The High-Yield Neurologic Examination

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The speaker has no disclosures

Examination Approach

- Two types of neurologic examinations
  - 1. Screening Examination
  - 2. Testing Hypotheses
- Select high-yield tests and techniques

Examination Approach

- Organization
  1. Mental Status
  2. Cranial Nerves
  3. Motor
  4. Reflexes
  5. Sensory
  6. Coordination
  7. Gait

The "High-Yield" Neurologic Examination: Top Ten Suggestions for a Better Neurologic Examination

1. If the patient can give a completely coherent history, then the mental status examination is probably normal

Digits Forward

- Outstanding test of attention to screen for delirium
- Given successively long strings of digits 1 second apart
  - 6-8-2-4
  - 5-1-9-3-5
  - 8-6-2-6-3-7
  - 5-4-6-9-7-5-2
- Less than 5 is abnormal and indicates an attentional deficit

Case 1: Mental Status

- A 73 year-old woman comes to the ER with 2 days of feeling fatigued
- General physical examination is normal and there is no weakness on neurological examination
- Language testing is abnormal

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2. Speech does not equal language: test three elements of language in each patient

Aphasia Testing

- Fluency: Use Naming and Conversation
- Comprehension: More difficult commands
- Repetition: “Today is a sunny day…”

Aphasia Chart

Name	Fluency	Comp	Rep
Broca's	Bad	Good	Bad
Wernicke's	Good	Bad	Bad
Global	Bad	Bad	Bad
Conduction	Good	Good	Bad
Transcort Motor	Bad	Good	Good
Transcort Sens.	Good	Bad	Good
Transcort Mixed	Bad	Bad	Good

Cranial Nerve Testing

II: Pupils, Acuity, Visual Fields

III, IV, VI: Extraocular Movements

V: Facial Sensation

VII: Facial Strength

VIII: Hearing

IX, X: Palatal Elevation and Gag

XI: SCM and Trapezius Power

XII: Tongue Power

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2. Speech does not equal language: test three elements of language in each patient
3. Visual field testing is highly informative and underutilized by the non-neurologist

Screening for Visual Field Deficits

- Cooperative patient: Move examiner finger in the center of each quadrant with patient gaze fixed
  - Test each eye by covering the opposite eye, present stimulus in all 4 quadrants
- Uncooperative patient: Use a single digit to suddenly approach each half of the visual fields; normally elicits a blink
  - Avoid using entire hand: elicits corneal reflex
  - Report as “Does/Does not blink to threat”

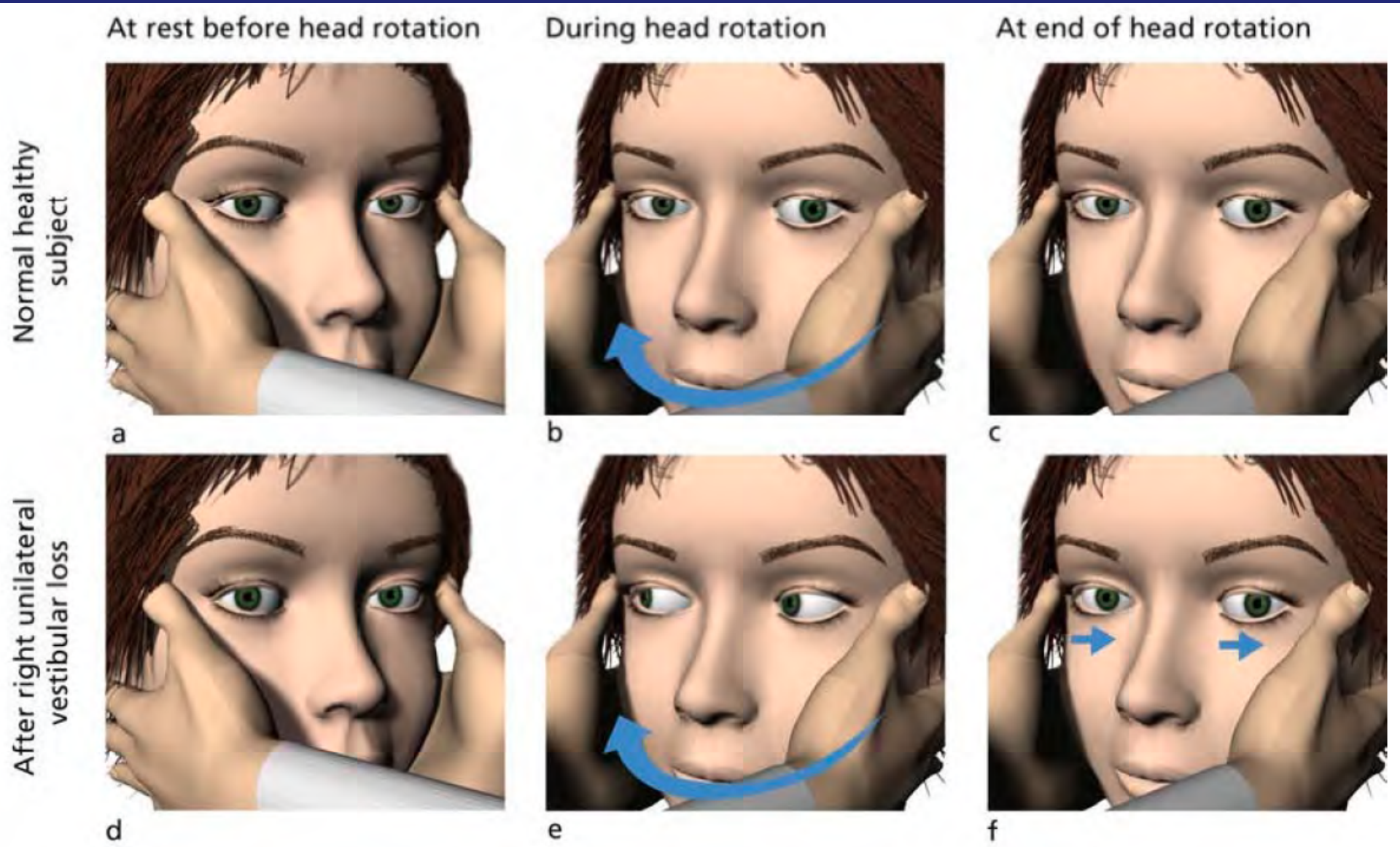
Central vs. Peripheral: Vertigo Exam Findings

- Always central, always needs imaging
  - 1. Any Cranial Nerve Lesion
  - 2. Any Asymmetric Cerebellar Finding
  - 3. Complete Absence of Peripheral Signs

HINTS

- Three step screen
  - 1. Head Impulse (should perform last)
  - 2. Nystagmus
  - 3. Test of Skew

http://content.lib.utah.edu/cdm/singleitem/collection/ehsl-dent/id/6



http://vertigodifferentiation.weebly.com/head-thrust.html

Coma

- Definition:
  - Not Awake
  - Not Arousable
  - Not Aware

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4. After establishing new-onset coma, the pupillary examination is the most important initial neurologic examination test

Two Localizations of Coma

- 1. Brainstem
- 2. Bilateral Hemispheres

- Step 1: CN exam to localize to brainstem or hemispheres
- Step 2: Pupils uneven: Structural not metabolic etiology

Case 2: Cranial Nerves

- A 54 year-old man with no PMH presents after being hit in the right temple with a baseball while playing with his son.
- General physical exam is normal. On neurologic examination the patient is lethargic. The right pupil is 7mm and minimally reactive while the left reacts briskly 3 to 2mm. The rest of the neurologic examination is normal.

“Fixed” Pupils and Coma

- Dilated (7-9mm): Early Herniation
- Mid-Position (3-5mm): Late Herniation
- Caveats
  - ? Adequacy of light stimulus
  - ? Drug Effect

Case 2: Cranial Nerves

- Over the next hour, the patient becomes unresponsive and develops extensor posturing on his left side

Cranial Nerve Testing: Coma

II: Pupils, Visual Fields

III, IV, VI: Oculocephalic Maneuver

V, VII: Corneal Reflex

VIII: Cold Calorics

IX, X: Gag, Cough, Spontaneous Respirations

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5. Use an appropriate screen for Upper Motor Neuron-type weakness

Case 3: Motor

- A 75 yo male with HTN, DM and current tobacco use comes to the ED with mild problems walking and a complaint of “my left arm is not working right.”

Case 3: Motor

- The ED physician tells you that he knows the patient has no weakness in his extremities as his own exam shows equal hand grasps, moving all fours, and “stepping on the gas” in the lower extremities.

Upper Motor Neurons of the Pyramidal Tract

Predictable Pattern of Weakness

Distal Extensors of the UEs and Distal (Dorsi)Flexors of the LEs

Quick Screen for Upper Motor Neuron/Pyramidal Weakness

- Pronator Drift
- Fine Finger Movements/Toe Taps
- One muscle in each of four extremities
  - Upper Extremities: 1st DI or finger extensors
  - Lower Extremities: Extensor of big toe

- Common ED screen VERY insensitive!

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6. Use the exam to localize the weakness in the nervous system

	UMN	LMN
Pattern of Weakness	Pyramidal	Variable
Function/Dexterity	Slow alternate motion rate	Impairment of function is mostly due to weakness
Tone	Increased	Decreased
Tendon Reflex	Increased	Decreased, absent or normal
Other signs	Babinski sign, other CNS signs (e.g. aphasia, visual field cut)	Atrophy (except with problem of neuromuscular junction)

	Motor Neuron Disease	Neuropathy	NMJ	Myopathy
Weakness Pattern	Variable	Distal	Diffuse	Proximal
DTR	Increased, normal and/or decreased	Decreased or absent	Normal or decreased	Normal or decreased
Atrophy	Yes	Yes	No	No
Fasciculations	Yes	Sometimes	No	No
Sensory symptoms/ signs	No	Yes	No	No

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5. Use an appropriate screen for Upper Motor Neuron-type weakness
6. Use the exam to localize the weakness in the nervous system
7. Use the sensory examination sparingly and logically, testing each major pathway

Sensory Testing Modalities

- Vibration (128Hz Tuning Fork)
- Joint Position Sense/Proprioception
- Temperature
- Pinprick
- Light Touch (Not Useful)

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Case 4: Sensory

- A 45 yo man presents with 2 days of progressive tingling and weakness of the lower extremities. He now is having trouble walking and rising from a chair.

Case 4: Sensory

- Exam
  - MS, CN normal
  - Motor: normal tone throughout, normal power in upper ext., 4/5 throughout in the lower extremities
  - Sensory: decreased PP/Vib/temp patchy in lower extremities
    - A sensory level is found at T10

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8. Symmetry of reflexes is important, rather than absolute value

Reflex Tips

- Know the cord level of each reflex
  - Biceps: C5-6
  - Triceps: C7-8
  - Patella: L2-4
  - Ankle: L5-S1
- Symmetric positioning is key
- Expose the muscle being tested
- Strike with only moderate force

Case 5: Coordination

- A 54 year-old woman presents with vertigo and gait difficulties
- On finger-nose-finger, she exhibits dysmetria with the right upper extremity, but not with the left

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8. Symmetry of reflexes is important, rather than absolute value
9. In the coordination exam, bilateral abnormalities are often benign

Key Cerebellar Exam Tips

- Bilateral dysfunction is often benign and drug/medication related
- Unilateral dysfunction is a cerebellar lesion until proven otherwise
  - CT insensitive in this region
- Cerebellar tracts run through the brainstem
  - Cerebellar signs with cranial nerve deficits is a brainstem lesion until proven otherwise

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9. In the coordination exam, bilateral abnormalities are often benign
10. The single most useful test on the neurologic exam is having the patient ambulate

The (Misunderstood) Romberg

- How to perform
- What systems help us stand?
  - 1. Cerebellum
  - 2. Motor
  - 3. Vestibular
  - 4. Dorsal Columns
  - 5. Vision

Part of the Sensory Exam!

NOT Gait or Coordination Exam

The Quick Screening Exam

1. Mental Status: Digits forward, 3 elements of language
2. Cranial Nerves: Pupils, visual fields, EOMs, facial droop
3. Motor: 3-step screen for UMN weakness
4. Reflexes:
5. Sensory: Test toes w/ 2 modalities (1 from each path); Romberg
6. Coordination: Finger-nose-finger
7. Gait: Walk the patient