

# CHANGES IN NEAR VISUAL ACUITY OVER TIME IN THE ASTRONAUT CORPS



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## Background

Presbyopia is characterized as the gradual loss of near visual acuity over time due to a loss in ability to accommodate. It generally develops in the mid-40s and progresses until about age 65; the mean age of onset within the general population is 45-47 years old<sup>1,2</sup>. Presbyopia can be corrected with eye glasses, contacts, or LASIK.

## Purpose

We hypothesized that visual impairment due to intracranial pressure (VIIP) would induce development of presbyopia at an earlier age in the astronaut population, with long duration flyers at an especially high risk.

## Design and Methods

We reviewed annual vision exams conducted on active NASA astronauts with any spaceflight experience. All astronauts participating in long duration (30+ days) and short duration (29 days or less) missions were included in the analysis. For the purpose of this analysis, onset of presbyopia was characterized as performance of 20/40 or greater on the standard Snellen test.

## Sample Characteristics

- Had a preflight and postflight vision exam or annual exams before and after flight
- 40 to 60 years of age at the time of analysis (2013)
- Uncorrected Snellen of 20/30 or lower prior to mission
- Repeat flyers were sampled until they were characterized as presbyopic

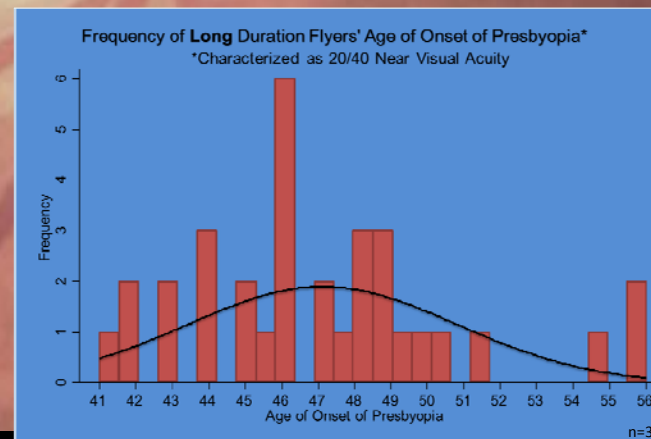
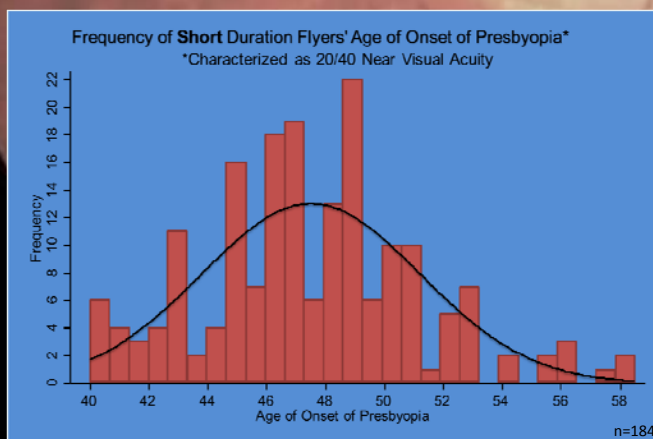
## Results

236 short duration and 48 long duration flyers were included in the analysis. The mean age of onset was 47 years old (SD±3.71).

Population	N	Number of onset vs no onset	Mean Age of Onset of Presbyopia	Standard Deviation	Age Range (Min, Max)
Total	284	217 vs 67	47.31	3.71	41.00, 58.50
Long Duration	48	33 vs 15	47.11	3.72	41.00, 56.01
Short Duration	236	184 vs 52	47.50	3.71	41.00, 58.50

## Conclusion

The mean age at onset of presbyopia is similar for short and long duration flyers, indicating that mission duration does not influence onset of presbyopia.



## REFERENCES

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- [2] Miranda, M. N. (1979). The geographic factor in the onset of presbyopia. *Transactions of the American Ophthalmological Society*, 77, 603.