

MEMORANDUM

Lyndon B. Johnson Space Center



REFER

TO: CB-86-419

DATE

INITIATOR

CB/JPBagian:jmg:12-02-86:3721

ENCL

TO: CA/Director, Flight Crew Operations

CC
see below

FROM: CB/Chief, Astronaut Office

SIGNATURE

John W. Young

SUBJ: Treadmill Testing as Part of Annual Astronaut Physical Examinations

Currently, each member of the Astronaut Office must pass a physical examination annually to remain on flying status. While the maintenance of a healthy crew for safety purposes is a proper goal, certain tests are administered which are contrary to rational medical practice and potentially can result in physical harm to the individual examined.

In particular, the treadmill testing policy has recently been changed such that maximal treadmill testing is done when any of the following criteria are met:

- Age 20, 30, 35, 40 then biannually until age 50 and annually thereafter.
- Two or more risk factors (i.e., hypertension, smoking, (+) family history and/or CARE II equation) -- annual treadmills.
- Abnormal resting ECG or serial ECG changes.
- Arrhythmia is detected on the treadmill test -- annual treadmill.
- Evaluation of aerobic capacity for EVA during year of flight.

While this new policy is an improvement over the old policy (requiring each astronaut to perform one treadmill every year) there is little justification for treadmill testing based solely on age or EVA performance. An excellent summary of the guidelines for exercise testing was published this year in the reputable journal "Circulation" (Circulation 1986: 74, No. 3), and represented the recommendations of the Joint American College of Cardiology and American Task Force on Assessment of Cardiovascular Procedures (Subcommittee on Exercise Testing). This report in essence states that in the screening of apparently healthy individuals:

- a. The positive predictive value in asymptomatic male and, in particular, female patients of treadmill testing is poor especially in those without risk factors.

b. That screening of asymptomatic people should be limited to those over 40 years of age with two or more strongly abnormal risk factors (i.e., smoking, hypertension, or elevated blood lipids) or a family history of premature heart disease.

c. That screening of airline pilots with an "unhealthy lifestyle" (i.e., obesity, smoking, inactivity) would be justified on a periodic basis.

The recommendations of this "blue ribbon" committee do not represent any information which were not already recognized by the medical community at large for some time but rather present it in a concise fashion. The price of doing a screening test with a high yield of false positives (i.e., treadmill testing) increases the likelihood of the occurrence of physician induced problems and, therefore, the risk to the patient outweighs the benefit. For example, based on a quoted 40 percent false positive rate for treadmill testing and an 8 percent false positive rate for Thallium scans, which would have been done to clear up the treadmill false positive, we could expect up to 3.2 percent of our people who were healthy to be required to undergo cardiac catheterization. This is potentially very dangerous and it may represent medical malpractice for our population. It can kill astronauts or injure them for no reason.

Based on the information in the medical literature and what is considered to be appropriate medical practice, we feel that treadmill testing should only be done under those circumstances consistent with points a, b, and c above as recommended by the Joint American College of Cardiology Task Force. Specifically, treadmill testing should only be done in those individuals who have symptoms or signs of coronary heart disease (CHD), have two or more risk factors for CHD (i.e., smoking, hypertension, elevated blood lipids, or positive family history), or display an abnormal or serial change on their annual resting ECG. Furthermore, any treadmill testing which is desired for medical research rather than clinical purposes should be identified as such and sink or swim on its own merits with regard to peer review and the HRPPC. This treadmill research testing must not hide behind a fictitious clinical medical requirement to certify astronauts for flight.

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