

## SCUBA Diving Merit Badge at Camp Sequassen 2021

The SCUBA Diving Merit Badge Program provides Scouts (male and female), Venturers, and Scouters (registered adult leaders) the opportunity to meet all the requirements for the SCUBA Diving Merit Badge, including NAUI Open Water SCUBA Diver certification.

**The SCUBA Diving Merit Badge program meets at Camp Sequassen during weeks one through seven of Boy Scout Resident Camp, from 9:00 AM to 5:00 PM, Monday through Friday. All necessary equipment is provided. You may bring your own mask, snorkel, fins and/or wetsuit if you have them, but this is not required. Participants must be 14 years old by June 30<sup>th</sup> and have earned Swimming Merit Badge. First Aid Merit Badge is strongly recommended. Registered adult leaders are also encouraged to participate.**

**Please note: This course will meet morning and afternoon, Monday through Friday with mornings in the water and afternoons in the classroom (which may be rearranged due to weather). Participants will have the opportunity to engage in open programs in the evenings.**

Four forms are required to enroll:

- Student Record Form
- Participant Agreement
- Assumption of Risk – Waiver and Release
- RSTC medical form

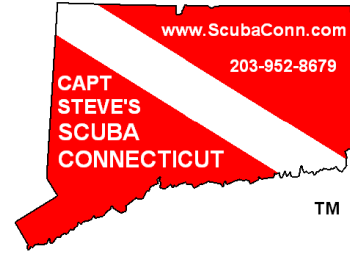
### **Two important notes regarding the medical form:**

- 1) The "Guide to Safe Scouting" requires that the participant be examined by his/her MD and signed off for diving on the RSTC medical form. The scout and parents complete page one and the top half of page two, and then take all pages to the MD to be signed off on the bottom half of page two.
- 2) The camp physical form is **NOT** a substitute for this form. The RSTC form is required for SCUBA **IN ADDITION** to the regular camp physical form.

Forms must be completed and submitted at least two weeks in advance of your arrival at camp!

Questions? Email [CAPTSteve@ScubaConn.com](mailto:CAPTSteve@ScubaConn.com) or call (203) 952-8679.





## Statement of Understanding and Participant Agreement for SCUBA Diving Merit Badge at Camp Sequassen 2021

The diving course you are about to begin is an exciting and demanding challenge. To accept the call of underwater adventure, you must be aware of the risks involved in the sport and be willing to cooperate and obey instructions to achieve success.

The SCUBA Diving Merit Badge Program provides Scout (male and female), Venturing, and registered adult participants with the opportunity to meet all the requirements for the merit badge, including NAUI Open Water SCUBA Diver certification. Minimum age for this program is fourteen.

This course will require physical exertion. You must pass the BSA swim test to the BLUE (swimmer) level and have earned the Swimming Merit Badge. In addition, having earned First Aid Merit Badge is strongly recommended. You will need to be able to equalize pressure in your ears and sinuses. Your breathing and circulatory systems must also be in good health. You will need to complete a medical history form and are required to be examined by a physician. **The camp medical form is NOT a substitute for the medical form provided in this package. BOTH must be completed and signed by your physician.** You and your parent or guardian if you are a minor (under age 18), will also need to read, discuss and sign the other documents in this package, including a waiver, release and indemnity agreement, the medical form, and this document. These forms are returned to the instructor for the course files.

**The SCUBA Diving Merit Badge program meets each week of Scouts, BSA Resident Camp, from 9:00 AM to 5:00 PM, Monday through Friday, with mornings in the water and afternoons in the classroom (which may be rearranged due to weather). Participants will have the opportunity to engage in open programs in the evenings. Cost is \$275.00 in addition to the cost of the week at camp. All necessary equipment is provided. You may bring your own mask, snorkel, fins and/or wetsuit if you have them, but this is not required.**

**AGREEMENT: I understand and agree that by enrolling in this course I am incurring obligations for attendance, skill performance and cooperation. I understand and agree that mastering the subject matter and skills of skin and scuba diving are largely dependent on me. I also understand that my instructor is only able to assist and guide me as I proceed through the training process. I am willing to accept the risks and responsibilities for my own actions. I understand and agree that the instructor must make the final judgment as to my competency to be a safe diver and to participate in the program.**

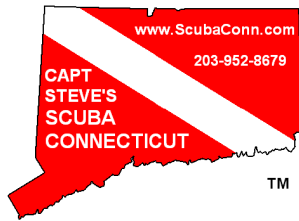
Signed \_\_\_\_\_ Date \_\_\_\_\_

Printed Name \_\_\_\_\_

**AGREEMENT: I understand and agree that by enrolling my son/daughter in this course I am incurring obligations for attendance, skill performance and cooperation. I understand and agree that mastering the subject matter and skills of skin and scuba diving are largely dependent on him/her and that there will be no refunds for any reason. I also understand that the instructor is only able to assist and guide students through the training process. I am willing to accept the risks and responsibilities for his/her actions. I understand and agree that the instructor must make the final judgment as to competency to be a safe diver and to participate in the program.**

Signed  
Parent/Guardian \_\_\_\_\_ Date \_\_\_\_\_

Printed Name \_\_\_\_\_



**CAPT STEVE'S SCUBA CONNECTICUT**  
POB 175, Norwalk, CT 06852-0175

**EXPRESS ASSUMPTION OF RISK AND INDEMNITY AGREEMENT,  
RELEASE OF LIABILITY, AND WAIVER OF CLAIMS**

**PLEASE READ CAREFULLY AND BE CERTAIN YOU UNDERSTAND THE  
IMPLICATIONS OF SIGNING**

**EXPRESS ASSUMPTION OF RISK ASSOCIATED WITH DIVING AND RELATED ACTIVITIES**

I \_\_\_\_\_ do hereby affirm and acknowledge that I have been fully informed of the inherent hazards and risks associated with snorkeling, skin and/or scuba diving, and instruction related thereto ("Diving Activities"). I understand that these risks can lead to severe injury and even loss of life.

I understand that diving with compressed air involves certain inherent risks; including but not limited to decompression sickness, embolism or other hyperbaric/air expansion injury that require treatment in a recompression chamber. I understand that snorkeling, skin diving and scuba diving are physically strenuous activities and that I will be exerting myself during Diving Activities, and that if I am injured as a result of heart attack, stroke, panic, hyperventilation, drowning or any other cause, that I expressly ASSUME THE RISK of said injuries and that I will not seek to hold any other party responsible for the same. I understand that Diving Activities may be conducted at a site that is remote, either by time or distance or both, from a recompression chamber and competent medical assistance.

Despite this, I choose to proceed with these Diving Activities even in the absence of a recompression chamber and competent medical assistance. I understand that there are hazards and risks associated with travel to and from dive sites ("Dive Travel"), including, but not limited to the possible injury or loss of life as a result of a boating accident.

Regardless of the potential hazards and risks associated with Diving Activities and Dive Travel, I wish to proceed and HEREBY PERSONALLY ASSUME ALL HAZARDS AND RISKS, including possible personal injury, loss of life and/or property damage, arising out of or in connection with Diving Activities and/or Dive Travel, whether foreseen or unforeseen, that may befall me while I am a participant in these activities.

**RELEASE OF LIABILITY, WAIVER OF CLAIMS, AND INDEMNITY AGREEMENT:**

In consideration of being allowed to participate in Diving Activities, Dive Travel, and use of any of the facilities and equipment of the parties listed below, I understand and agree that neither CAPT Stephen F. Coe (Instructor), Edward S. Coe (Divemaster/Assistant Instructor), SCUBA Connecticut (Facility), The Emergency Response Training Center LLC (Facility), Connecticut Yankee Council BSA (Facility), Camp Sequassen BSA (Facility), nor the National Association of Underwater Instructors, Inc., nor their affiliate and subsidiary organizations, nor any of their respective employees, officers, directors, representatives, agents, contractors, volunteers, or assigns (hereinafter collectively referred to as the "Released Parties") may be held liable or responsible in any way for any injury, death or other damages to me or my property that may occur as a result of my participation in Diving Activities or Dive Travel, or as a result of the negligence of any party, including the Released Parties, whether passive or active, foreseen or unforeseen.

**I HEREBY WAIVE AND RELEASE ANY AND ALL CLAIMS OR CAUSES OF ACTION THAT I, MY ESTATE, HEIRS, EXECUTORS OR ASSIGNS MAY HAVE FOR PERSONAL INJURY, PROPERTY DAMAGE OR LOSS OF LIFE BASED UPON NEGLIGENCE, ACTIVE OR PASSIVE WITH THE EXCEPTION OF GROSS NEGLIGENCE, FORESEEN OR UNFORESEEN, WHICH ARISE FROM DIVING ACTIVITIES OR DIVE TRAVEL.**

By executing this Agreement, I agree to hold the Released Parties harmless from and against all claims or causes of action for any personal injury, property damage, or loss of life which may occur during Diving Activities and/or Dive Travel. I hereby declare that I am of legal age and am competent to sign this Agreement, or if not, that my parent or legal guardian shall sign on my behalf and that my parent or legal guardian is in complete understanding and concurrence with this Agreement.

I understand the terms herein are contractual and not a mere recital, and that I have signed this Agreement of my own free act and with the knowledge that I hereby agree to waive my legal rights.

By entering into this Agreement, I am not relying on any oral or written representation or statements made by the Released Parties other than what is set forth in this Agreement.

I agree that this Agreement shall be governed by and interpreted in accordance with the laws of the State of California, United States of America. If any provision, section, subsection, clause or phrase of this Agreement is found to be unenforceable or invalid, that part shall be stricken from this Agreement. The remainder of this Agreement will then be construed as though the unenforceable or invalid part had never been contained herein.

I understand and agree that I am not only giving up my right to sue the Released Parties but also any rights my heirs, assigns, or beneficiaries may have to sue the Released Parties on my behalf or as a result of my death. I further represent I have the authority to do so and that my heirs, assigns, or beneficiaries will be stopped from claiming otherwise because of my representations to the Released Parties.

**I HAVE READ THIS AGREEMENT, I UNDERSTAND IT, AND I AGREE TO BE BOUND BY IT.**

Signature of Participant \_\_\_\_\_ Date \_\_\_\_\_

Witness (Printed Name) \_\_\_\_\_ Signature \_\_\_\_\_

Signature of Parent or Guardian If Participant Is a Minor, and by their signature they, on my behalf release all claims that both they and I have.  
\_\_\_\_\_ Date \_\_\_\_\_

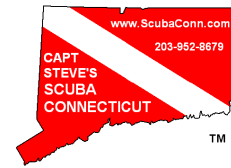
Printed Name of Parent or Guardian \_\_\_\_\_

Witness (Printed Name) \_\_\_\_\_ Signature \_\_\_\_\_



# MEDICAL STATEMENT

## Participant Record (Confidential Information)



Please read carefully before signing.

This is a statement in which you are informed of some potential risks involved in scuba diving and of the conduct required of you during the scuba training program. Your signature (and that of a parent or guardian if you are a minor) on this statement is required for you to participate in the scuba training program offered by CAPT Stephen F. Coe (Instructor) and SCUBA Connecticut, Division of E.R.T.C LLC (Facility) located in Norwalk, CT.

Read this statement prior to signing it. You must complete this Medical Statement, which includes the medical questionnaire section, to enroll in the scuba training program. If you are a minor, you must have this Statement signed by a parent or guardian.

Diving is an exciting and demanding activity. When performed correctly, applying correct techniques, it is relatively safe. When established safety procedures are not followed, however, there are increased risks.

To scuba dive safely, you should not be extremely overweight or out of condition. Diving can be strenuous under certain conditions. Your respiratory and circulatory systems must be in good health. All body air spaces must be normal and healthy. A person with coronary disease, a current cold or congestion, epilepsy, a severe medical problem or who is under the influence of alcohol or drugs should not dive. If you have asthma, heart disease, other chronic medical conditions or you are taking medications on a regular basis, you should consult your doctor and the instructor before participating in this program, and on a regular basis thereafter upon completion. You will also learn from the instructor the important safety rules regarding breathing and equalization while scuba diving. Improper use of scuba equipment can result in serious injury. You must be thoroughly instructed in its use under direct supervision of a qualified instructor to use it safely.

If you have any additional questions regarding this Medical Statement or the Medical Questionnaire section, review them with your instructor before signing.

## Divers Medical Questionnaire

### To the Participant:

The purpose of this Medical Questionnaire is to detail your medical history before participating in recreational diver training. A positive response to a question does not necessarily disqualify you from diving. A positive response means that there is a preexisting condition that may affect your safety while diving and must be brought to the attention of your physician prior to engaging in dive activities.

Please answer **EACH** of the following questions on your past or present medical history with a "**YES**" or "**NO**". If you are not sure, answer "**YES**". The "Guide to Safe Scouting" now requires that you be examined by a physician prior to participating in scuba diving. You must take this RSTC Medical Statement and Guidelines for Recreational Scuba Diver's Physical Examination with you to your physician, who must complete and sign the bottom half of page two.

- Could you be pregnant, or are you attempting to become pregnant?
- Are you presently taking prescription medications? (with the exception of birth control or anti-malarial)
- Are you over 45 years of age and can answer YES to one or more of the following?
  - currently smoke a pipe, cigars or cigarettes
  - have a high cholesterol level
  - have a family history of heart attack or stroke
  - are currently receiving medical care
  - high blood pressure
  - diabetes mellitus, even if controlled by diet alone

- Frequent or severe suffering from motion sickness (seasick, carsick, etc.)?
- Dysentery or dehydration requiring medical intervention?
- Any dive accidents or decompression sickness?
- Inability to perform moderate exercise (example: walk one mile within 12 minutes)?
- Head injury with loss of consciousness in the past five years?
- Recurrent back problems?
- Back or spinal surgery?
- Diabetes?
- Back, arm or leg problems following surgery, injury or fracture?
- High blood pressure or take medicine to control blood pressure?
- Heart disease?
- Heart attack?
- Angina, heart surgery or blood vessel surgery?
- Sinus surgery?
- Ear disease or surgery, hearing loss or problems with balance?
- Recurrent ear problems?
- Bleeding or other blood disorders?
- Hernia?
- Ulcers or ulcer surgery?
- A colostomy or ileostomy?
- Recreational drug use or treatment for, or alcoholism in the past five years?

### Have you ever had or do you currently have...

- Asthma, or wheezing with breathing, or wheezing with exercise?
- Frequent or severe attacks of hayfever or allergy?
- Frequent colds, sinusitis or bronchitis?
- Any form of lung disease?
- Pneumothorax (collapsed lung)?
- Other chest disease or chest surgery?
- Behavioral health, mental or psychological problems (Panic attack, fear of closed or open spaces)?
- Epilepsy, seizures, convulsions or take medications to prevent them?
- Recurring complicated migraine headaches or take medications to prevent them?
- Blackouts or fainting (full/partial loss of consciousness)?

**The information I have provided about my medical history is accurate to the best of my knowledge. I agree to accept responsibility for omissions regarding my failure to disclose any existing or past health condition.**

Signature of Participant \_\_\_\_\_ Date \_\_\_\_\_

Signature of Parent or Guardian \_\_\_\_\_ Date \_\_\_\_\_

Printed Name of Participant \_\_\_\_\_

Printed Name of Parent or Guardian \_\_\_\_\_

# STUDENT

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Please print legibly.

Name \_\_\_\_\_ Birth Date \_\_\_\_\_ Age \_\_\_\_\_  
First Initial Last Day/Month/Year

Mailing Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Home Phone (\_\_\_\_) \_\_\_\_\_ Business Phone (\_\_\_\_) \_\_\_\_\_

Email \_\_\_\_\_ FAX \_\_\_\_\_

Name and address of your family physician:

Physician \_\_\_\_\_

Address \_\_\_\_\_

Date of last physical examination \_\_\_\_\_

Name of examiner \_\_\_\_\_

Clinic/Hospital \_\_\_\_\_

Address \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ Email \_\_\_\_\_

Have you ever been required to have a physical for diving? (circle) Yes No If so, when? \_\_\_\_\_

# PHYSICIAN

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This person is applying for training or is presently certified to engage in scuba (self-contained underwater breathing apparatus) diving. Your opinion of the applicant's medical fitness for scuba diving is requested. There are guidelines attached for your information and reference.

## Physician's Impression (check one)

I find no medical conditions that I consider incompatible with diving.

I am unable to recommend this individual for diving.

## Remarks

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Physician's Signature or Legal Representative of Medical Practitioner \_\_\_\_\_ Date \_\_\_\_\_  
Day/Month/Year

Physician \_\_\_\_\_

Clinic/Hospital \_\_\_\_\_

Address \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ Email \_\_\_\_\_

# Guidelines for Recreational Scuba Diver's Physical Examination

## Instructions to the Physician:

Recreational **SCUBA** (Self-Contained Underwater Breathing Apparatus) can provide recreational divers with an enjoyable sport safer than many other activities. The risk of diving is increased by certain physical conditions, which the relationship to diving may not be readily obvious. Thus, it is important to screen divers for such conditions.

The **RECREATIONAL SCUBA DIVER'S PHYSICAL EXAMINATION** focuses on conditions that may put a diver at increased risk for decompression sickness, pulmonary overinflation syndrome with subsequent arterial gas embolization and other conditions such as loss of consciousness, which could lead to drowning. Additionally, the diver must be able to withstand some degree of cold stress, the physiological effects of immersion and the optical effects of water and have sufficient physical and mental reserves to deal with possible emergencies.

The history, review of systems and physical examination should include as a minimum the points listed below. The list of conditions that might adversely affect the diver is not all-inclusive, but contains the most commonly encountered medical problems. The brief introductions should serve as an alert to the nature of the risk posed by each medical problem.

The potential diver and his or her physician must weigh the pleasures to be had by diving against an increased risk of death or injury due to the individual's medical condition. As with any recreational activity, there are no data for diving enabling the calculation of an accurate mathematical probability of injury. Experience and physiological principles only permit a qualitative assessment of relative risk.

For the purposes of this document, **Severe Risk** implies that an individual is believed to be at substantially elevated risk of decompression sickness, pulmonary or otic barotrauma or altered consciousness with subsequent drowning, compared with the general population. The consultants involved in drafting this document would generally discourage a student with such medical problems from diving. **Relative Risk** refers to a moderate increase in risk, which in some instances may be acceptable. To make a decision as to whether diving is contraindicated for this category of medical problems, physicians must base their judgment on an assessment of the individual patient. Some medical problems which may preclude diving are **temporary** in nature or responsive to treatment, allowing the student to dive safely after they have resolved.

Diagnostic studies and specialty consultations should be obtained as indicated to determine the diver's status. A list of references is included to aid in clarifying issues that arise. Physicians and other medical professionals of the Divers Alert Network (DAN) associated with Duke University Health System are available for consultation by phone +1 919 684 2948 during normal business hours. For emergency calls, 24 hours 7 days a week, call +1 919 684 8111 or +1 919 684 4DAN (collect). Related organizations exist in other parts of the world – DAN Europe in Italy +39 039 605 7858, DAN S.E.A.P. in Australia +61 3 9886 9166 and Divers Emergency Service (DES) in Australia +61 8 8212 9242, DAN Japan +81 33590 6501 and DAN Southern Africa +27 11 242 0380. There are also a number of informative websites offering similar advice.

## NEUROLOGICAL

Neurological abnormalities affecting a diver's ability to perform exercise should be assessed according to the degree of compromise. Some diving physicians feel that conditions in which there can be a waxing and waning of neurological symptoms and signs, such as migraine or demyelinating disease, contraindicate diving because an exacerbation or attack of the preexisting disease (e.g.: a migraine with aura) may be

difficult to distinguish from neurological decompression sickness. A history of head injury resulting in unconsciousness should be evaluated for risk of seizure.

## Relative Risk Conditions

- **Complicated Migraine Headaches whose symptoms or severity impair motor or cognitive function, neurologic manifestations**
- **History of Head Injury with sequelae other than seizure**
- **Herniated Nucleus Pulposus**
- **Intracranial Tumor or Aneurysm**
- **Peripheral Neuropathy**
- **Multiple Sclerosis**
- **Trigeminal Neuralgia**
- **History of spinal cord or brain injury**

## Temporary Risk Condition

**History of cerebral gas embolism without residual where pulmonary air trapping has been excluded and for which there is a satisfactory explanation and some reason to believe that the probability of recurrence is low.**

## Severe Risk Conditions

Any abnormalities where there is a significant probability of unconsciousness, hence putting the diver at increased risk of drowning. Divers with spinal cord or brain abnormalities where perfusion is impaired may be at increased risk of decompression sickness.

Some conditions are as follows:

- **History of seizures other than childhood febrile seizures**
- **History of Transient Ischemic Attack (TIA) or Cerebrovascular Accident (CVA)**
- **History of Serious (Central Nervous System, Cerebral or Inner Ear) Decompression Sickness with residual deficits**

## CARDIOVASCULAR SYSTEMS

### Relative Risk Conditions

The diagnoses listed below potentially render the diver unable to meet the exertional performance requirements likely to be encountered in recreational diving. These conditions may lead the diver to experience cardiac ischemia and its consequences. Formalized stress testing is encouraged if there is any doubt regarding physical performance capability. The suggested minimum criteria for stress testing in such cases is at least 13 METS.\* Failure to meet the exercise criteria would be of significant concern. Conditioning and retesting may make later qualification possible. Immersion in water causes a redistribution of blood from the periphery into the central compartment, an effect that is greatest in cold water. The marked increase in cardiac preload during immersion can precipitate pulmonary edema in patients with impaired left ventricular function or significant valvular disease. The effects of immersion can mostly be gauged by an assessment of the diver's performance while swimming on the surface. A large proportion of scuba diving deaths in North America are due to coronary artery disease. Before being approved to scuba dive, individuals older than 40 years are recommended to undergo risk assessment for coronary artery disease. Formal exercise testing may be needed to assess the risk.

\* METS is a term used to describe the metabolic cost. The MET at rest is one, two METS is two times the resting level, three METS is three times the resting level, and so on. The resting energy cost (net oxygen requirement) is thus standardized. (Exercise Physiology; Clark, Prentice Hall, 1975.)

## Relative Risk Conditions

- History of Coronary Artery Bypass Grafting (CABG)
- Percutaneous Balloon Angioplasty (PCTA) or Coronary Artery Disease (CAD)
- History of Myocardial Infarction
- Congestive Heart Failure
- Hypertension
- History of dysrhythmias requiring medication for suppression
- Valvular Regurgitation

## Pacemakers

The pathologic process that necessitated should be addressed regarding the diver's fitness to dive. In those instances where the problem necessitating pacing does not preclude diving, will the diver be able to meet the performance criteria?

\* NOTE: Pacemakers must be certified by the manufacturer as able to withstand the pressure changes involved in recreational diving.

## Severe Risks

Venous emboli, commonly produced during decompression, may cross major intracardiac right-to-left shunts and enter the cerebral or spinal cord circulations causing neurological decompression illness. Hypertrophic cardiomyopathy and valvular stenosis may lead to the sudden onset of unconsciousness during exercise.

## PULMONARY

Any process or lesion that impedes airflow from the lungs places the diver at risk for pulmonary overinflation with alveolar rupture and the possibility of cerebral air embolization. Many interstitial diseases predispose to spontaneous pneumothorax: Asthma (reactive airway disease), Chronic Obstructive Pulmonary Disease (COPD), cystic or cavitating lung diseases may all cause air trapping. The 1996 Undersea and Hyperbaric Medical Society (UHMS) consensus on diving and asthma indicates that for the risk of pulmonary barotrauma and decompression illness to be acceptably low, the asthmatic diver should be asymptomatic and have normal spirometry before and after an exercise test. Inhalation challenge tests (e.g.: using histamine, hypertonic saline or methacholine) are not sufficiently standardized to be interpreted in the context of scuba diving.

A pneumothorax that occurs or reoccurs while diving may be catastrophic. As the diver ascends, air trapped in the cavity expands and could produce a tension pneumothorax.

In addition to the risk of pulmonary barotrauma, respiratory disease due to either structural disorders of the lung or chest wall or neuromuscular disease may impair exercise performance. Structural disorders of the chest or abdominal wall (e.g.: prune belly), or neuromuscular disorders, may impair cough, which could be life threatening if water is aspirated. Respiratory limitation due to disease is compounded by the combined effects of immersion (causing a restrictive deficit) and the increase in gas density, which increases in proportion to the ambient pressure (causing increased airway resistance). Formal exercise testing may be helpful.

## Relative Risk Conditions

- History of Asthma or Reactive Airway Disease (RAD)\*
- History of Exercise Induced Bronchospasm (EIB)\*
- History of solid, cystic or cavitating lesion\*
- Pneumothorax secondary to:
  - Thoracic Surgery
  - Trauma or Pleural Penetration\*
  - Previous Overinflation Injury\*
- Obesity
- History of Immersion Pulmonary Edema Restrictive Disease\*

- Interstitial lung disease: May increase the risk of pneumothorax
- \* Spirometry should be normal before and after exercise

Active Reactive Airway Disease, Active Asthma, Exercise Induced Bronchospasm, Chronic Obstructive Pulmonary Disease or history of same with abnormal PFTs or a positive exercise challenge are concerns for diving.

## Severe Risk Conditions

- History of spontaneous pneumothorax. Individuals who have experienced spontaneous pneumothorax should avoid diving, even after a surgical procedure designed to prevent recurrence (such as pleurodesis). Surgical procedures either do not correct the underlying lung abnormality (e.g.: pleurodesis, apical pleurectomy) or may not totally correct it (e.g.: resection of blebs or bullae).
- Impaired exercise performance due to respiratory disease.

## GASTROINTESTINAL

### Temporary Risks

As with other organ systems and disease states, a process which chronically debilitates the diver may impair exercise performance. Additionally, dive activities may take place in areas remote from medical care. The possibility of acute recurrences of disability or lethal symptoms must be considered.

### Temporary Risk Conditions

- Peptic Ulcer Disease associated with pyloric obstruction or severe reflux
- Unrepaired hernias of the abdominal wall large enough to contain bowel within the hernia sac could incarcerate.

### Relative Risk Conditions

- Inflammatory Bowel Disease
- Functional Bowel Disorders

### Severe Risks

Altered anatomical relationships secondary to surgery or malformations that lead to gas trapping may cause serious problems. Gas trapped in a hollow viscous expands as the divers surfaces and can lead to rupture or, in the case of the upper GI tract, emesis. Emesis underwater may lead to drowning.

### Severe Risk Conditions

- Gastric outlet obstruction of a degree sufficient to produce recurrent vomiting
- Chronic or recurrent small bowel obstruction
- Severe gastroesophageal reflux
- Achalasia
- Paraesophageal Hernia

## ORTHOPEDIC

Relative impairment of mobility, particularly in a boat or ashore with equipment weighing up to 18 kgs/40 pounds must be assessed. Orthopedic conditions of a degree sufficient to impair exercise performance may increase the risk.

### Relative Risk Conditions

- Amputation
- Scoliosis must also assess impact on respiratory function and exercise performance.
- Aseptic Necrosis possible risk of progression due to effects of decompression (evaluate the underlying medical cause of decompression may accelerate/escalate the progression).



## Temporary Risk Conditions

- Back pain

## HEMATOLOGICAL

Abnormalities resulting in altered rheological properties may theoretically increase the risk of decompression sickness. Bleeding disorders could worsen the effects of otic or sinus barotrauma, and exacerbate the injury associated with inner ear or spinal cord decompression sickness. Spontaneous bleeding into the joints (e.g.: in hemophilia) may be difficult to distinguish from decompression illness.

### Relative Risk Conditions

- Sickle Cell Disease
- Polycythemia Vera
- Leukemia
- Hemophilia/Impaired Coagulation

## METABOLIC AND ENDOCRINOLOGICAL

With the exception of diabetes mellitus, states of altered hormonal or metabolic function should be assessed according to their impact on the individual's ability to tolerate the moderate exercise requirement and environmental stress of sport diving. Obesity may predispose the individual to decompression sickness, can impair exercise tolerance and is a risk factor for coronary artery disease.

### Relative Risk Conditions

- Hormonal Excess or Deficiency
- Obesity
- Renal Insufficiency

### Severe Risk Conditions

The potentially rapid change in level of consciousness associated with hypoglycemia in diabetics on insulin therapy or certain oral hypoglycemic medications can result in drowning. Diving is therefore generally contraindicated, unless associated with a specialized program that addresses these issues. [See "Guidelines for Recreational Diving with Diabetes" at [www.wrsc.com](http://www.wrsc.com) and [www.diversalertnetwork.org](http://www.diversalertnetwork.org).]

**Pregnancy:** The effect of venous emboli formed during decompression on the fetus has not been thoroughly investigated. Diving is therefore not recommended during any stage of pregnancy or for women actively seeking to become pregnant.

## BEHAVIORAL HEALTH

Behavioral: The diver's mental capacity and emotional make-up are important to safe diving. The student diver must have sufficient learning abilities to grasp information presented to him by his instructors, be able to safely plan and execute his own dives and react to changes around him in the underwater environment. The student's motivation to learn and his ability to deal with potentially dangerous situations are also crucial to safe scuba diving.

### Relative Risk Conditions

- Developmental delay
- History of drug or alcohol abuse
- History of previous psychotic episodes
- Use of psychotropic medications

## Severe Risk Conditions

- Inappropriate motivation to dive – solely to please spouse, partner or family member, to prove oneself in the face of personal fears
- Claustrophobia and agoraphobia
- Active psychosis
- History of untreated panic disorder
- Drug or alcohol abuse

## OTOLARYNGOLOGICAL

Equalization of pressure must take place during ascent and descent between ambient water pressure and the external auditory canal, middle ear and paranasal sinuses. Failure of this to occur results at least in pain and in the worst case rupture of the occluded space with disabling and possible lethal consequences.

The inner ear is fluid filled and therefore incompressible. The flexible interfaces between the middle and inner ear, the round and oval windows are, however, subject to pressure changes. Previously ruptured but healed round or oval window membranes are at increased risk of rupture due to failure to equalize pressure or due to marked overpressurization during vigorous or explosive Valsalva maneuvers.

The larynx and pharynx must be free of an obstruction to airflow. The laryngeal and epiglottic structure must function normally to prevent aspiration.

Mandibular and maxillary function must be capable of allowing the patient to hold a scuba mouthpiece. Individuals who have had mid-face fractures may be prone to barotrauma and rupture of the air filled cavities involved.

### Relative Risk Conditions

- Recurrent otitis externa
- Significant obstruction of external auditory canal
- History of significant cold injury to pinna
- Eustachian tube dysfunction
- Recurrent otitis media or sinusitis
- History of TM perforation
- History of tympanoplasty
- History of mastoidectomy
- Significant conductive or sensorineural hearing impairment
- Facial nerve paralysis not associated with barotrauma
- Full prosthodontic devices
- History of mid-face fracture
- Unhealed oral surgery sites
- History of head and/or neck therapeutic radiation
- History of temporomandibular joint dysfunction
- History of round window rupture

### Severe Risk Conditions

- Monomeric TM
- Open TM perforation
- Tube myringotomy
- History of stapedectomy
- History of ossicular chain surgery
- History of inner ear surgery
- Facial nerve paralysis secondary to barotrauma
- Inner ear disease other than presbycusis
- Uncorrected upper airway obstruction
- Laryngectomy or status post partial laryngectomy
- Tracheostomy
- Uncorrected laryngocele
- History of vestibular decompression sickness

## BIBLIOGRAPHY/REFERENCE

1. Bennett, P. & Elliott, D (eds.) (1993). The Physiology and Medicine of Diving. 4th Ed., W.B. Saunders Company Ltd., London, England.
2. Bove, A., & Davis, J. (1990). Diving Medicine. 2nd Edition, W.B. Saunders Company, Philadelphia, PA.
3. Davis, J., & Bove, A. (1986). "Medical Examination of Sport Scuba Divers, Medical Seminars, Inc.," San Antonio, TX
4. Dembert, M. & Keith, J. (1986). "Evaluating the Potential Pediatric Scuba Diver." AJDC, Vol. 140, November.
5. Edmonds, C., Lowry, C., & Pennefether, J. (1992) .3rd ed., Diving and Subaquatic Medicine. Butterworth & Heineman Ltd., Oxford, England.
6. Elliott, D. (Ed) (1994). "Medical Assessment of Fitness to Dive." Proceedings of an International Conference at the Edinburgh Conference Centre, Biomedical Seminars, Surry, England.
7. "Fitness to Dive," Proceedings of the 34th Underwater & Hyperbaric Medical Society Workshop (1987) UHMS Publication Number 70(WS-FD) Bethesda, MD.
8. Neuman, T. & Bove, A. (1994). "Asthma and Diving." Ann. Allergy, Vol. 73, October, O'Conner & Kelsen.
9. Shilling, C. & Carlston, D. & Mathias, R. (eds) (1984). The Physician's Guide to Diving Medicine. Plenum Press, New York, NY.
10. Undersea and Hyperbaric Medical Society (UHMS) www.UHMS.org
11. Divers Alert Network (DAN) United States, 6 West Colony Place, Durham, NC www.DiversAlertNetwork.org
12. Divers Alert Network Europe, P.O. Box 64026 Roseto, Italy, telephone non-emergency line: weekdays office hours +39-085-893-0333, emergency line 24 hours: +39-039-605-7858
13. Divers Alert Network S.E.A.P., P. O. Box 384, Ashburton, Australia, telephone 61-3-9886-9166
14. Divers Emergency Service, Australia, www.rah.sa.gov.au/hyperbaric, telephone 61-8-8212-9242
15. South Pacific Underwater Medicine Society (SPUMS), P.O. Box 190, Red Hill South, Victoria, Australia, www.spums.org.au
16. European Underwater and Baromedical Society, www.eubs.org

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