

# COMA EXAMINATION

Neurological Exam on a Non-Participatory Patient

## EXAMINATION GOALS

1. Determine patient's level of arousal  
(baseline, maximal, stimulus required)
2. Assess for volitional responses  
(purposeful vs. stereotyped/reflexive)
3. Evaluate brainstem and diencephalon  
integrity through reflex testing
4. Evaluate spinal cord, peripheral nerves,  
and neuromuscular junction

## IMPORTANT RULES

1. DO NOT HARM THE PATIENT!
  - Pay attention to tubes: endotracheal, NG, central lines
  - Avoid applying noxious stimuli to injured tissue
2. USE PLAIN ENGLISH - AVOID MEDICAL JARGON
  - Ensures all staff are on the same page
3. RECORD TYPE AND DOSE OF SEDATION
  - Interpreting exam without this information is impossible
4. INCLUDE MULTIPLE TEAM MEMBERS
  - Especially if help is required with sedation, restraints
5. VERIFY RESPONSES ARE VOLITIONAL

## STEP 1: RECORD SEDATION

"Patient was on propofol 1.5 mg/min that was stopped 20 minutes before the exam."

Interpreting an exam without sedation information is impossible

## STEP 2: BASELINE AROUSAL

- Eyes open or closed?
- Spontaneous movements?
- Patient regard/tracking?
- Communication attempts?

## STEP 3: STIMULATION

### Stimulation Progression:

Voice → Loud → Yell  
Shake → Noxious

### Noxious Stimuli:

- Sternal rub (avoid if wires)
- Nail bed pressure
- Pinch
- Trapezius squeeze

## STEP 4: PARTICIPATION

### Command Following:

- Simple vs. complex
- Midline (blink, tongue out)
- Appendicular (thumbs up)
- NO VISUAL CUES!

### Also Assess:

- Mimicking behaviors

## STEP 5: CRANIAL NERVE EXAMINATION

### Pupillary reflex:

- Size, symmetry, reactivity
- Path: CN II → midbrain → CN III

### Oculocephalic (Doll's eyes):

- Tests vestibulo-ocular reflex
- Eyes rotate opposite to head
- AVOID if C-spine precautions
- Path: CN VIII → vestibular nucleus → CN III and VI

### Oculovestibular (cold caloric):

- 20cc ice water in ear canal
- Eyes deviate toward cold
- Don't perform in awake patients

### Corneal/Eyelash reflexes:

- Use saline drop first
- Path: CN V → trigeminal nucleus → CN VII

### Gag reflex:

- Use Yankauer for intubated
- Watch thyroid cartilage
- Path: CN IX → medulla → CN X

### Cough reflex:

- Advance suction past ETT
- Path: sensory nerves → respiratory muscles

### Gaze assessment:

- Direction, conjugacy, spontaneous roving

## STEP 6: MOTOR REFLEX ASSESSMENT

### Anterior Chest Stimulus:

- Localizing (purposeful reaching)

### Flexor posturing (decorticate):

- Arms adducted & pronated
- Elbows flexed, wrists flexed
- Legs extended, ankles plantar-flexed

### Extensor posturing (decerebrate):

- Arms adducted, extended & pronated
- Wrists flexed, legs extended, ankles plantar-flexed
- Note: Posturing often seen in fragments

### Notes:

- Different patterns suggest areas of injury
- Look for asymmetries

### Extremity Stimulus:

- Withdrawal (purposeful)
- Triple flexion in legs (reflexive)
- Extensor or flexor posturing in arms

### Tips to distinguish reflexive vs. purposeful:

- Purposeful never moves INTO noxious stimulus
- In arm: flex elbow, pinch ulnar forearm (shouldn't extend)
- Triple flexion occurs in stereotyped way regardless of location

### Notes:

- Spontaneous movements may not be volitional
- Reflexive movements are "releases" from diencephalon