LOCALIZATION IN NEUROLOGY

1. Hemisphere - includes internal capsule
   - Bilateral – diffuse mental status changes (ex: dementia)
   - Unilateral – hemi symptoms (motor and sensory)
     - Are crossed
     - May have aphasia (95% of people speech is in L side)
     - May have visual field cuts (further back the lesion the more the same in each eye)
     - UMN signs with increased reflexes, tone and upgoing toe

2. Brainstem – "cross signs"
   - Cranial nerves are ipsilateral and long tract signs (UMN) are contralateral
   - Sensory (spinothalamic) are contralateral while sensory to the face is ipsilateral (V or trigeminal)

3. Cerebellum – ipsilateral because tracts are double crossed
   - Hemisphere lesions cause ipsilateral limb ataxia
   - Midline lesions cause truncal ataxia
   - Anterior vermis (seen in alcoholics) lesions cause LE appendicular dysfunction and broad-based gait
   - May also see decreased tone and reflexes ipsilateral

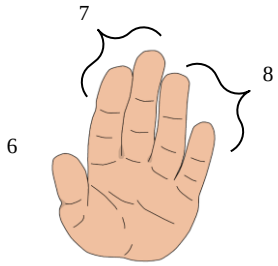
4. Cord – URGENT
   - May be secondary to demyelination (MS), tumor, vascular problem, or bony impingement
   - Face not involved except with high cervical lesions since spinal tract of V comes down to about C_2.
   - Have a level to both sensory (to all modalities) and motor
   - Have long tract signs
   - May have sphincter involvement
   - Hemi-involvement of the cord gives a Brown Sequard Syndrome – contralateral pain and temperature (spinothalamic tract) and ipsilateral vibratory, position sense, and long tract findings (posterior columns and corticospinal tracts).

5. Anterior Horn Cell (LMN)
   - See decreased reflexes with down-going toes; may also see fasciculations
   - Sensation is spared
   - Amyotrophic lateral sclerosis (ALS) see UMN and LMN
   - Polio is an anterior horn cell disease
   - Usually bilateral and symmetric

6. Root

- See pain, decreased strength, loss of reflexes, and sensory loss in a dermatomal distribution

- Usually asymmetric
  Disc disease causes root problems-most common levels:
  - In the neck $C_{6, 7, 8}$



  - In the back are usually L_{4-5} and L_5-S_1

7. Plexus
   - See multiple root involvement of both motor and sensory modalities
   - Patients usually have pain
   - See decreased reflexes
   - Signs and symptoms in one limb

8. Peripheral nerve
   A. Compression – sensory and motor loss in the anatomic distribution of the nerve
   B. Peripheral Neuropathy – signs and symptoms are bilateral and symmetric
      - Sensory deficit is stocking/glove
      - Decreased reflexes greater distally
      - Symptoms may evolve distal to proximal

9. Neuromuscular junction (ex. Myasthenia Gravis, Lambert Eaton Syndrome)
   - See bilateral and diffuse weakness with easy fatigabilitity and improvement with rest
   - Sensation is spared
   - May see extremity involvement with eye movements (diplopia), ptosis, and oropharyngeal and respiratory muscle problems.

10. Muscle (myopathy)
    - See proximal muscle weakness with spared sensation
    - Neck flexors are a good proximal muscle to check
    - Symptoms are bilateral and symmetric
    - May see decreased reflexes