How to examine the elderly patient
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No conflicts of interest
Introduction
Mental Status
Cranial nerves
Extremities/Gait
Screening and functional tests
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Cranial nerves
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Screening and functional tests
skull thickened
meninges thickened
brain and spinal cord shrunked
neuronal loss
peripher fibres loss
media thickening

Critchley, Lancet 1931
The neurology of aging

- loss of 10-50,000 neurons/year
- reduction of brain weight (20-90y: 5-10%)
- reduction of olfactory, hearing neurons
- reduction in number/size of muscle fibers (25%)

Neurologic history and examination I

• "low and high doctor“ control history
• systematic review of systems and examination
• "you won`t find what you don`t look for“

• observation during interview, walking, undressing,..
• examination is guided by hypothesis

Elderly
• speak/go slow, open-ended questions
• enough light/glasses
• sit in front (eye-level, lips reading)
Neurologic history and examination II

Abnormal findings

• normal aging  usually predictable, symmetric
• residua  unpredictable, often asymmetric
• early signs of a neurologic disorder
Epidemiology of neurologic problems >65y

M. Alzheimer incidence: 1%, prevalence: 2–4%
M. Parkinson incidence: 0.1%, prevalence: 1%
Stroke incidence: 0.5–1.0% (2% when >85y)

Dementia prevalence 5–7% (40% when >90y)
Gait problems prevalence 5–15% (40–60% when >80y)
Hearing loss prevalence 30%

Geriatric Functional Assessment, UoM, 2003; De Lau, Lancet Neurol 2006
Figure 3: Age-specific prevalence of dementia by world region and in major countries
Patterns of age-specific prevalence of dementia are similar across worldwide regions, but vary substantially among the oldest old (age ≥90 years). 72-75

Winblad, Lancet Neurol 2016
M. Parkinson

De Lau, Lancet Neurol 2006
Stroke

Nature Reviews Neurology 2010
Stroke

Incidence

Mortality

Feigin, Lancet 2014
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Mental status examination of the elderly I

- a mental status examination is mandatory in all pts

- observation/history taking are informative:
  - vigilance, drive, attention, memory
  - language, speech
  - mood, behavior
  - insight, concern

- screening/formal tests are done according to clinical situation and hypothesis
Imitation behavior
(environmental dependency syndrome)
Mental status examination of the elderly II

Normal are mild/discrete:
- psychomotor **slowing** (word fluency > 14/min)
- problems **with recall, create new memories**

Abnormal are disturbances of:
- orientation, attention (digit span < 4)
- language, speech
- judgement
- praxias
- organization of space (clock drawing)
Apraxia („le corps pour object“)

„Show me how you comb your hair“  „Show me how you brush your teeth“

K.B., 70y
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Cranial nerve examination of the elderly

Normal are:
• decrease of olfaction (in 75% >75y), and taste
• small pupils, sluggish reflexes
• limited upgaze (10–20 degrees), convergence, pursuit
• reduced facial expression
• hearing loss (presbyacusis, 30% >65y, high frequencies)

Abnormal are:
• clear-cut vision or visual fields deficits
• unilateral pupillary changes, ptosis
• nystagmus
• dysarthria

Chamberlain, Am J Ophtalmol 1971
Kaye, Arch Neurol 1994
M.R., 67y: since many years

M.W., 61y: acute after exercise

J.D., 80y: fluctuating

N.N., 85y: „I do not know“
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Motor examination of the elderly

Normal are:
• some muscle **wasting** (thenar, small feet muscles)
• decrease of **strength** (20–30%, legs>arms)
• mild **bradykinesia**
• mild **paratonic rigidity** (Gegenhalten, legs)
• mild, symmetrical **extrapyramidal signs** (50% >85y)

Abnormal are:
• **paresis** (exception: proximal legs)
• **tremor**
• **ataxia**

Mild central paresis

Mingazzini/Barré

E.W., 80y
Mild central paresis

Barré/Mingazzini

K.B., 51y
Prevalence of Parkinson syndrome

467 subjects >65 year-old:

- Parkinson syndrome*: 34%
  (resting tremor: 5%)

- 2x higher risk of death

*2 ore more: bradykinesia, gait disturbance, rigidity, tremor
Sensory/reflex examination of the elderly

**Normal are:**
- decreased *vibratory sensation at the ankles* (25-50% >85y)
- decreased *achilles reflexes* (absent in 5-10% >65y)
- *primitive reflexes* (at least 1 in 25% general population)

**Abnormal are:**
- loss of touch, pinprick, postural sensation
- loss of *patellar reflexes*
- *Babinski sign* (when bilateral: cervical myelopathy)

Increase of central motor drive

**Fig. 4.2 (a,b):** Two manoeuvres to increase the central motor drive: Jendrassik manoeuvre (a) and clench-your-teeth manoeuvre (b)

**Fig. 4.2a**

**Fig. 4.2b**

E. Jendrassik
1856–1921

A. Van Gehuchten
1861–1914

EAN e-book
Neurological examination
Primitive reflexes

25% of subjects one primitive reflex
0.4–2% ≥1 reflex

Brown, Neurology 1998
Grasping

Motor impersistence

Z.A., 68y
Babinski sign
Signe de l’orteil, signe de l’éventail

C. Rend. Soc. Biol
1896; 3: 207-8

Gaz Hôp 1900; 53: 533-8

Rev Neurol 1903; 11: 728-9
Standing and gait examination of the elderly

Normal are:
• increased postural sway (presbyastasis, Romberg+ in 50%>85y)
• general flexion (head/neck, kyphosis, elbows, knees)
• gait slower and cautious (walking on ice)
• short steps (marche à petits pas)
• shortened standing on 1 leg (>65y: 5–15 sec, eyes open)
• impaired tandem gait

Abnormal are:
• start hesitation, shuffling, freezing
• falls

Predicted median life expectancy by age and gait speed

Studenski, JAMA 2011
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Useful screening/functional tests

Screening
• for dementia (MoCA)
• for depression

Functions
• timed up and go test
• activities of daily living

1) "During the past month, have you often been bothered by feeling down, depressed, or hopeless?"

2) "During the past month, have you often been bothered by little interest or pleasure in doing things?"
Montreal Cognitive Assessment (MOCA)

cut-off for AD 26
high sensitivity, low specificity

Davis, Cochrane Database Syst Rev 2015
Thomann, J Alzheimer Dis 2018
Timed up & go test

cut-off <10 sec
Conclusions

• abnormal findings often due to pathologies, not age
• mental and gait examination very important

• Common normal findings in the healthy elderly subject:
  - slow cognition, minor memory problems
  - reduced vision, hearing, upward gaze
  - primitive reflexes
  - decreased vibratory sensation and ankle reflexes
  - cautious gait with short steps, difficult tandem

Biedert, Fortschr Neurol Psychiat 1993; Gladstone, Geriatr Aging 2002