

Vestibular dysfunction as a key contributor to balance impairment in dementia

Michele da Rocha ANSELMO^{1,2,3}, Lucélia Epifânio Pereira DA SILVA^{1,2,4}, Bianca Melo GONÇALVES^{1,2}, Lara Catarine Inácio DA SILVA^{1,2}, Giovanna Correia Pereira MORO^{1,5,6}, Bruna Fulgêncio DIAS, MSC^{5,7,8}, Gabriela Tomé Oliveira ENGELMANN, MSC^{1,3,4}, Bernardo de Mattos VIANA, PhD^{1,3,4,5}, Maria Aparecida Camargos BICALHO, PhD^{1,3,4,5}, Ludimila LABANCA, PhD^{1,2,3}.

Introduction

Falls represent a major public health concern among older adults and are particularly prevalent in individuals with cognitive impairment and dementia, being one of the main causes of morbidity, loss of independence and functional decline. Although balance impairment is already recognized in dementia cases, the specific contributions of sensory integration systems involved in postural control are affected across different stages of cognitive decline.

Methods

This research project was approved by the local ethics committee.

Participants: Individuals from a older adult health research group located in an older adults health reference center in Belo Horizonte, Minas Gerais, Brazil

Evaluation: **medical** and **neuropsychological evaluation**, anamnesis and **static posturography**.

Included

Posturography tests:

- Stability limit test;
- Sensory integration test (Figure 1 and 2).

G1 -
Cognitive
Unimpaired
(n=32)

G2 - Mild
Cognitive
Impairment
(n=51)

G3 -
Dementia
(n=40)

Analyses: Group differences in balance performance were statistically assessed across diagnostic categories.

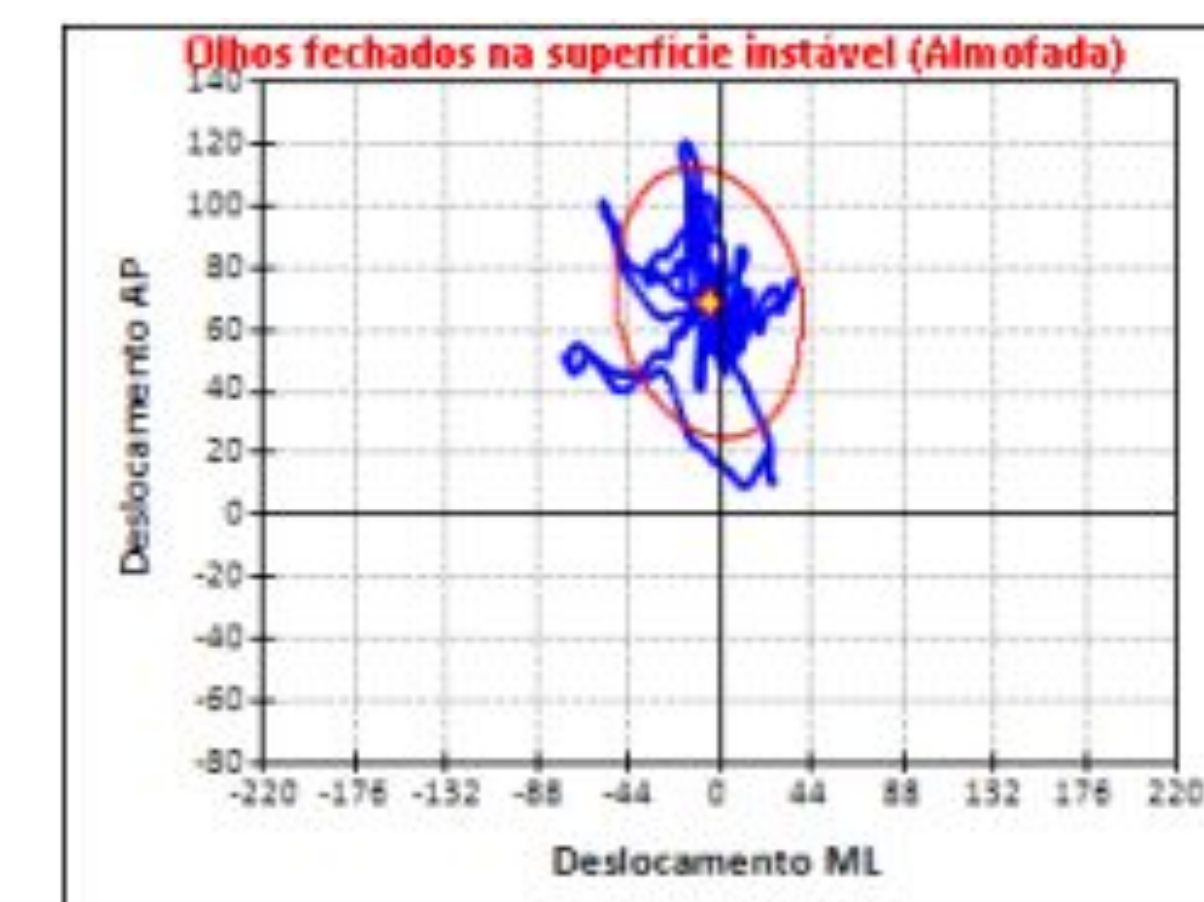
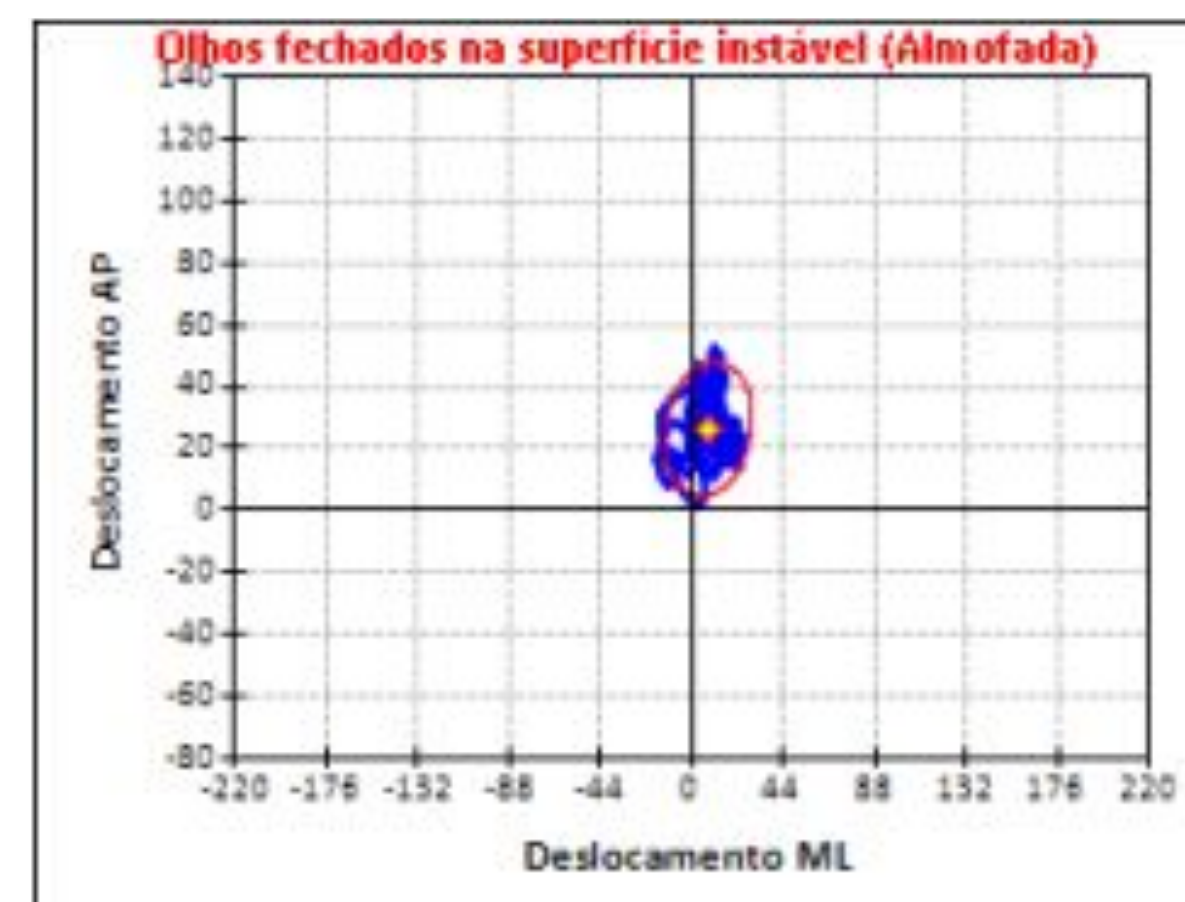


Figure 1: Stability Limit Test

Two graphical examples of the results from one of the sensory integration test tasks in a patient from the cognitively unimpaired group and the dementia group, respectively.



Figure 2: Sensory integration test

Older adult performing sensory integration test

Results

The Dementia group demonstrated significantly lower scores on the Vestibular Index ($p=0.018$) and General Balance Index ($p=0.008$) compared to the Cognitive Unimpaired group. No statistically significant differences were found between the groups in the visual and somatosensory indices. The MCI group showed intermediate performance between the Cognitive Unimpaired and Dementia, without reaching statistical significance.

	Cognitive Unimpaired	Mild Cognitive Impairment	Dementia
Global balance index	91,4	86,3	82,9
Vestibular index	82,6	74,8	66,0
Visual index	91,0	85,0	82,8
Somatosensory Index	99,2	98,4	97,3

Chart 1 - Results of static posturography

Conclusion

These findings suggest that vestibular dysfunction plays an important role in balance impairment among older adults with dementia, while individuals with MCI may already exhibit early, subclinical balance alterations. The preservation of visual and somatosensory inputs alongside reduced global balance effectiveness may help explain the increased fall risk in cognitively impaired older adults, reinforcing the importance of balance assessment across the cognitive aging continuum.

References



Contact

