



PÉCSI TUDOMÁNYEGYETEM  
ÁLTALÁNOS ORVOSTUDOMÁNYI KAR

# Examination of posture, muscle strength and flexibility

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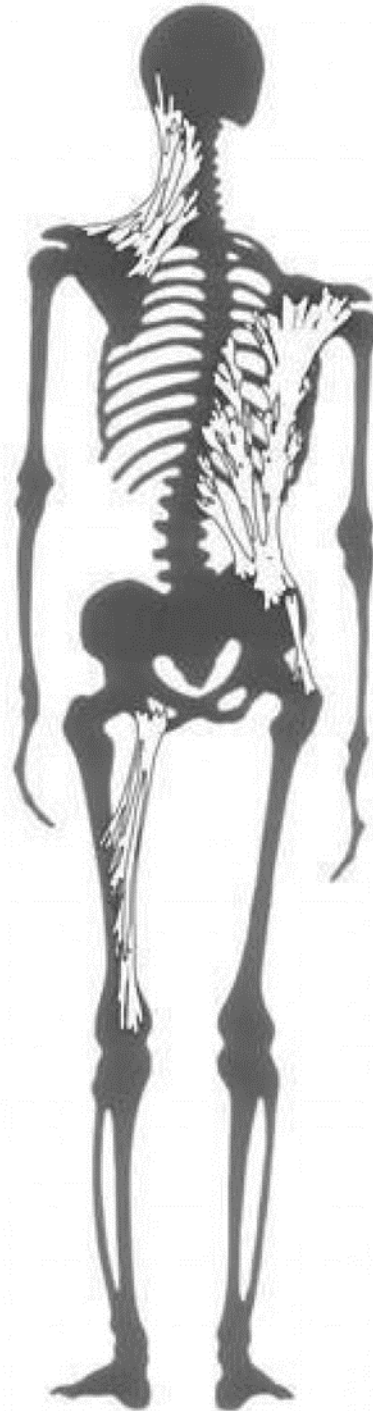
Examination of posture, muscle strength and flexibility

# Proper body pos



Examination of posture, muscle st

# Who are you?



# Tests of posture, muscle strength and flexibility tests

- Posture is a dynamic state of equilibrium maintained by muscles and tendons (as dynamic structures), ligaments, fasciae, bones, joints (as passive elements) and the nervous system as a coordinator of the foregoing.
- If the posture deviates from the biomechanically correct posture, it is called a postural dysfunction.
- Posture can be assessed using functional tests and various tools.

***In which clinical cases would you use posture examination?***

# Medical examination

- Past medical history, complaints
- Inspection (assymetry, swelling, movements)
- Palpation
- Imaging examination
- Diagnose
- Treatment recommendation



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# Inspection





Examination of posture, muscle strength and flexibility

# Tests for postural assessment

- Photo analysis



# Inspection task

Work in pairs.

Observe each other's posture from the front, side, and back.

Check: shoulder symmetry, pelvic tilt, spinal curves.

Write down 2 normal and 2 abnormal findings!





# Tests for postural assessment

- Adam's test
- Scoliometer

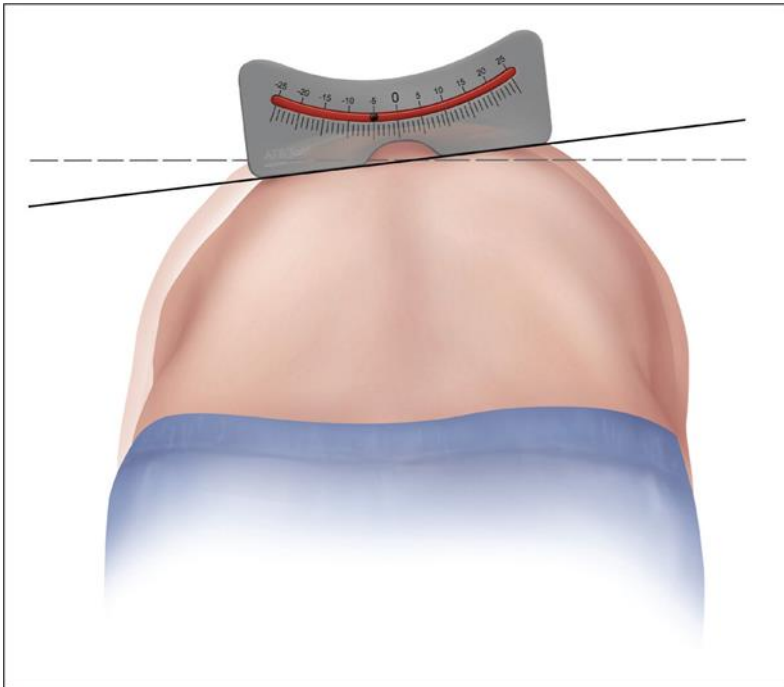


ILLUSTRATION BY RENEE L. CANNON



*Positive test result for scoliosis  
as seen from examiner's perspective*



# Tests for postural assessment

- Plumb line

- **Plumb line** - On posterior aspect, line drawn from occiput should normally align with gluteal cleft

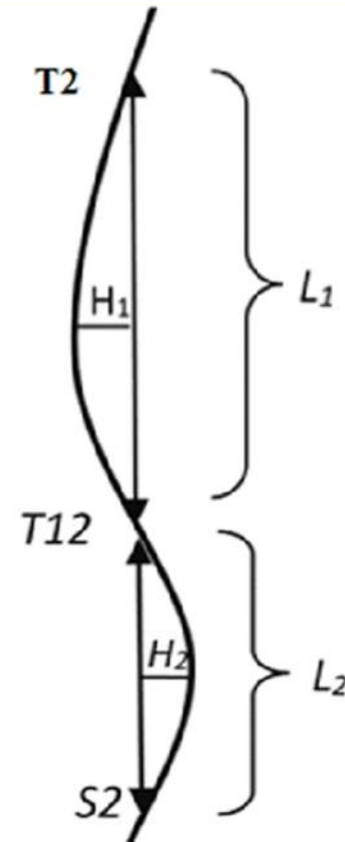
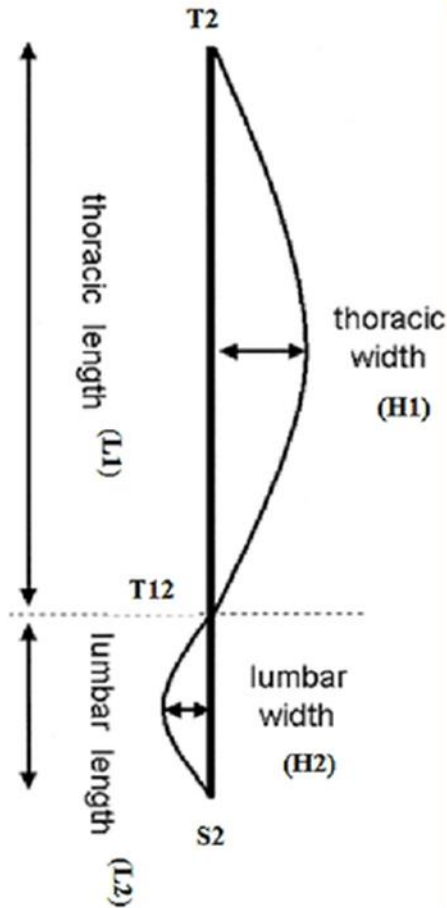


Figure 18.7. Diagram of a left thoracic scoliosis with a plumb dropped from the C7 spinous process. Weight shift can be noted by the plumb line striking the left buttock.



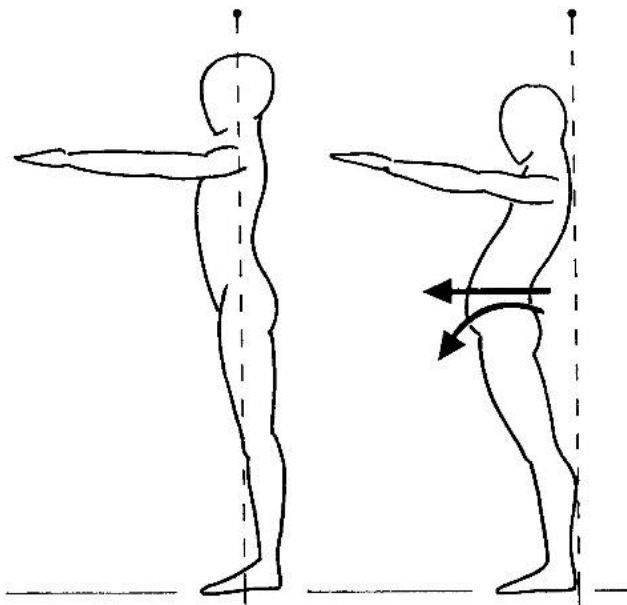
# Tests for postural assessment

- Flexiruler (Delmas index: normal value 94-96%)  
< 94% dynamic spine, > 96% static spine



# Tests for postural assessment

- Matthias test



**Matthias test** (long-arm holding test) is a simple method to examine postural endurance and spinal stability.

**Starting position:** standing, arms extended forward at shoulder height, palms down, elbows straight.

**Execution:** maintain this posture for 30 seconds.

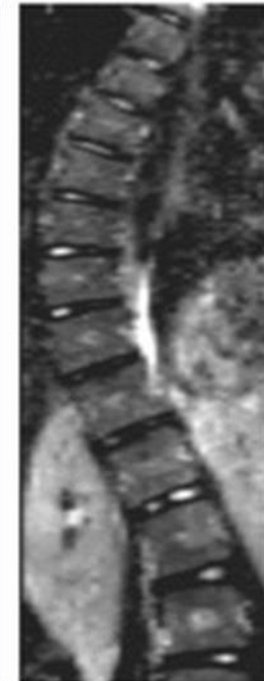
**Observe:**

- Shoulders: do they fall forward?
- Spine: thoracic kyphosis/lumbar lordosis increase?
- Pelvis: tilt?
- Head: moves forward?
- Arms: sinking due to fatigue?

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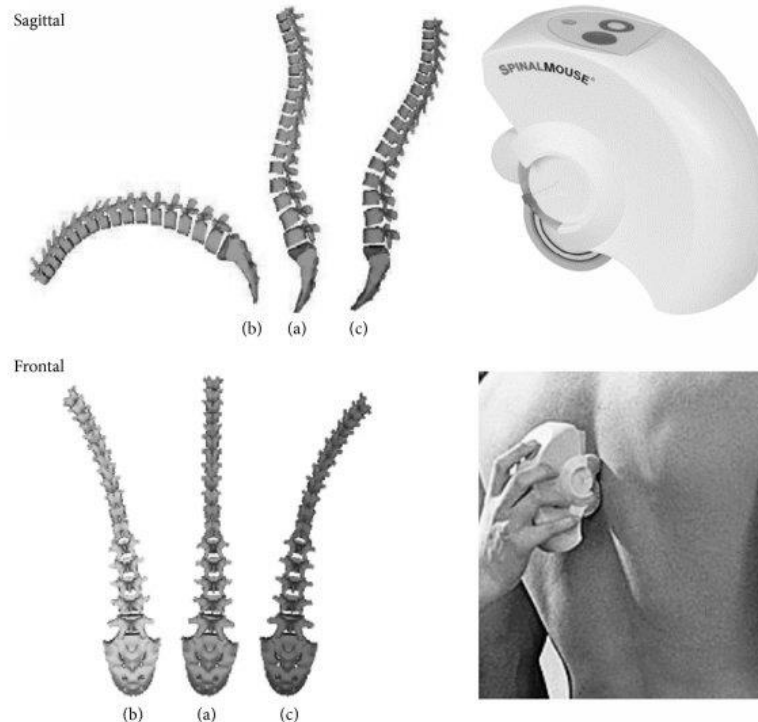
# Tests for postural assessment

- X-ray
  - CT
  - MRI
- (radiation exposure)



# Tests for postural assessment

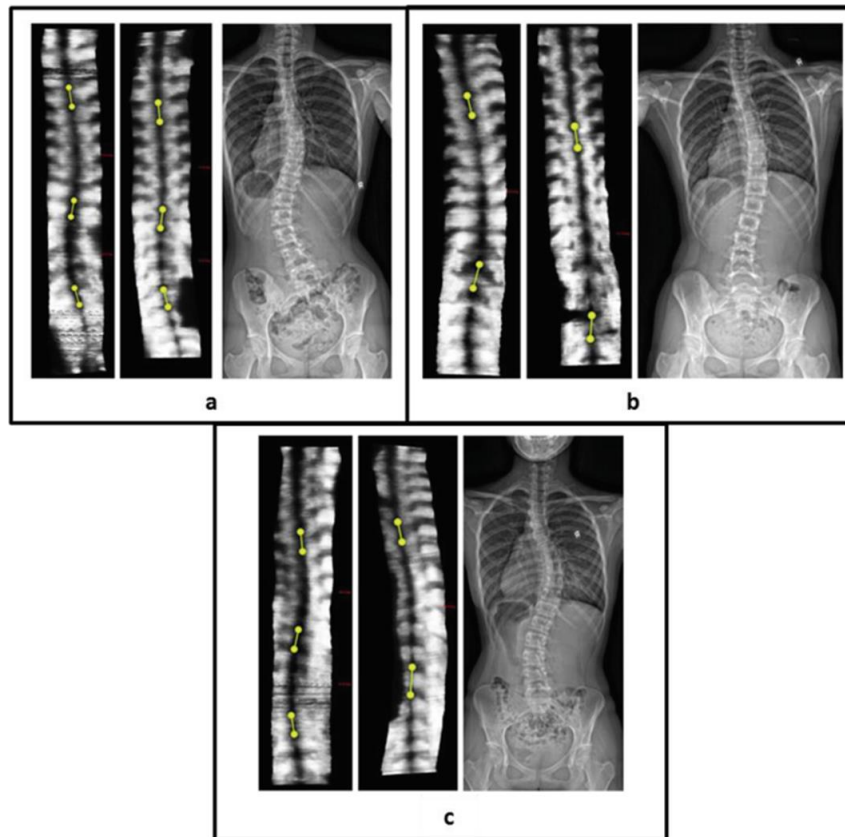
- Spinal Mouse (electromagnetic pulse changes)
- <https://www.youtube.com/watch?v=7En8WEaU4Dw>





# Tests for postural assessment

- 3D Ultrasound
- <https://www.youtube.com/watch?v=wWunRwJuTgA>



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# Tests for postural assessment

- Zebris CMS-HS – Spine examination system



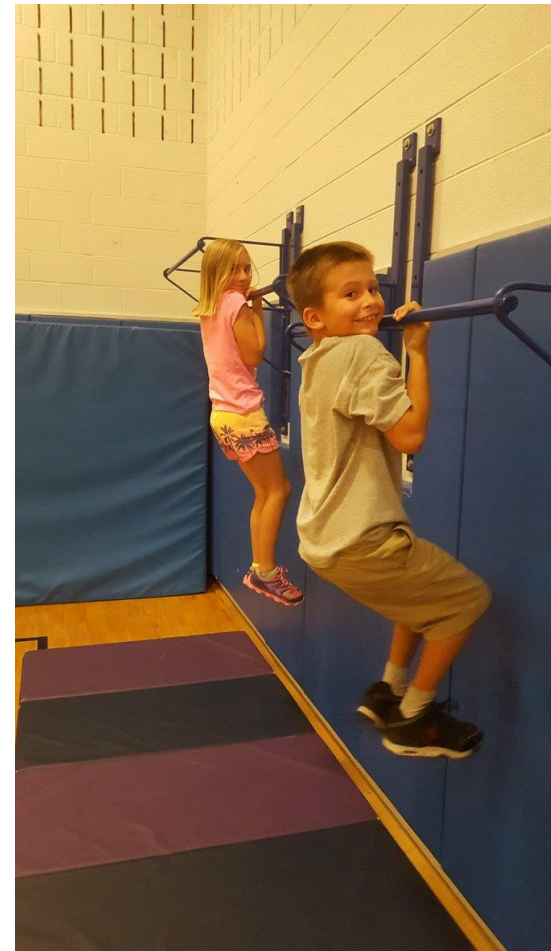
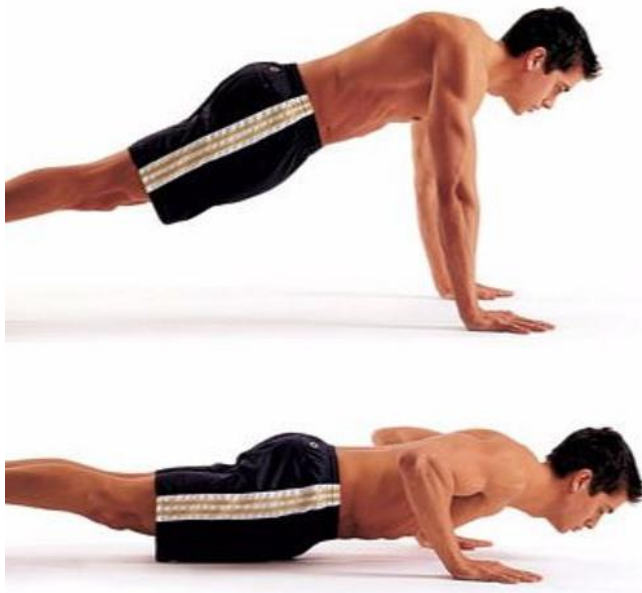
## Additional tests to assess the strength of muscles involved in posture

- Trunk lift test
- Isometric leg strength test (Groeningen)
- Static muscle strength tests (according to Kempf)



# Tests of upper body strength and endurance

- Stretching test
- Timed push-up test
- Flexed arm hanging test





# Tests of lower body strength and endurance

- Squat test
- One leg squat test
- 30 second jump test
- Chair stand test



## Muscle tests of the trunk

- Abdominal muscle endurance test
- 30 second sit-up test
- Muscular strength test of the trunk, shoulder girdle and pelvic girdle (Core test)
- Stretch tests (Kempf tests)

verywell





## Sit-to-Stand test (STS)

- The (STS) assesses functional lower limb strength, endurance, and coordination.
- 5xSTS: measure time to stand up and sit down 5 times, arms crossed.
- 30sSTS: count how many times the person can stand in 30 seconds.
- Test each other and note observations (use of arms, stability, forward lean).
- What did you feel? What errors did you notice?"
- Discussion: clinical meaning → geriatrics, rehab, sports medicine.



## Sit-to-Stand test (STS) values

### 5xSTS:

- Young adults: < 10 sec
- 60–69 yrs: 11–12 sec
- 70–79 yrs: 12–13 sec
- 80–89 yrs: 14–15 sec
- 15 sec (especially >60 yrs) = increased fall risk.

### 30sSTS (average repetitions):

- 60–64 yrs: men 14–19, women 12–17
- 65–69 yrs: men 12–18, women 11–16
- 70–74 yrs: men 12–17, women 10–15
- 75–79 yrs: men 11–17, women 10–15
- 80–84 yrs: men 10–15, women 9–14
- 85–89 yrs: men 8–14, women 8–13
- 90–94 yrs: men 7–12, women 4–11

In general: >20 reps = very good (young adults), ~10–15 reps = normal in elderly.



# Posture examination in sport

## 1. Sport improves posture compared to non-athletes

- For general muscular development

## 2. Relationship between athletes' posture and injury incidence

- In swimmers, poor posture as aetiology of swimmers shoulder
- Table tennis athletes kyphotic posture behind chronic back pain
- In football players, trunk asymmetries and sagittal plane deviations in the background of muscle strains

## 3. 'Sport-specific' posture

- Hyperkyphotic posture in swimmers
- Dancers hyperlordosis
- Basketball and handball frontal asymmetry





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# Thank you for your attention!



**SPORTMED**

PTE ÁOK SPORTMEDICINA TANSZÉK

*Egy csapatban*

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