Supplement to Explain Neurologic Evaluation

1. General appearance, observe vital signs
2. Cranial Nerve Testing
3. CN [I: Olfactory](https://webmail.utmb.edu/owa/redir.aspx?C=48c7c32afc83470197fae696ba078acb&URL=http%3a%2f%2fwww.clinicalexam.com%2fpda%2fn_cranial_nerves_exam.htm%23cn_i): usually not tested. Can test each nostril with essence bottles of peppermint, vanilla, coffee
4. CN [II: Optic](https://webmail.utmb.edu/owa/redir.aspx?C=48c7c32afc83470197fae696ba078acb&URL=http%3a%2f%2fwww.clinicalexam.com%2fpda%2fn_cranial_nerves_exam.htm%23cn_ii): Test vision of each eye using eye chart while covering the opposite eye. Also examine visual fields
5. CN III-IV-VI: Oculomotor, Trochlear, Abducens: Examine the pupil (size, shape) and eye for ptosis. Assess both direct and consensual responses to penlight. Also have patient follow your finger with eyes without moving head; test 6 cardinal points in an H pattern.
6. CN V: Trigeminal:
7. Corneal Reflex: Patient looks up and away; touch cotton wool to other side. Look for blink in both eyes and if patient can sense it. (Tests V-sensory and VII motor)
8. Facial sensation: check sensation to sharp and dull objects on forehead, cheek, and jaw
9. Motor: pt clenches teeth and palpate masseter muscles
10. CN [VII: Facial](https://webmail.utmb.edu/owa/redir.aspx?C=48c7c32afc83470197fae696ba078acb&URL=http%3a%2f%2fwww.clinicalexam.com%2fpda%2fn_cranial_nerves_exam.htm%23cn_vii): Check facial expression muscles. Patient wrinkles forehead, shuts eyes tightly, shows teeth, puffs out cheeks
11. [VIII: Vestibulocochlear](https://webmail.utmb.edu/owa/redir.aspx?C=48c7c32afc83470197fae696ba078acb&URL=http%3a%2f%2fwww.clinicalexam.com%2fpda%2fn_cranial_nerves_exam.htm%23cn_viii):
12. Place hands by each ear of patient and rub ones’ fingers together on one side and ask patient in which ear the noise is heard.
13. Weber's test: Lateralization: Place 512/ 1024 Hz vibrating fork on top of patients head/ forehead.  Ask patient "Where do you hear sound coming from?" • Normal reply is midline.
14. Rinne's test: Air vs. Bone Conduction: Place same vibrating fork on mastoid behind ear. Ask patient when stop hearing it. When stop hearing it, move to the patients ear so can hear it. • Normal: air conduction [ear] better than bone conduction [mastoid].
15. [IX-X: Glossopharyngeal, Vagus](https://webmail.utmb.edu/owa/redir.aspx?C=48c7c32afc83470197fae696ba078acb&URL=http%3a%2f%2fwww.clinicalexam.com%2fpda%2fn_cranial_nerves_exam.htm%23cn_ix-x)
16. Examine palate for uvular displacement. (unilateral lesion: uvula

drawn to normal side)

1. Pt says "Ah": symmetrical soft palate movement.
2. Gag reflex [sensory IX, motor X]: • Stimulate back of throat each

side. Normal to gag each time.

1. [XI: Accessory](https://webmail.utmb.edu/owa/redir.aspx?C=48c7c32afc83470197fae696ba078acb&URL=http%3a%2f%2fwww.clinicalexam.com%2fpda%2fn_cranial_nerves_exam.htm%23cn_xi): Examine for trapezius atrophy, asymmetry. Ask pt to shrugs shoulders (trapezius). Have patient turn head against resistance (sternocleidomastoid).
2. [XII: Hypoglossal](https://webmail.utmb.edu/owa/redir.aspx?C=48c7c32afc83470197fae696ba078acb&URL=http%3a%2f%2fwww.clinicalexam.com%2fpda%2fn_cranial_nerves_exam.htm%23cn_xii): Inspect tongue in mouth for wasting. Protrude tongue: unilateral deviates to affected side.

III. Examination for Meningeal Signs

1. The main clinical signs that indicate meningism are nuchal rigidity, Kernig's sign and Brudzinski's signs. None of the signs are particularly sensitive; in adults with meningitis, nuchal rigidity was present in 30% and Kernig's or Brudzinski's sign only in 5%
2. Nuchal rigidity is the inability to flex the [head](https://webmail.utmb.edu/owa/redir.aspx?C=6d0889968a374f31b4428eba407330da&URL=http%3a%2f%2fen.wikipedia.org%2fwiki%2fHead) forward due to rigidity of the neck muscles; if flexion of the neck is painful but full range of motion is present, nuchal rigidity is absent.
3. Kernig’s test is positive when the leg is bent at the hip and knee at 90 degrees, and subsequent extension in the knee is painful (leading to resistance). This may indicate subarachnoid hemorrhage or meningitis. Patients may also show [opisthotonus](https://webmail.utmb.edu/owa/redir.aspx?C=6d0889968a374f31b4428eba407330da&URL=http%3a%2f%2fen.wikipedia.org%2fwiki%2fOpisthotonus)—spasm of the whole body that leads to legs and head being bent back and body bowed backwards
4. Brudzinski's neck sign is the appearance of involuntary lifting of the legs in meningeal irritation when lifting a patient's head off the examining couch, with the patient lying [supine](https://webmail.utmb.edu/owa/redir.aspx?C=6d0889968a374f31b4428eba407330da&URL=http%3a%2f%2fen.wikipedia.org%2fwiki%2fSupine_position)

IV. Motor Testing: Examine for muscle atrophy, tone, and strength

A. Strength table:

|  |  |  |
| --- | --- | --- |
| **Grading Motor Strength** | | |
| **Grade** | | **Description** |
| 0/5 | No muscle movement | |
| 1/5 | Visible muscle movement, but no movement at the joint | |
| 2/5 | Movement at the joint, but not against gravity | |
| 3/5 | Movement against gravity, but not against added resistance | |
| 4/5 | Movement against resistance, but less than normal | |
| 5/5 | Normal strength | |

B. Test the following:

1. 1. Flexion at the elbow (C5, C6, biceps)
2. 2. Extension at the elbow (C6, C7, C8, triceps)
3. 3. Extension at the wrist (C6, C7, C8, radial nerve)
4. 4. Squeeze two of your fingers as hard as possible ("grip," C7, C8, T1)
5. 5. Finger abduction (C8, T1, ulnar nerve)
6. 6. Oppostion of the thumb (C8, T1, median nerve)
7. 7. Flexion at the hip (L2, L3, L4, iliopsoas)
8. 8. Adduction at the hips (L2, L3, L4, adductors)
9. 9. Abduction at the hips (L4, L5, S1, gluteus medius and minimus)
10. 10. Extension at the hips (S1, gluteus maximus)
11. 11. Extension at the knee (L2, L3, L4, quadriceps)
12. 12. Flexion at the knee (L4, L5, S1, S2, hamstrings)
13. 13. Dorsiflexion at the ankle (L4, L5)
14. 14. Plantar flexion (S1)

V. Sensory Testing: Test for position, pinprick, temperature, and light touch

Explain each test. Then ask patient to close eyes and compare

symmetrical areas on the two sides of the body. Also compare distal

and proximal areas of the extremities. When you detect an area of

sensory loss map out its boundaries in detail.

VI. Reflex Testing: Patient should be relaxed and properly positioned.

2. A. Reflexes should be graded on a 0 to 4 "plus" scale:

|  |  |
| --- | --- |
| **Tendon Reflex Grading Scale** | |
| **Grade** | **Description** |
| 0 | Absent |
| 1+ or + | Hypoactive |
| 2+ or ++ | "Normal" |
| 3+ or +++ | Hyperactive without clonus |
| 4+ or ++++ | Hyperactive with clonus |

1. Test the following:
2. Biceps (C5, C6)
3. Triceps (C6, C7)
4. Brachioradialis (C5, C6)
5. Knee (L2, L3, L4)
6. Ankle (S1, S2)
7. Clonus:If the reflexes seem hyperactive, test for ankle clonus. With the

patient relaxed and knee slightly flexed, quickly dorsiflex the foot.Observe for rhythmic oscillations.

1. Plantar Response (Babinski): Stroke the lateral aspect of the sole of each

foot with the end of a reflex hammer. Normally toes should flexion (withdrawal). Extension of the big toe with fanning of the other toes is abnormal and is referred to as a positive Babinski.

VII. Coordination and Gait: Monitor patient walking across the room normally, walking heel-to-toe in a straight line, walking on their toes in a straight line, and walking on their heels in a straight line.

Differential diagnosis of post-dural puncture headache in pregnant women:

1. Post-dural puncture headache

2. Non-specific headache

3. Migraine

4. Caffeine-withdrawal headache

5. Meningitis

6. Sinus headache

7. Pregnancy induced hypertension

8. Drugs (amphetamine, cocaine)

9. Pneumocephalus-related headache

10. Cerebral vein thrombosis

11. Subdural hematoma

12. Subarachnoid hematoma

13. Brain tumor

14. Lactation headache

Risks of epidural blood patch:

1. unintentional puncture of the subarachnoid space
2. bleeding
3. no alleviation of headache
4. infection
5. pain at the site of injection
6. back pain
7. lower extremity discomfort
8. compression of nerve roots and radiculopathy with resultant lower extremity sensory disturbances and weakness
9. Arachnoiditis-Blood in the subarachnoid space is highly irritant and can cause arachnoiditis

Complications of Regional Anesthesia:

1. Temporary or permanent nerve damage causing numbness, weakness, or pain
2. bleeding, bruising
3. infection
4. systemic toxicity of local anesthesia due t intravascular injection
5. allergic reaction
6. failure of block to work

Differential diagnosis of nerve damage:

1. Trauma/compression (from performing regional block, mechanism of original trauma, surgery, positioning, etc)
2. Autoimmune disease (MS, Guillain-Barre, etc)
3. Cancer
4. Diabetes
5. Drug side effects and toxic substances
6. Motor neuron diseases (ALS, etc)
7. Nutritional deficiencies
8. Infectious disease (HIV, Lyme disease, etc)