

Are Your Lungs Fit to Dive?

Tony Alleman, MD MPH, and Joseph Serio, MD, tackle pertinent issues concerning today's commercial diver in each issue of **UW**. If you have a medical diving question for the good doctors, email it to talleman@occmmed-sl.com.



The most important decision a diving medical officer must make is the determination of a diver's fitness for duty. This process involves careful review of all the organ systems of the body.

While a complete discussion of gas exchange in the lung would be burdensome and beyond the scope of this publication, suffice it to say that the pulmonary system is one of the most important organ systems necessary for diving. The lung is the only vehicle the body has of decreasing the body's burden of unwanted gases, namely nitrogen.

This article focuses on the conditions that may be considered disqualifying to the commercial diver. As with any medical condition, the decision to declare a diver fit for duty rests entirely on the medical examiner. The medical examiner must feel comfortable clearing a diver with any potentially disqualifying condition identified that may adversely affect the diver or any rescuers.

There are two commonly used tests in the evaluation of a diver's pulmonary status: the pulmonary function test and the chest x-ray. In addition to the physical examination, both of these tests give the medical examiner more information about the lungs in order to make a determination of fitness for duty. The medical examiner will use these two tests, the physical examination, and the medical history in making a determination of fitness to dive.

Pneumothorax

Commonly known as a collapsed lung, and sometimes the result of barotrauma, a pneumothorax, when determined to be spontaneous (without a specific cause) will disqualify a diver from diving.

The typical subject with a spontaneous collapsed lung is a tall, thin male, usually between 20 and 30 years of age, who smokes cigarettes. Blebs (large pockets in the lungs) are usually responsible for this condition, although other underlying lung conditions could also be responsible.

GAS & EQUIPMENT

Serving the Offshore Diving & Construction Industry for Over 20 Years

Is NOW...

Airgas

You'll find it with us.

Commercial Diving Gases	Pipe Purging & Leak Detection	Pipe Welding
<ul style="list-style-type: none">• Helium• Oxygen• Breathing Air	<ul style="list-style-type: none">• Heliox Mixes• Nitrox• Nitrogen• Nitrogen-Helium	<ul style="list-style-type: none">• Argon• CO₂

Compressed Gas Packages *Designed for the Marsh Offshore Environment*

 6 Cylinder Pack	 12 Cylinder Pack	 24 Cylinder Pack	 18 Cylinder Pack	 64 Cylinder Pack
---------------------	----------------------	----------------------	----------------------	----------------------

We Supplement Sales with Logistical Support & Certifications

800-575-1133
Phone: 985-868-0002 • Fax: 985-868-0076

The chances for recurrence of a collapsed lung after the initial event are increased up to 40%. If a diver experiences a pneumothorax while underwater at any considerable depth, it could be fatal.

Collapsed lungs that occur for specific reasons, such as trauma or with medical procedures near the lung, are not disqualifying but require a considerable time of healing before diving.

Obstructive Pulmonary Diseases

There are a variety of conditions that cause airway obstruction in the lung. These include asthma, chronic bronchitis, and emphysema. Any obstructive lung disease increases a diver's risk for arterial gas em-

bolism, a condition where a bubble of gas travels through the arteries and may end up in the brain or another crucial organ.

Cigarette smoking is the primary contributing factor in the cause of many obstructive lung diseases, with the exception of asthma; therefore divers should not smoke.

When these conditions are symptomatic, medications, typically bronchodilators may be required to keep the airways open. When medications are required there is usually evidence of lung disease either on the chest x-ray or the pulmonary function test. The medical examiner will use both of these tests to determine a diver's fitness for duty.

Asthma is a condition that generally is

Cigarette smoking is the primary contributing factor in the cause of many obstructive lung diseases, with the exception of asthma; therefore divers should **not smoke.**

considered as an airway obstruction in response to an external stimulus. The stimulus could be an allergy to anything in the air, sensitization to chemicals or fumes, or even exercise.

Asthma originally was considered automatically disqualifying, unless there was a history of childhood asthma before the age of five. There has been recent medical literature supporting the recommendation to allow divers with asthma to be considered fit to dive only if they have normal pulmonary function tests. Again, it is the medical examiner's decision whether or not to declare any diver fit for diving. Most conservative physicians still consider asthma as a disqualifying condition.

Restrictive Lung Diseases

There are other lung diseases that are known as restrictive lung diseases, and are less common than the obstructive types. Restrictive lung diseases, by definition, are those that reduce the volume of the lung. These may occur from exposure to certain dusts such as cotton, silica, coal, or asbestos. Exposures to

If a diver experiences a pneumothorax while underwater at any considerable depth, it could be **fatal.**

DC BRUSHLESS THRUSTERS

Models...

- 260 - 5.4kg Thrust
- 300 - 8.2kg Thrust
- 560 - 18kg Thrust
- 1060 - 41kg Thrust
- 2020 - 114kg Thrust
- 8020 - 230kg Thrust
- & 6 others

PRESSURE COMPENSATORS

12 Models
0.02-9.6L

4 Linear Models
100-4500 kg

8 Rotaries
14-540 N-m

ACTUATORS

HPU's

16 Models
1.5-20 Lpm

SUBSEA CONTROLLERS

TECNADYNE
A TECNOVA INC. COMPANY

Voice: 1.858.756-9660
Fax: 1.858.756-9880
sales@tecnadyne.com
www.tecnadyne.com

