Contributors to Aging and Physical Function that are Under-recognized: Visual Function, Auditory Function, Swallowing&Vocal Function, and Oral Health

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Multisensory Loss in Older Americans is Common

By Age Group

Data based on n=2968 community-dwelling seniors in U.S.


Severity

Poor

Fair

# of Impairments

4 or 5

3

2

Estimated Prevalence

Severity: Poor and Fair

# of Impairments: 4 or 5, 3, 2

By Age Group:


Estimated Prevalence
The Challenge of Medical Comorbidity and Sensory Organ Dysfunction is a Two-Way Street

Comorbidity affects treatment plans and outcomes for sensory organ dysfunction or impairments.

Sensory health affects patient experience and ability to care for other chronic conditions.
Overview of Potential Mechanisms Linking Sensory Function and Cognition
Sensory Health in the Traditional Medical Model

The House of Medicine

Eye Care

Oral Care

Ear&Nose Care
Sensory Health is Central to Human Health

Sensory organs should come up in any discussion rooted in:

4Ms Framework

- What Matters
- Mobility
- Mentation
- Medication

Age-Friendly Health Systems

An initiative of The John A. Hartford Foundation and the Institute for Healthcare Improvement (IHI) in partnership with the American Hospital Association (AHA) and the Catholic Health Association of the United States (CHA).
Each of the next talks will briefly review a domain of health related to a sensory organ with attention to:

1) State of the science on the relationship between this domain and aging outcomes and mechanisms

2) Practical suggestions for measures and biomarkers relevant to that domain
Visual Function and Aging

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Epidemiological Evidence is Clear

Vision Loss is a Risk Factor for:

- Disability
- Depression
- Falls, Accidents, and Injuries
- Greater healthcare utilization
- Caregiver stress
- Cost
- Cognitive impairment
- Accelerated cognitive decline
In analyses restricted to those with overlapping propensity scores across VI groups and adjusted for age, race, sex, smoking, diabetes, # comorbidities:

Cross-sectional Odds Ratios: 3.15 to 5.52
Late-life vision loss is linked to changes in the brain.

Group Connectometry Analysis
[Unpublished results]
We know that correction or accommodation of vision loss improves function and QoL.

To what extent does treatment of age-related vision loss prevent or improve other outcomes that have been associated with late-life vision impairment?
“Vision” has many components

- Distance visual acuity
- Near visual acuity
- Visual Fields
- Contrast Sensitivity
- Color vision
- Depth perception
- Visual processing

(a central process)
Vision loss has many causes

The “Big 5” in Aging:
- Age-related macular degeneration (AMD)
- Cataracts
- Glaucoma
- Diabetic retinopathy
- Refractive error
Measurement Considerations: Distance Visual Acuity

- Measure best corrected and/or presenting vision?
- Measure right eye (OD) and left eye (OS), or both eyes (OU), or all 3?
- Convert your measures (e.g., 20/40 or 4/8) to LogMAR for analysis (logarithm of minimal angle of resolution)
More Measurement Options: Contrast Sensitivity an Near Vision Tools

Pelli Robson Chart for Contrast Sensitivity

Continuous Text Reading Cards for near vision

The fish jumped from the boat into the lake.
The boys do not want to leave the lake.
The lady put her book in a large glove.
What if I’m using survey instruments?

Self-reported vision ability
-No agreed-upon standard for simple question(s)
-E.g., “Rate your vision with your best glasses, if you wear glasses” Scale 0 (blind) to 10 (excellent)
-Typically correlate to clinical measures, but concordance not perfect¹

Vision-related quality of life (Age 18+)
-53 items, 10 minutes to administer

Vision function
-NEI-VFQ (39- or 25-item versions)
-VA-LV-VFQ (48 items)

¹El-Gasim et a. Ophthalmology 2012
El-Gasim et al. IOVS 2013
Coyle et al. J Aging Health 2017
Retinal Imaging: Promising Biomarkers

Optical coherence tomography (OCT)

Ultra wide field photography +/- Autoflourescence

OCT - Angiography