

CONTRA-INDICATIONS TO DIVING

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MEDICAL HISTORY

A thorough medical history is an important first step in evaluating any diver, and should include the usual format: history of specific complaints, review of systems, inquiry concerning present medication, allergic conditions, drug dependence and social, family and psychiatric histories. In addition, a diving medical history should be taken to learn about the diver's practices and judgement, as well as specific medical conditions that relate to the hyperbaric environment. The following topics should be addressed:

- a. Current diving practices or goals of candidate, whether sport diving or commercial diving.

- b. Diving history of candidate:

Where was the candidate trained?
How long has he been diving?
What kind of diving has he undertaken?
To what depth has he dived?
How often does he dive?

- c. History of previous diving related medical problems:

Air Embolism
Decompression sickness
Barotrauma, including pneumothorax
Vertigo
Near drowning
Osteonecrosis
Nitrogen narcosis
Oxygen toxicity
Visual disturbances
Treatment in a recompression chamber
Prior medical disqualification from diving

PHYSICAL EXAMINATION

1. ENT

The examiner must be sure that the diver can perform pressure equilibration (auto-inflation) successfully. The Valsalva Manoeuvre, swallowing, or jaw movement may facilitate equilibration. In all cases the Eustachian tube and sinuses must be patent and the tympanic membranes must be proved intact and mobile by insufflation or auto-inflation.

Absolute Contra-indications

- (i) otosclerotic surgery
- (ii) chronic or serous otitis
- (iii) Meniere's disease
- (iv) inability to clear the middle ear
- (v) chronic mastoiditis
- (vi) vestibular lesions

2. CARDIOVASCULAR SYSTEM

Stress of Diving

The aquatic environment can impose severe stress on an individual's cardiovascular system, and physicians must appreciate the nature and extent of the physiologic responses involved in diving if

they are to make rational decisions concerning a candidate's fitness to dive.

Absolute Contra-indications

- (i) Myocardial infarction within the past year,
- (ii) Angina or other evidence of coronary artery disease.
- (iii) Congestive heart failure.
- (iv) Potential right to left shunts.
- (v) Significant valvular disease.
- (vi) Coarctation of the aorta.
- (vii) Electronic pacemakers.
- (viii) Prosthetic valves.
- (ix) Intraventricular conduction defects.
- (x) Wolff-Parkinson-White syndrome.
- (xi) Significant cardiac arrhythmias.
- (xii) Stokes-Adams attacks.
- (xiii) Peripheral vascular disease.
- (xiv) Use of anticoagulant drugs.
- (xv) Cardiac surgery for coronary artery disease
- (xvi) Hypertrophic cardiomyopathy.

3. CENTRAL NERVOUS SYSTEM

Neurological decompression sickness as well as air embolism can present as subtle or gross neurological deficits. Therefore, it is imperative to thoroughly examine and document the diver's neurological status. Any lesions that could compromise consciousness, judgement, motor control or diagnosis, should be disqualifying.

Absolute Contra-indications

- (i) Any demyelinating process, such as multiple sclerosis.
- (ii) Brain tumour.
- (iii) CVA or transient ischaemic attack.
- (iv) Intracranial aneurism vascular abnormality.
- (v) Narcolepsy.
- (vi) Unexplained syncope.
- (vii) Seizure disorders such as epilepsy.
- (viii) Decompression sickness with residual deficit.
- (ix) Neurosyphilis.
- (x) Head injury with sequelae, such as post-traumatic epilepsy.
- (xi) A history of intracranial surgery.
- (xii) Severe motion sickness.

4. PSYCHIATRIC EXAMINATION

This is one of the most important aspects of the medical examination, yet it is also the most elusive. Divers should be emotionally stable individuals who are capable of good judgement.

Absolute Contra-indications

- (i) Claustrophobia
- (ii) Suicidal tendencies
- (iii) Psychosis
- (iv) Neurosis
- (v) Anxiety states
- (vi) Severe depression
- (vii) Manic states
- (viii) Drug use
- (ix) Alcoholism

5. RESPIRATORY SYSTEM

Pathology in the respiratory system is the major cause of diver disqualification. Any lesions that

pre-dispose to air trapping can be lethal. This phenomenon can be responsible for the development of serious over-pressure in susceptible pulmonary structures, provided that gas in the pulmonary tree is not at all times free to equilibrate to ambient pressure. A typical hazard is breath-holding during ascent with scuba gear.

Workup

- (i) A thorough history and physical examination.
- (ii) A chest x-ray, including an expiratory film is recommended.
- (iii) Pulmonary functions test peak flow should be greater than 500 litres per minute, or greater than 75% of the predicted peak flow for size.

Absolute Contra-indications

- (i) Pulmonary blebs.
- (ii) History of spontaneous pneumothorax.
- (iii) Active asthma (opinion - childhood asthma with no recurrence is not necessarily disqualifying).
- (iv) Emphysema.
- (v) Chronic obstructive lung disease.
- (vi) Pulmonary thromboembolism.
- (vii) Recurrent thrombophlebitis.
- (viii) Pneumoconiosis.
- (ix) Silicosis.
- (x) Pulmonary fibrosis,
- (xi) Bronchiectasis.
- (xii) Benign and malignant chest tumours.
- (xiii) Granulomatous disease of the chest, TB, sarcoidosis and fungal disease.

6. GI SYSTEM

Abdominal pain can be confused with decompression sickness and any lesion that could predispose to gas trapping in a viscus must be a cause for disqualification.

Absolute Contra-indications

- (i) Chronic gastrointestinal disease such as ulcerative colitis, Crohn's disease and chronic hepatitis.
- (ii) Chronic liver disease.

7. MUSCULO-SKELETAL SYSTEM

Absolute Contra-indications

- (i) Muscular dystrophy.
- (ii) Muscular atrophy.
- (iii) Myasthenia gravis.
- (iv) Osteonecrotic lesions.

8. ENDOCRINE SYSTEM

Disorders of the endocrine system which leave the patient with obvious debility would be grounds for disqualification from diving.

Absolute Contra-indications

- (i) Insulin-dependent diabetes.
- (ii) Diabetics on oral hypoglycaemic agents, although some diabetics well controlled by diet alone, may be permitted to dive.

9. HAEMATOLOGIC AND IMMUNE SYSTEMS

Absolute Contra-indications

- (i) Sick cell anaemia.
- (ii) Haemophilia.
- (iii) Any blood dyscrasia or anaemia.

10. AGE

Although scuba training can be undertaken prior to 15 years of age it is recommended that certification be withheld until the age of 15 years is attained.

REFERENCES

1. Hickey DD. Outline of Medical standards for divers. Undersea Biomedical Research. 1984; 11(4): 407-432.

This presentation is based on a paper by DD Hickey, and is presented for discussion.

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MEDICAL STANDARDS FOR SPORTS DIVERS

John Knight

Diving instructors who are paid by results have an economic incentive to teach everyone who comes to them. Sometimes economics overcomes common sense and a person with a problem that will make diving dangerous or painful and damaging is taught to dive. Some of these come to harm but by no means all.

Over the years many people around the world have died while learning to dive, very few of these have died from their medical complaints, but some have. It is these tragedies that a proper medical should prevent. I believe that most instructors now think that a medical for their trainees is a good idea. The problem in Australia is that they are not as yet convinced that it should be done by a doctor with a knowledge of diving medicine. As diving medicals in Australia are outside the medical benefit system many diving instructors send their pupils to their usual GP who, because he does not know the medical benefits rules, gives them an itemized bill so they can claim most of the cost from Medicare. And many of these doctors do not even look in the ears and check that the ear drums move!

In my opinion the doctor is not God who lays down inviolable rules. He or she is an expert adviser who can explain to the person consulting him the risks involved in that particular person going diving. To do this the doctor has to know about diving medicine.

There is a problem with the supply of properly trained doctors so I have produced a "Guide to the examining