IN SUPPORT OF EMERGENCY ASCENT TRAINING

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Significant controversy currently exists regarding Emergency Ascent training. Such training for sport divers is advocated and arguments in favour of the training not previously considered are presented. Contributing factors to accidents occurring during Emergency Ascent training are set forth. Recommended training procedures to offset the contributing factors are presented ....

Within the next few minutes I will attempt to convince you of the value and need for Emergency Ascent training for sport divers. Having listened to the opposition to this training, and seeing the effect of this on some instructors, I feel it is important to present some information on Emergency Ascent training not previously considered. After defining what is we are talking about, the following areas will be presented:

1. Current status of Emergency Ascent Training
2. Arguments for and against Emergency Ascent Training
3. Causes of accidents during Emergency Ascent Training
4. Recommended training techniques

We will be talking about non-inhaling, vertical Emergency Ascents by scuba divers. These are not “free ascents” as conducted by the Navy and are not low-on-air ascents, but are ascents made by a scuba diver with no air except that in the lungs. We keep being compared to Navy ascent training when, in fact, we do not make unrestricted buoyant ascents at rates of 325 - 400 feet per minute from a depth of 50 feet. We recommend controlled Emergency Ascent training limited to a rate of ascent of 60 feet per minute from depths of 20 - 30 feet.

CURRENT STATUS

1. Emergency Ascent training is required for initial levels of scuba certification by all national certification agencies but one and by Los Angeles County.

2. All Emergency Procedures are under study by the training agencies, but the Emergency Ascent controversy is causing great concern.

3. The current controversy has forced realization that there must be agreement on Emergency Procedures, including Emergency Ascents, otherwise, we could have people diving together, trained by different agencies, who would react differently in an emergency. This could be disastrous.

4. Efforts are being made by a few people, such as Dr Eric Kindwall (1), Lee Somers (2) and Dr Nemiroff (3) to discourage or even prohibit Emergency Ascent training.

5. A survey (4) conducted among PADI Instructors in August resulted in the following statistics compiled from the first 150 questionnaires returned from active instructors in 34 states and nine countries:

   a. The first question asked, “How long have you been conducting Emergency Ascent training in open water?” The average length of time was 4.7 years.

   b. The second request was to estimate the number of Emergency Ascents conducted during open water training. The total was 63,263 or approx. 422 ascents per instructor.

c. The third item asked how many lung expansion injuries have occurred while conducting open water emergency ascent training. None were reported.

d. The final question asked, "Do you feel Emergency Ascent Training in Open Water is valuable and needed?" Only 19 were opposed. This means over 85% of the instructors responding are in favour of Emergency Ascent training in open water.

The fact that only a small percentage of instructors are opposed to open water Emergency Ascent training is consistent with the general opinion formed through discussion and correspondence with instructors on a daily basis from Headquarters.

ARGUMENTS FOR AND AGAINST EMERGENCY ASCENT TRAINING

Those opposed to the training involving non-inhaling, vertical ascents feel only a true emergency would warrant such action. They compare it to refraining from practicing the use of an ejection seat in an aircraft or jumping from the window of a hotel into a swimming pool in the event of fire. Those opposed feel the physical risk is too great and that the odds of an accident are too great to justify the training. They feel alternative training methods can adequately prepare the diver to successfully perform an actual Emergency Ascent.

Why should we conduct Emergency Ascent training? Because we have a moral obligation to; because a diver without air can only get to the surface two ways - assisted or unassisted, and we must prepare the diver for the unassisted situation; because it is one of the most significant exercises to increase student confidence and reduce anxiety; because it can prevent panic in a later emergency situation; because it is an excellent evaluation of diver composure and ability; because it works equally well in all geographical areas; because far too many accidents occur from divers attempting other emergency procedures at depths where an Emergency Ascent is easily performed; and because our personal experience and intuition tells us we should!

The opposers to Emergency Ascent Training point out the number of accidents resulting from Emergency Ascents, but all the information is not available to justify the movement to eliminate this valuable exercise. The University of Rhode Island 1974 Accident Study (5) indicates one accident due to Emergency Ascent training in 1974. During 1974, all certifying agencies required this type of training and the total number of divers certified during that year exceeded 200,000! Other accidents are attributed to Emergency Ascents when a closer investigation reveals the real problem was an unsuccessful attempt to buddy breathe, resulting in forced ascent.

Since some notable people oppose Emergency Ascent training, I decided to survey other notable people in the diving community to seek out those who advocate vertical, non-inhaling Emergency Ascent training in open water for sport divers. The following individuals have lent their support to my effort to re-enforce the need for Emergency Ascent training:

1. Dr Albert Behnke, one of the most distinguished men in underwater medicine.
2. Dr Glen Egstrom, UCLA Director of Diver Safety Research Project.
3. Dr Andrew Pilmanis, Diving Officer, USC Labs at Catalina Island.
4. Dr John Alexander, Respiratory Specialist
5. Dr Edward Hipp, Nalle Clinic
6. Dr Takashi Hattori, Pacific Grove Marine Rescue
7. Dr Thomas Noguchi, Chief Medical Examiner for Los Angeles County
8. Dr Charles Brown, Medical Editor, NAUI News and Medical Columnist for SKIN DIVER Magazine.
9. Dr Michael Strauss, Naval Regional Medical Center in Rhode Island

10. Jim Stewart, Diving officer, Scripp's Institute
11. Four National Diver training organizations

Saying that Emergency Ascents should not be practiced because of the danger of lung injury is like saying we should not dive below 33 feet because of decompression sickness. I recall my early days of instruction when it was not uncommon for a student to bolt for the surface during mask clearing on a "check out" dive. This was hazardous, but we didn't eliminate mask clearing. Instead, we figured out how to prepare students for the situation so they were relaxed and confident. We had them practice mask clearing in the pool with open water equipment, put their face in the cold water at the surface so flooding the mask underwater wouldn't be such a shock, and clear their mask at the surface before clearing it at depth. These and other training techniques nearly eliminated the problem of students bolting during open water mask clearing.

It is very similar with Emergency Ascent training. We should no more eliminate Emergency Ascent training than mask clearing. If we have a problem, let's not discontinue Emergency Ascent training, but develop the training procedures to get the student relaxed and confident.

CAUSES OF ACCIDENTS

It is pointed out that accidents occur even when "everything is done right". What is right? There are no standards for Emergency Ascents, and therein lies the problem. I will show how a person could have an accident even when it appears that everything is being done correctly.

The following factors all contribute to a possible accident during Emergency Ascent training:

1. Medical Problems: It is possible for a student to have a lung defect which could lead to lung rupture during ascent. Colds or recent colds can also create problems. Professor Walden of the Royal Navy of England has reported that all embolism cases he has noted during ascent training have occurred to individuals who had had colds within the previous ten days.
2. Inadequate Preparation: Student readiness may, unfortunately, be determined by the number of hours of training rather than by individual ability and readiness.
3. Extreme Conditions: Students have been directed to perform as Emergency Ascent in very cold water with little visibility from an excessive depth immediately after descending from adverse surface conditions.
4. No Adaptation Time: A diver requires some time underwater to adapt both physiologically and psychologically. The student may not be permitted time to adapt to the environment, thereby reducing mental and physical capabilities.
5. Undue Stress: Lack of confidence by the student can create anxiety and apprehension which seriously affect performance.
6. Lack of Control: Instructors may have students ascend two or more at a time, not having control over the ascents. The instructor may also allow the students to ascend independently while only observing from below.
7. Looking Down: The instructor may be positioned in such a way that the student must look down at the instructor, thereby restricting the air passage. From personal observation, it is common for the instructor to be below the student during the ascent.
8. Rapid Ascent: Students may ascend at a far greater rate than 60 feet per minute, thereby increasing the possibility of lung expansion injuries.
9. Excessive Exhalation: It may be possible to embolize from exhaling too much during ascent, as pointed out in MAUl NEWS (6) and SKIN DIVER Magazine (7).

I think you can see how a student could have an accident when it appeared that "everything was done right". If adequately prepared, apprehensive, unadapted to the environment, recovering from a cold and exhaling excessively, the student might appear to be performing well while experiencing great distress.

These problems have been identified as contributing to accidents during Emergency Ascents. Now let's see what training techniques may be employed to offset these problems and reduce the risk.

RECOMMENDED TRAINING TECHNIQUES

PADI has required Emergency Ascent training for years. Recent changes techniques have been made, however, to offset some of the factors contributing to accidents that have been presented. The key to safe Emergency Ascent training is for the student to have confidence and for the instructor to have control. Both come from education and preparation. The following techniques help provide the needed confidence and control.

Preparation: An attempt should be made to discover any physical defects in the student. This includes completion of a medical history form and perhaps X-Rays and a medical examination for diving. These will only disclose defects, however. The type of defect which could lead to lung rupture can cause an accident during a normal ascent just as well as in an emergency ascent, and is not readily discovered. Requiring any more than a standard physical examination and X-Rays of students is not reasonable.

Once reasonably confident the student is physically able, begin to develop the skill. First, educate students until they are familiar with the physics and physiology involved. Describe the skill and explain the practical application. Explain the value and simplicity. Next, gradually develop the physical skill. Have students exhale when swimming underwater with skin diving equipment, exhale while swimming horizontally, exhale while swimming from the deep to the shallow end of the pool and exhale while making diagonal ascents from the deep end of the pool. Initial preparation involves knowledge, description, motivation and simulation. The skill must then be developed for open water, and the transitions are important. Teach from the known to the unknown. Assure student confidence and success. Have students exhale while swimming underwater in open water as skin divers, have them exhale while ascending diagonally in shallow water, have them perform vertical ascents from 10 feet, then 15 feet and finally 20-25 feet. Build confidence gradually.

The Open Water Exercise: The students must be thoroughly briefed to know what to expect. Establish signals such as "exhale", "stop", and "breathe"; have a common understanding of the sequence of events during the exercise: have a "dry run" out of the water where you simulate the ascent while you can still talk and answer questions; be sure students feel confident and at ease.

Some equipment is needed to provide a reference and control during the exercise. This consists of a surface float, such as a surf mat or inner tube, and a control line, marked at regular intervals to indicate depth, held down by 30-50 pounds of weight. This equipment should be set up in 20-30 feet of water with the line vertical and taut. See Figure A.

During the ascent, physical contact with the student and the line is mandatory. Should any difficulty develop, the instructor can arrest the ascent by wrapping a foot around the line (see Figure B) and restoring air to the student. The practice of wrapping a foot around a vertical line to arrest an ascent has been used successfully by the Navy for many years. The object is not to restrain a totally panicked student, but

to monitor the person and prevent panic. It is extremely difficult to stop a person who decides to bolt for the surface. All you can do is try to slow the ascent and get the person to exhale. Your objective is to have them properly prepared for the exercise and to prevent panic by observation and control. The instructor must be positioned above the student and be equipped with an additional second stage to give to a student unable to locate his own.

PADI requires removal of the weight belt during Emergency Ascent training even though the instructor limits the rate of ascent to approximately 60 feet per minute using the control line to slow the ascent. In an actual emergency, a diver making an ascent from a depth greater than 30-40 feet should establish buoyancy to reduce the effort needed to reach the surface and to make sure it is reached, conscious or not. Some instructors point out that the diver will "rocket to the surface out of control" if the belt is removed. I believe many instructors take a strong position on issues without the benefit of much knowledge or experience. I conducted rate-of-ascent studies to determine how fast divers ascend after ditching weights and determined the following:

Sixteen instructor candidates in full 1/4 inch wet suits, neutrally buoyant at the surface, descended to a depth of 30 feet in calm water, ditched their belts from a kneeling position, totally relaxed and floated to the surface. Average time of ascent was 20 seconds! This could hardly be called "rocketing to the surface". By flaring out, it is possible to achieve ascent rates approaching 60 feet per minute after ditching the weight belt. There are also other studies that indicate the average rate of ascent while swimming by sport divers is from 120 to 200 feet per minute during normal swimming ascents!

Whether or not the belt should be removed is not of great importance and neither is whether or not the regulator is kept in the mouth. I have argued about the regulator for years and have reached the point where it doesn't matter as long as students make an ascent.

After removing the belt, the student should begin exhaling. Rather than blowing, have them pronounce "O" or "AH" all the way to the surface, as this keeps an open airway and helps prevent excessive exhalation. Notice we did not shut off the air supply, for this causes increased apprehension.

Have the student give two or three kicks to get started after beginning to exhale. It is best if the instructor signals when to begin the ascent. Agree ahead of time that the student is to take air any time it is offered, regardless of the circumstances. It is possible that something may not be right even though the student is performing correctly. An example would be an instructor equipment problem.

For the last 10-15 feet before the surface, the student should lean back and flare to slow the ascent just as would be done in an actual situation. See Figure C. The instructor continues to maintain contact throughout the ascent. It is necessary for the student to turn sideways when flaring as shown in Figure C.

After surfacing, the student pulls back down the control line to recover the weight belt.

Emergency Ascents performed to progressively deeper depths in this matter over a period of several open water dives provide safe and effective training for new divers and reduce the chance of an accident occurring. Simulated ascents while skin diving, etc., as set forth by some, are not acceptable substitutes for the actual practice. These are significantly different both physiologically and psychologically.

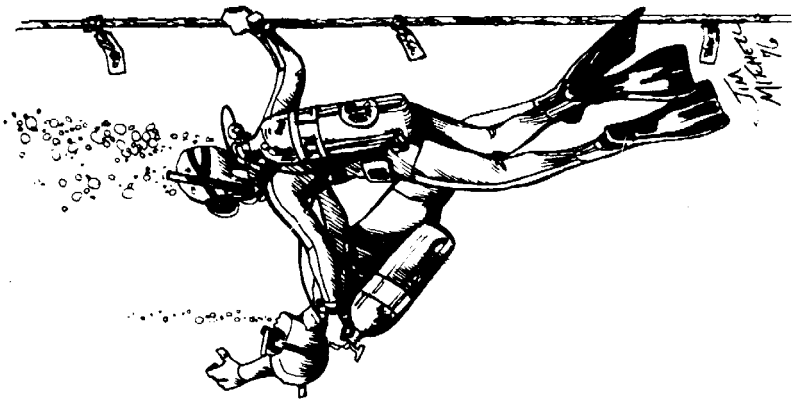

FIGURE C

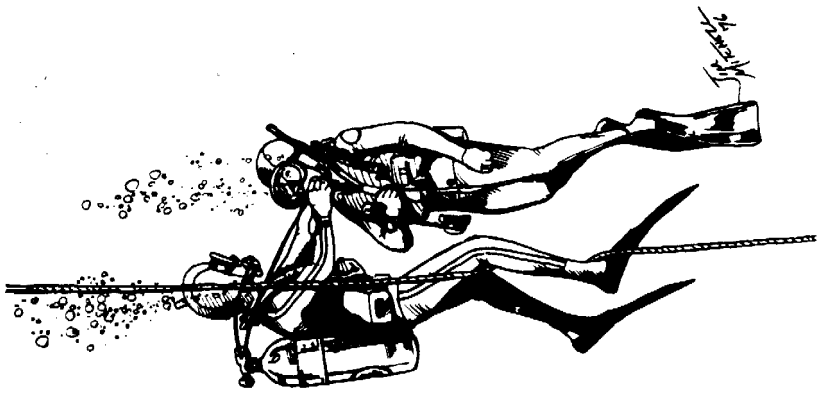

FIGURE B

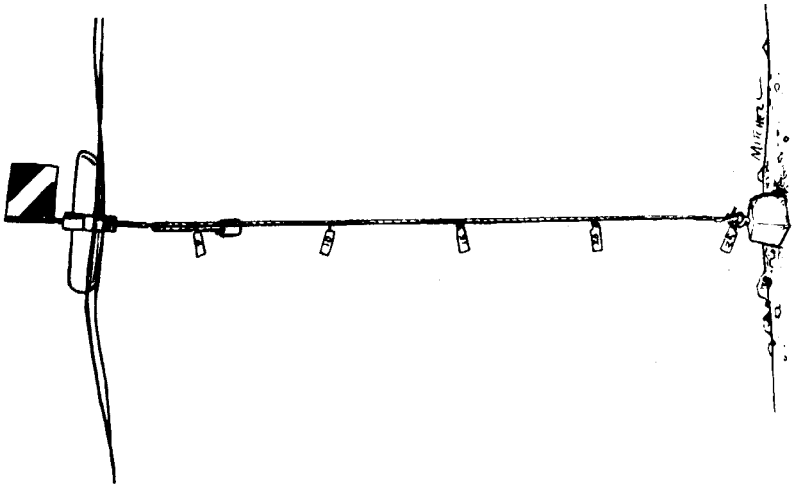

FIGURE A

SUMMARY

Emergency Ascent Training is essential and advocated by many experts. There is a need to reduce the chance of accidents and to standardize emergency procedures. While there are reasons why Emergency Ascents should not be practiced, there are other, more important reasons why they should not be practiced. The causes of accidents should be more closely studied and training techniques implemented to eliminate contributing factors. PADI sets forth a series of techniques and training procedures to reduce the risk to students during Emergency Ascent training by providing student confidence and instructor control.

The National Scuba Training Committee will be standardizing Emergency Procedures at the next meeting. We owe it to the diving community to reach an agreement on this matter. Please express your support of Emergency Ascent training to each agency with which you are affiliated. Who do you want to determine whether or not this important training should be conducted, the vocal minority or the silent majority? It is time for the 85% of you who feel Emergency Ascent training is needed and valuable to make yourselves heard.

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WOMEN IN HYPERBARIC CHAMBERS (ITALY)

Italian occupational safety laws prohibiting women from working in hyperbaric chambers recently became the subject of controversy. The Latin Region had organised a course for hyperbaric chamber technicians, which was open to both sexes. After the course was well under way it was found that a 1956 law prohibited such work by women. The author urges the repeal of this law, which denies the services of health care personnel to sick and injured patients, and which has apparently no basis in scientific fact.

(Medicina Subacquea ed Iperbarica, 1977, No 2, by MEMH)

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PREVENTIVE MEDICINE ... BUT YOU PAY!

* South Australia's Institute for Fitness Research and Training, which is affiliated with the Adelaide College of Advanced Education and has assessed and trained more than 7,000 men and women since the introduction of courses in 1969, is itself in danger of collapse.

* The reason is the recent amendment to the Health Insurance Act to disallow medical benefits (except for several approved organisations) for health screening services. People who enroll for the 12 week course are now faced with a personal bill of an extra $70 for tests they must undergo to assess their fitness for the course.

* The Institute's acting director, Miss Ann Davidson, says the Government's action makes it clear that it is not interested in promoting preventive health through the medical benefits scheme.

(AMA Gazette, 28 Sept 1978)

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