

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