

Question:

What do you think these simple tests should involve?

Dr John Knight

My list of tests includes a history that asks questions about such things as spontaneous pneumothorax and asthma. It includes a chest X-ray, because no-one can detect cysts and other lung lesions without a chest X-ray. It includes doing a vitalograph, because it has been shown that most of the people who turned up at the School of Underwater Medicine with burst lungs had FEV¹/VC ratios below 75%. They had all burst their lungs bobbing to the surface having run out of air. However, as a group, those with a low FEV¹/VC ratio are over-represented in these incidents. I include an audiogram to establish that they have got normal hearing. Not all divers complain of giddiness but they all have loss of hearing if they burst their inner ear windows. Divers may be accustomed to feeling giddy. I do a physical examination to make sure that there is a clear wheeze-free chest and that their eardrums move. Those are my basic requirements. As the exercise they are going to undertake is swimming exercise, I think that is the way their fitness should be tested.

LETTERS TO THE EDITOR

FITNESS FOR DIVING

1 Thomas Street,
Lewisham NSW 2049

Dear Sir,

There are a number of fitness parameters which can be fairly easily measured. A lot of experimental work on this has been done by K Cooper et al of Dallas. They have made a study of aerobic exercise and came up with the concept of a person's ability to metabolize oxygen - the greater the amount of oxygen an individual can consume while maximally exercising, the fitter he is. This is measured in ml of O₂/Kg body wt./min.

It is necessary to exercise for a certain period of time to get reliable measurements of this. One is interested in aerobic metabolism as opposed to anaerobic metabolism. (The latter is seen in short bursts of exercise). The suggested minimum period of maximum exercise while measuring aerobic fitness is 12 minutes.

Cooper made actual measurements of O₂ consumption during exercise in a laboratory using a treadmill. He has converted this to a number of everyday activities such as cycling, running, swimming etc., so that the distance travelled by a person in 12 minutes while maximally performing one of these activities can be related to his laboratory studies of O₂ consumption. An example of this

is a person who can run a distance of 1.73 miles in 12 minutes has an O₂ uptake of 51 ml/Kg/ min.

Cooper has come up with many tables correlating fitness with O₂ consumption and relating it to different activities and age groups. He has six categories of fitness from very poor to superior.

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| 1. Very poor | 4. Good |
| 2. Poor | 5. Excellent |
| 3. Fair | 6. Superior |

Here is an example from these tables for running for 12 minutes.

CATEGORY	AGE 13-19	40-49	60+
1. O ₂ uptake ml/min	<35	<30	<20
Miles run in 12 mins.	<1.3	<1.14	<0.87
3. O ₂ uptake ml/min	38-45	33-40	26-32
Miles run in 12 mins.	1.4-1.56	1.2-1.4	1-1.2
5. O ₂ uptake ml/min	51-56	43-48	36-44
Miles run in 12 mins.	1.7-1.8	1.5-1.7	1.3-1.5

I refer you to his book "The Aerobics Way" for further details of these tables. There are similar tables for swimming, cycling, etc., which give an assessment of a person's aerobic fitness, and relating this to one of the six categories and to the person's age.

To relate this to what level of fitness should be expected in diving is difficult. One has to consider the types of diving and obviously differing standards would be used for professional divers than for sports divers. Exactly what level of fitness should be expected for a person to become a safe sports diver is not easily decided. Obviously the person should be capable of a reasonably prolonged period of moderate exercise - perhaps category 4 at the minimum.

I would think that this could be discussed at one of our future meetings. Without doubt the present standards of physical fitness (in an aerobic sense) necessary to become a certified diver are quite inadequate.

Yours sincerely,
GREG LESLIE

INTRAUTERINE BENDS?

Sir,

Scuba diving is an increasingly popular sport. Any person diving to a depth greater than 9 m is at risk of developing the bends from nitrogen bubbling and venous gas emboli formation which may be clinically asymptomatic but detectable by ultrasonics. Theoretically diving could be a potential teratogen, either through bubble formation affecting the function of the placenta or circulation in the