

Charles A. Berry, ms

FUNCTIONAL TEST OF THE MEASURED  
EFFECTS OF NPLB""

It is planned to carry out the functional test of the ef-  
fects of NPLB during the pre- and postflight periods in the  
Soviet Union not as a replacement of the orthostatic test,  
but along with it. In this case, it is suggested that the in-  
dividual relationships in the reactions to both effects, that  
the results of ground and flight tests be compared, and that  
an attempt be made to predict orthostatic disorders even before  
termination of the flight. We feel that these tasks corres-  
pond to the regime which would be used during the flight it-  
self, which would be safe and informative to a sufficient  
degree. Therefore, we do not feel it necessary to simulate  
the equivalent orthostatic test in flight and we graduate the  
effects so that the increase in pulse frequency comprises an  
average of 50-60% of the corresponding indicator during the  
orthostatic test. According to our data, the following regime  
of decompression of the lower half of the body corresponds to  
these requirements:

- 25 mm Hg for 2 min;
- 35 mm Hg for 3 min.

A close correlational relationship ( $r = 0.89$ ) was obtained be-  
tween the indicators of pulse frequency for this test and the  
10-minute orthostatic test ( $70^\circ$ ) in ground experiments with the  
test subjects in a bedrest regime. Whereas the indicator of  
pulse frequency in the orthostatic test increased by 19 beats/  
min (by 20%) toward the end of the experiment compared to the  
initial period, it increased by 10.5 beats/min (by 18%) during  
the functional test of NPLB. In this case, the changes in

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\*Numbers in the right-hand margin indicate pagination in the  
foreign text.

reactions to these effects were statistically reliable by the end of the experiment.

The first experiment in using the described functional test under conditions of space flight in the Salut orbital station showed that changes in the reaction to decompression of the lower half of the body corresponded to the anticipated moderate decrease in orthostatic stability, and that the proposed regime of the functional test was quite acceptable with regard to its information content and tolerance. /2

Taking into account the differences in the regimes of functional tests used in the Soviet Union and in the United States, and attempting to find an acceptable compromise, we suggest for the pre- and postflight examination that a regime be used which essentially combines the proposals of both sides:

- 25 mm Hg for 2 min
- 35 mm Hg for 3 min
- 40 mm Hg for 5 min
- 50 mm Hg for 5 min

There are no differences in the proposals of the parties on additional conditions for conducting the examinations, and this part of the procedure may be considered coordinated.

Specific differences are noted in the composition of the recorded parameters, and it is apparently unrealistic for the parties to completely come to agreement in the near future. In this regard it is feasible to coordinate the obligatory and easily implemented set of investigation methods:

1. systolic frequency;



2. electrocardiogram (preferably in a DS chest tap);

3. arterial pressure ( systolic and diastolic). In this case the method of determining arterial pressure should be additionally stipulated.

The remaining physiological parameters, recorded in the functional test, are defined by each of the parties independently, according to established traditions, although it is feasible in the future to reach agreement on these problems as well. Possibly, an exchange of the more detailed characteristics of the procedures is required for this. /3

Some differences in the specific period of the examination may arise with respect to the problem of the periodicity of examination during the pre- and postflight periods, but the desired minimum should be considered testing twice prior to the flight and after it, and the earliest possible beginning of examination after the crews have landed.

The proposals on recording the passport and anthropometric characteristics of the test subjects, as well as of external conditions, are basically identical for both parties and may be regarded as coordinated.

The criteria for assessing the tolerance of effects during the pre- and postflight periods should take into account the subjective reactions of the astronauts, should ensue from the volume of required recorded parameters, and should include assessment of the quantitative changes entering the reaction of an organism to the effects of spaceflight factors.