

FAX 979 846 5151

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joe, the attached is a draft of
my planned submission to Drs
Mc Gonigal & Jeff Davis.
Comment is welcomed
encouraged ~ Bill

5 March 2008

To Whom It May Concern

The following are observations and comments on deletion of the Bruce Stress Test from the annual LSAH evaluation, based on extensive experience in exercise stress testing since 1960 with 27 years of it in the astronaut office, plus a life long personal interest in fitness.

1. The basis of comparative testing, such as in LSAH, is recognition of differing populations. Too often individual astronauts and the office have been damaged when such differences were not recognized. To apply decisions from an outside panel that did not include a cardiologist and based on study populations, recognized as being generally in less than good health and often with indications of CAD, violates basic scientific practice and ignores a JSC experience of half a century, including the LSAH study population. Why was the decision delayed four years after the panel's recommendation?
2. The LSAH was conceived as, and has been careful to maintain its annual evaluation as a study of longitudinal changes in fitness and health, not a clinical evaluation. When and why did this change? A clinical evaluation demands a different protocol, equipment and procedures.
3. Treadmill exercise stress tests were used to evaluate performance and physical condition for decades before it was possible to record EKGs from moving subjects. While more than the Bruce Stress Test should have been incorporated for this evaluation, even a Bruce allows a knowledgeable evaluator insight into the musculo-skeletal, neurological, metabolic, peripheral circulatory and psychological functions as well as a documented record of physical condition and performance. Patency of coronary arteries is or should be only one concern of this test as used here. Removal of this test further reduces the value of the LSAH.
4. For a subset of astronauts an annual "what can you really do?" test was and remains a significant incentive to maintain performance and condition. Don't discount this factor in a population known for its competitive nature, many of whom compete with themselves. It can be argued that removal of this test, which was always a part of astronaut life is an imposed alteration in the subject's life.

5. Dangers of the Bruce test: Essentially every evaluation in medicine has false positives and negatives, and some element of risk. Looking first at physical risks. It is small but finite here and increases with age. This population is probably too small to allow statistical evaluation for it, so established risks from the most similar population should be made available to participants who are then free to make an informed decision on participation. False positive/negative risks for the Bruce are among the best documented of any test, in other populations. If complete records have been kept of the astronaut population, false positives have been extraordinarily high and clustered around introduction of new machines, procedures and especially new evaluators. While this caused significant problems and the loss of one or more astronaut careers, the incidence should now be low in the LSAH, and easily resolved by a competent cardiac referral. False negatives only become a problem when the LSAH test becomes a clinical diagnostic procedure substituted for the subject's usual clinical resources.
6. Obligations: I joined the LSAH group on the basis of getting a well done stress test with respiratory gas analysis, a bone scan and meaningful reports on a LSAH. The bone scan was dropped and reporting spotty. Under the circumstance and depending on a reconsideration of this decision I will have to consider continued participation.

Conclusion:

My strong recommendation is that this decision be temporarily reversed while the LSAH program ¹³ be examined in the light of its intent and history, with consideration of augmenting its evaluation of physical capacity and performance. If there is a more appropriate cardiac component it could be included, however this should only be done with a procedure that allows continuity of testing meaningful extensions of existing data.

My concern is that this is another example of major absence of corporate memory that may anticipate even more losses. From a person with a great interest in the program and a taxpayer, please don't let a contractor destroy data and experience collected by using this test to again reset stress testing to time zero at JSC.

Questions or comments would be welcome.

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