

MOHLER SR. *Aging and space flight. Aerosp Med recent; 33:594-7.*

Summary of Original Publication

The motivation for this paper was the recent decision to set 40 years of age as the maximum for consideration to be selected as a Mercury Project astronaut. The article accurately predicted that in the future there would be a need for non-pilot astronauts as crewmembers with a high degree of specialization. Due to their qualifications, many such specialists would be considerably older than 40 yr and probably into their sixth decade of life. This came to pass 20 yr later with the selection of the first Mission Specialists.

The author also correctly predicted that long-duration spaceflight would lead to problems with physiological deconditioning such as bone demineralization, postural muscle atrophy, and cardiac atrophy. While this would not prevent the participation of older astronauts, they would require longer periods for rehabilitation and reconditioning. Joint function might be impaired and take longer to recover. However, older astronauts would have an advantage in adapting to the psychological stress and group dynamics of long-duration spaceflight. He noted that they would have an increased tolerance for monotony, be able to better withstand sensory deprivation, are better at precision performance tasks, able to more quickly find alternative solutions to problems, and would serve as a more stabilizing force to the crew. However, they would have more difficulty with "time pressured" tasks than younger astronauts. The biggest medical disadvantage would be with the difficulties associated with the inevitable onset of presbyopic vision after middle age. Neurovestibular function, hearing, and reaction times would not be significantly degraded until over the age of 65. Individual variation and genetic differences would probably be more important factors than age alone.

Finally, the article indicated that certification for flight of older astronauts would have to emphasize the

detection of coronary artery disease and malignancies, which would be made easier by future improvement in medical diagnostic abilities to detect those clinical entities.

Commentary by STANLEY R. MOHLER, M.D.

This paper was written when it was common practice to impose arbitrary age limits on applicants to various occupations. Thus, age limits were imposed on those interested in aviation careers and were in place at the initiation of the U.S. space program. From 1957-61, the author was a medical officer in the Center for Aging Research at the National Institutes of Health, which supported research showing that an individual's health status and performance capabilities were more useful criteria than was simple date of birth.

At the same time, human life expectancy was increasing in the U.S., Canada, Europe, and Japan, while computers were revolutionizing medical diagnosis and treatment. Research publications were providing increasingly clear data showing that the "normal aging process" was a separate entity from the effects of acquired diseases. NASA had set a mandatory cut-off age of 40 yr for the Mercury astronaut selections. This stimulated the suggestion in this paper that advances in medical diagnosis and treatment were making the use of arbitrary age cut-offs in selection obsolete relics of a past age. Evidence that this debate continued for decades can be found not only in later astronaut selection criteria but also in the continuing "Age 60" rule for airline pilots, which has only recently been taken off the books.

Classics in Space Medicine are selected from among more than 250 space medicine articles published prior to 1965 in this journal. The series is edited by Mark R. Campbell, M.D.

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