Forward Head Posture (FHP) is the tendency to carry one’s head forward of one’s torso. FHP has been associated with numerous health problems, including:

- neck pain
- carpal tunnel syndrome
- headaches
- reduced lung capacity
- and, in older people,
- increased fall risk
- higher mortality

Although FHP tends to increase with age, it is not directly attributable to physiological causes such as osteoporosis. Thus, it is important to consider possible alternative factors.

Some aspects of posture, such as balance during gait, have recently been shown to be associated with executive functions (EF), the high level cognitive processes that organize and order behavior. Therefore, we hypothesized that EF is associated with postural alignment, as characterized by FHP.

Study Goal: To investigate the possible relationship between FHP and specific aspects of cognition in older adults

Methods

Subjects: 55 neurologically healthy adults (part of a larger study)
- Exclusions: neurological disease, history of stroke, brain surgery
- aged 50-86 (median 67)
- 62% female
- 11-20 years of education (median 16)

Measures:
- FHP: Subjects were instructed to stand normally. Neck angle (tragus-C7) was measured from a horizontal with an inclinometer. FHP is characterized by smaller than normal neck angles.
- Cognitive function: We tested executive and non-executive cognitive functions. EF tasks were grouped as proposed by Miyake into inhibition, task switching, and working memory categories, with the addition of verbal fluency. Non-EF tasks focused mostly on memory.

Analysis: We computed correlations between neck angle and performance on cognitive tasks, with and without corrections for age.

Stimuli for the Stoop task

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Conclusions

FHP in healthy older adults is associated with deficits in EF, including inhibition, task switching, and verbal fluency.

- List learning, the only aspect of memory that correlated with FHP, was recently shown to be related to EF in subjects with Parkinson’s disease.
- The results are consistent with recent findings that EF is associated with deficits in postural control in Parkinson’s disease.
- Do these correlations indicate an underlying causal relationship?
  1. FHP could interfere with blood flow to the brain, thus affecting the most fragile cognitive functions (EF).
  2. Inhibitory deficits could cause people to allow the head to move ahead of the body, and this “head leading” posture could become habitual.
  3. Further studies will explore these possibilities.

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References