulation</i></b>	Same as above	Tactile, pressure or noxious stimulation must be applied at least once during the examination in order for the patient to sustain eye opening (the length of time the eyes remain open may vary and is not considered in the scoring).
0	<b><i>Unarousable</i></b>	See above	No eye opening noted.

# ASSESSMENT OF CONTINGENT BEHAVIOR ©2004

## (Supplementary Item)

Score	Item	Method	Response
<b>Not Scored</b>	<b>Contingent Vocalization / Gesture / Affective Response</b>	<p>1. Vocalizations, gestures and affective responses are assessed through a combination of reports from family and clinicians, and direct observations from treating staff. Family and clinical staff should be questioned about any vocalizations, gestures or affective responses (i.e. smiling, laughing, frowning, crying) that are observed to occur spontaneously or in response to a specific stimulus.</p> <p>2. If above response is based on report, staff should attempt to directly elicit the behavior again with the assistance of the individual who reported it.</p> <p>3. If affective responses are observed during direct examination, the examiner should attempt to re-elicite the behavior using the same eliciting stimulus previously noted to produce the behavior. Examples of appropriate eliciting stimuli include verbal requests ("What's your name?"), limb gestures (wave), facial gestures (sticking out tongue) and pictures (family photos).</p> <p>4. The examiner should document:</p> <p>a. The nature of the eliciting stimulus (e.g. Verbal: "Are you feeling sad?"; Limb gesture: handshake);</p> <p>b. Specific characteristics of the behavioral response (e.g. facial grimace with tearing of the eyes; smiling, moaning);</p> <p>c. Number of times the behavior has been observed to occur within 10 seconds of the eliciting stimulus;</p> <p>d. Number of times the behavior has been observed to occur spontaneously;</p> <p>e. The time frame allowed for "c" and "d" should be specified and approximately the same.</p>	<p>A vocalization, gesture or affective response occurs significantly more often in response to a specific eliciting stimulus, than when the stimulus is absent.</p> <p><i>Contingent responses do not include those that occur following administration of painful stimuli.</i></p>

### RECORD DATE AND DESCRIPTION OF ABOVE STIMULI UTILIZED AND RESPONSES OBSERVED

DATE	ELICITING STIMULUS	TARGET BEHAVIOR	# SPONTANEOUS OCCURRENCES OF TARGET BEHAVIOR	# OCCURRENCES OF TARGET BEHAVIOR WITHIN 10 SEC OF ELICITING STIMULU

# CRS-R TOTAL SCORE PROGRESS TRACKING CHART ©2004

Record Form

Patient:	Diagnosis:	Etiology:
Date of Onset:		Date of Admission:

Date																	
Week	Adm	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
23																	
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CRS-R Total Score																	