Fall 2022 Singer Island Excursion

Personal Information

Full Name: _____
Last *First* *M.I.*

Address: _____
Street Address *Apartment/Unit #*

_____
City *State* *Zip Code*

Home Phone: _____Cell Phone:_____

Email: _____

Birth Date: _____Gender:_____Marital Status:_____

Height: _____Weight: _____T-Shirt Size:_____

Have you previously participated in a DWH Excursion?_____If yes, what year?_____

Have you been vaccinated against COVID? _____ If yes, date of vaccination(s): _____

Diver Information

Are you a certified diver?_____Highest Level of Certification:_____

Certifying Agency:_____Certification #:_____Date of Last Dive:_____

# of Years of Diving Experience:_____# of Open Water Dives:_____

HSA Certified?_____HSA Certification #_____

Nitrox Certified?_____Certifying Agency: _____Certification #:_____

Divers Alert Network (DAN) Insurance #:_____Expiration Date:_____

Do you own your own equipment?_____

Do you need to rent anything (if yes, indicate items below)?_____

Regulator/Gauges:_____ Wetsuit (size/length):_____

Dive Computer:_____ Mask/Snorkel:_____

BCD (size):_____ Fins/Booties (size):_____

How much weight will you need?_____(Tanks and weights will be provided by Pura Vida Divers)

Liability Release and Assumption of Risk Agreement

I, _____, hereby affirm that I am aware that skin and scuba diving have inherent risks which may result in serious injury or death.

I, _____, hereby affirm that **I am** or **I am not** (check) a qualified SCUBA diver with a valid diving certificate issued by _____ (Certifying Agency) _____ (Certification Number) and with _____(#) years' experience, with a total _____(#) open water dives.

I understand that diving with compressed air involves certain inherent risks; including but not limited to decompression sickness, embolism or other hyperbaric/air expansion injuries that require treatment in a recompression chamber. I further understand that the open water diving trips which are necessary for training and for certification may be conducted at a site that is remote, either by time or distance or both, from such recompression chamber. I still choose to proceed with such instructional dives in spite of the possible absence of a recompression chamber in proximity to the dive site.

I, _____, hereby affirm that I am voluntarily engaging in the recreational activities planned for my Diving with Heroes Excursion, which activities may include, but are not limited to, scuba diving, snorkeling and boating. I certify that I am fully aware of and expressly assume all risks involved in scuba diving, snorkeling, boating and other activities in which I choose to participate.

I understand and agree that neither my instructors, **Jill Hottel**, **Neal Hamilton**, nor **Diving with Heroes**, nor **International Training** or **Scuba Divers International**, nor its affiliate and subsidiary corporations, nor any of their respective employees, officers, agents, contractors or assigns (hereinafter referred to as "Released Parties") may be held liable or responsible in any way for any injury, death or other damages to me, my family, estate, heirs or assigns that may occur as a result of my participating in this diving program and recreational trip or as a result of the negligence of any party, including the Released Parties, whether passive or active.

In consideration of being allowed to participate in this dive program and recreational trip, hereinafter referred to as "program," I hereby personally assume all risks of this program, whether foreseen or unforeseen, that may befall me while I am a participant in this program including, but not limited to, the academics, confined water and/or open water activities, travel by boat or plane, or any other additional recreational activities I wish to participate in.

I further release, exempt and hold harmless said program and Released Parties from any claim or lawsuit by me, my family, estate, heirs or assigns, arising out of my enrollment and participation in this program including both claims arising during the program or after I receive my certification.

I affirm I am in good mental and physical fitness to scuba dive. I further state that I am not under the influence of alcohol or any drugs that are contradicted to diving. If I am taking medication, I affirm that I have seen a physician and have approval to dive while under the influence of the medication/drugs. I understand that skin and scuba diving are physically strenuous activities and that I will be exerting myself during this program, and that if I am injured because of heart attack, panic, hyperventilation, drowning or any other cause, that I expressly assume the risk of said injuries and that I will not hold the Released Parties responsible for the same.

I further state that I am of lawful age and legally competent to sign this liability release. I understand the terms herein are contractual and not 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. I further agree that if any provision of this Agreement is found to be unenforceable or invalid, that provision shall be severed from this Agreement. The remainder of this Agreement will then be construed as though the unenforceable provision 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 to my heirs, assigns, or beneficiaries may have to sue the Released Parties resulting from my death. I further represent I have authority to do so and that my heirs, assigns, or beneficiaries will be estopped from claiming otherwise because of my representations to the Release Parties.

I, _____, BY THIS INSTRUMENT AGREE TO EXEMPT AND RELEASE MY INSTRUCTORS, **JILL HOTTEL**, **NEAL HAMILTON**, OTHER PARTIES INVOLVED, **DIVING WITH HEROES**, AND **INTERNATIONAL TRAINING AND SCUBA DIVING INTERNATIONAL**, AND ALL RELATED ENTITIES AS DEFINED ABOVE, FROM ALL LIABILITY OR RESPONSIBILITY WHATSOEVER FOR PERSONAL INJURY, PROPERTY DAMAGE OR WRONGFUL DEATH HOWEVER CAUSED, INCLUDING BUT NOT LIMITED TO THE NEGLIGENCE OF THE RELEASED PARTIES, WHETHER PASSIVE OR ACTIVE.

I HAVE FULLY INFOMRED MYSELF AND MY HEIRS OF THE CONTENTS OF THIS NON-AGENCY DISCLOSURE AND ACKNOWLEDGEMENT AGREEMENT AND LIABILITY RELEASE AND ASSUMPTION OF RISK AGREEMENT BY READING BOTH BEFORE SIGNING BELOW ON BEHALF OF MYSELF AND MY HEIRS.

_____ _____

Participant Signature Date (Day/Month/Year)

Diver Medical | Participant Questionnaire

Recreational scuba diving and freediving requires good physical and mental health. There are a few medical conditions which can be hazardous while diving, listed below. Those who have, or are predisposed to, any of these conditions, should be evaluated by a physician. This Diver Medical Participant Questionnaire provides a basis to determine if you should seek out that evaluation. If you have any concerns about your diving fitness not represented on this form, consult with your physician before diving. If you are feeling ill, avoid diving. If you think you may have a contagious disease, protect yourself and others by not participating in dive training and/or dive activities. References to "diving" on this form encompass both recreational scuba diving and freediving. This form is principally designed as an initial medical screen for new divers, but is also appropriate for divers taking continuing education. For your safety, and that of others who may dive with you, answer all questions honestly.

Directions

Complete this questionnaire as a prerequisite to a recreational scuba diving or freediving course. Note to women:

If you are pregnant, or attempting to become pregnant, *do not dive.*

1. I have had problems with my lungs/breathing, heart, blood, or have been diagnosed with COVID-19.	Yes ☐ Go to Box A	No ☐
2. I am over 45 years of age.	Yes ☐ Go to Box B	No ☐
3. I struggle to perform moderate exercise (for example, walk 1.6 kilometer/one mile in 14 minutes or swim 200 meters/yards without resting), OR I have been unable to participate in a normal physical activity due to fitness or health reasons within the past 12 months.	Yes ☐*	No ☐
4. I have had problems with my eyes, ears, or nasal passages/sinuses.	Yes ☐ Go to Box C	No ☐
5. I have had surgery within the last 12 months, OR I have ongoing problems related to past surgery.	Yes ☐*	No ☐
6. I have lost consciousness, had migraine headaches, seizures, stroke, significant head injury, or suffer from persistent neurologic injury or disease.	Yes ☐ Go to Box D	No ☐
7. I am currently undergoing treatment (or have required treatment within the last five years) for psychological problems, personality disorder, panic attacks, or an addiction to drugs or alcohol; or, I have been diagnosed with a learning disability.	Yes ☐ Go to Box E	No ☐
8. I have had back problems, hernia, ulcers, or diabetes.	Yes ☐ Go to Box F	No ☐
9. I have had stomach or intestine problems, including recent diarrhea.	Yes ☐ Go to Box G	No ☐
10. I am taking prescription medications (with the exception of birth control or anti-malarial drugs other than mefloquine/Lariam).	Yes ☐*	No ☐

Participant Signature

If you answered *NO* to all 10 questions above, a medical evaluation is not required. Please read and agree to the participant statement below by signing and dating it.

Participant Statement: I have answered all questions honestly, and understand that I accept responsibility for any consequences resulting from any questions I may have answered inaccurately or for my failure to disclose any existing or past health conditions.

Participant Signature (or, if a minor, participant's parent/guardian signature required.) _____ Date (dd/mm/yyyy) _____

Participant Name (Print) _____ Birthdate (dd/mm/yyyy) _____

Instructor Name (Print) _____ Facility Name (Print) _____

*** If you answered *YES*** to questions 3, 5 or 10 above ***OR*** to any of the questions on page 2, please read and agree to the statement above by signing and dating it ***AND* take all three pages of this form (Participant Questionnaire and the Physician's Evaluation Form) to your physician** for a medical evaluation. Participation in a diving course requires your physician's approval.

Participant Name_____ **Birthdate** _____

(Print) Date (dd/mm/yyyy)

Diver Medical | Participant Questionnaire Continued

Box A – I have/have had:		
Chest surgery, heart surgery, heart valve surgery, stent placement, or a pneumothorax (collapsed lung).	Yes ☐*	No ☐
Asthma, wheezing, severe allergies, hay fever or congested airways within the last 12 months that limits my physical activity/exercise.	Yes ☐*	No ☐
A problem or illness involving my heart such as: angina, chest pain on exertion, heart failure, immersion pulmonary edema, heart attack or stroke, OR am taking medication for any heart condition.	Yes ☐*	No ☐
Recurrent bronchitis and currently coughing within the past 12 months, OR have been diagnosed with emphysema.	Yes ☐*	No ☐
A diagnosis of COVID-19.	Yes ☐*	No ☐

Box B – I am over 45 years of age AND:		
I currently smoke or inhale nicotine by other means.	Yes ☐*	No ☐
I have a high cholesterol level.	Yes ☐*	No ☐
I have high blood pressure.	Yes ☐*	No ☐
I have had a close blood relative die suddenly or of cardiac disease or stroke before the age of 50, OR have a family history of heart disease before age 50 (including abnormal heart rhythms, coronary artery disease or cardiomyopathy).	Yes ☐*	No ☐

Box C – I have/have had:		
Sinus surgery within the last 6 months.	Yes ☐*	No ☐
Ear disease or ear surgery, hearing loss, or problems with balance.	Yes ☐*	No ☐
Recurrent sinusitis within the past 12 months.	Yes ☐*	No ☐
Eye surgery within the past 3 months.	Yes ☐*	No ☐

Box D – I have/have had:		
Head injury with loss of consciousness within the past 5 years.	Yes ☐*	No ☐
Persistent neurologic injury or disease.	Yes ☐*	No ☐
Recurring migraine headaches within the past 12 months, or take medications to prevent them.	Yes ☐*	No ☐
Blackouts or fainting (full/partial loss of consciousness) within the last 5 years.	Yes ☐*	No ☐
Epilepsy, seizures, or convulsions, OR take medications to prevent them.	Yes ☐*	No ☐

Box E – I have/have had:		
Behavioral health, mental or psychological problems requiring medical/psychiatric treatment.	Yes ☐*	No ☐
Major depression, suicidal ideation, panic attacks, uncontrolled bipolar disorder requiring medication/psychiatric treatment.	Yes ☐*	No ☐
Been diagnosed with a mental health condition or a learning/developmental disorder that requires ongoing care.	Yes ☐*	No ☐
An addiction to drugs or alcohol requiring treatment within the last 5 years.	Yes ☐*	No ☐

Box F – I have/have had:		
Recurrent back problems in the last 6 months that limit my everyday activity.	Yes ☐*	No ☐
Back or spinal surgery within the last 12 months.	Yes ☐*	No ☐
Diabetes, drug- or diet-controlled, OR gestational diabetes within the last 12 months.	Yes ☐*	No ☐
An uncorrected hernia that limits my physical abilities.	Yes ☐*	No ☐
Active or untreated ulcers, problem wounds, or ulcer surgery within the last 6 months.	Yes ☐*	No ☐

Box G – I have had:		
Ostomy surgery and do not have medical clearance to swim or engage in physical activity.	Yes ☐*	No ☐
Dehydration requiring medical intervention within the last 7 days.	Yes ☐*	No ☐
Active or untreated stomach or intestinal ulcers or ulcer surgery within the last 6 months.	Yes ☐*	No ☐
Frequent heartburn, regurgitation, or gastroesophageal reflux disease (GERD).	Yes ☐*	No ☐
Active or uncontrolled ulcerative colitis or Crohn's disease.	Yes ☐*	No ☐
Bariatric surgery within the last 12 months.	Yes ☐*	No ☐

*Physician's medical evaluation required (see page 1).

Diver Medical | Physician's Evaluation Form

Participant Name _____ Birthdate _____
(Print) Date (dd/mm/yyyy)

The above-named person requests your opinion of his/her medical suitability to participate in recreational scuba diving or freediving training or activity. Please visit uhms.org for medical guidance on medical conditions as they relate to diving. Review the areas relevant to your patient as part of your evaluation.

Evaluation Result

☐ Approved – I find no conditions that I consider incompatible with recreational scuba diving or freediving.

☐ Not approved – I find conditions that I consider incompatible with recreational scuba diving or freediving.

_____ _____
Physican's Signature Date (dd/mm/yyyy)

Physician's Name _____ Specialty _____
(Print)

Clinic/Hospital _____

Address _____

_____

Phone _____ Email _____

Physician/Clinic Stamp (optional)

Created by the Diver Medical Screen Committee in association with the following bodies: The

Undersea & Hyperbaric Medical Society
DAN (US)
DAN Europe
Hyperbaric Medicine Division, University of California, San Diego

Diving Medical Guidance to the Physician

These guidelines are typically used by physicians who have been approached by an individual wishing to take part in recreational scuba diving or freediving. They will usually have completed a WRSTC Diver Medical Participant Questionnaire.

Recreational scuba diving and freediving (hereafter "diving") is performed safely by many people. The risks associated with diving may be increased by certain physical conditions, and the relationship to diving may not be readily appreciated by candidates. Thus, it is important to screen divers for such conditions.

A physical examination for diving focuses on conditions that may put a diver at increased risk for decompression sickness, pulmonary overinflation with subsequent arterial gas embolization, and other conditions such as loss of consciousness, which could lead to drowning. Additionally, divers must be able to withstand some degree of thermal stress, the physiological effects of immersion, and have sufficient physical and mental reserves to deal with normal diving and 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 exhaustive, but contains the most commonly encountered medical problems. The brief introductions serve as an alert to the nature of the risk posed.

The potential diver and his or her physician must weigh the benefits to be had by diving against an increased risk of injury or death due to the individual's medical condition. As with any recreational activity, there are limited data for diving with which to calculate the 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 injury compared with the general population. The consultants involved in drafting this document would generally discourage a candidate 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 candidate. **Temporary Risk** refers to medical problems which may preclude diving but are temporary in nature, allowing the individual to dive after they have resolved.

Following many of the sections is a short list of references that give more information on the topic. The lists are not exhaustive, but examples that may be of particular relevance.

Diagnostic studies and specialty consultations should be obtained as indicated to determine the candidate's status. A list of references is included to aid in clarifying issues that arise.

The following sections are included in this document (click to jump to section):

BEHAVIORAL HEALTH

Behavioral health is one of the most difficult aspects of diver candidate evaluation, because many relevant potential problems may not be apparent and are not easily assessed in an office consultation. This is also an aspect of evaluating suitability for diving in which the diving instructor, who observes the candidate in the field, must also play a part.

The diving candidate must be capable of learning and applying a theoretical knowledge base for diving. Significant intellectual handicap is incompatible with independent diving.

Motivational and behavioral traits should be considered if there is obvious related history or problems become apparent during training. Candidates who appear unmotivated, irresponsible, or prone to distraction or panic should be discouraged from diving.

A history of psychiatric disease is not in and of itself disqualifying. Psychotropic medications can be problematic if they are associated with altered level of awareness or sedation, or may alter seizure threshold, (e.g., benzodiazepines, narcotics). What is of primary importance is the individual's current psychological state, and anticipated impact of their mental/psychological history relative to their ability to navigate the potential and anticipated challenges and stresses of diving. The level of baseline mental health, with or without medication, is therefore of greater importance than the theoretical effects of a given medication or class of medications while diving.

Candidates with major depression, bipolar disorder, psychoses, or current drug or alcohol abuse should not dive. Even if a candidate is well controlled on medication (see below for discussion of SSRIs), there may be risks associated with the use of potent antidepressant and antipsychotic drugs in the underwater environment. The tendency for potent psychotropic drugs to impair concentration and cause drowsiness is of particular concern, as is their potential to lower the seizure threshold, and the lack of research data evaluating potential interactions with the pressure environment. Candidates with a past history of major psychiatric problems or drug/alcohol abuse who are stable without medication and withdrawn from drugs and alcohol can be considered on a case-by-case basis, preferably by a physician trained in diving medicine.

Perhaps the most challenging group of candidates from a behavioral perspective in the modern context is those with "mild" depression (those who have never been hospitalized for psychiatric treatment or placed on psychiatric hold or attempted self-harm) or those with mood disturbances treated with selective serotonin reuptake inhibitors (SSRIs). The general use of SSRIs has increased dramatically over recent years in many countries. There are no data describing use of SSRIs among divers, but anecdotally the numbers are significant. Concerns over diving while using SSRIs relate to the disorder being treated and to the potential interaction between the drug and diving. There are many candidates taking these drugs whose mild mood disturbance would not of itself constitute a reason to avoid diving. Evaluation of the potential for an interaction between SSRIs and diving is more difficult. There are no published reports of apparent problems despite what is almost certainly a large number of divers using them. Diving while taking an SSRI is probably acceptable provided that: the treated mood disturbance was mild prior to treatment and has been well controlled by the drug; the drug has been used for at least one month without evidence of relevant side effects; and the candidate is fully counseled about (and accepting of) the relevant risks. If the candidate is considering diving beyond the traditional recreational envelope or using gases other than air, he or she should consult an appropriate diving medicine specialist.

There are also potential risks associated with other drugs used to treat psychiatric conditions, including serotonin-norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), and atypical agents (including bupropion). Candidates on these medications should be evaluated on a case-by-case basis.

Severe Risk Conditions

- Active major depression, bipolar or psychotic disorder
- History of panic attacks
- Drug or alcohol abuse
- Severe intellectual handicap

Relative Risk Conditions

- Questionable motivation to dive – solely to please spouse, partner or family member, or to prove oneself in the face of personal fears
- Developmental delay/Cognitive impairment
- Anxiety disorder
- History of drug or alcohol abuse
- History of major depression, bipolar, or psychotic disorder
- Use of psychotropic medications
- Claustrophobia or agoraphobia

CARDIOVASCULAR SYSTEMS

Diving places increased demands on the heart. Immersion itself results in an increase in cardiac preload, as does peripheral vasoconstriction with an increase in blood pressure. These changes are typically accompanied by sustained mild to moderate exercise. Perhaps not surprisingly, almost 30% of recreational diving fatalities have a cardiac event as the disabling injury. It follows that the primary goals of evaluating the cardiovascular system in a diving candidate are to identify those who appear to be at risk of myocardial ischemic events, myocardial insufficiency, or other cardiac events (such as arrhythmias) that might disable a diver underwater, and to establish that the candidate has an adequate exercise capacity for diving.

With the above in mind, some cardiac diagnoses are considered to render a candidate unsuitable for diving, including: untreated symptomatic coronary artery disease, dilated or obstructive or previous stress cardiomyopathy, congestive heart failure, moderate or worse pulmonary hypertension, long QT syndrome or other arrhythmia-inducing channelopathies, paroxysmal arrhythmias causing unconsciousness or impairment of exercise capacity, poor exercise capacity of apparent cardiac origin, moderate to severe valvular lesions, complex congenital cardiac disease, atrial septal defect, and the presence of an implanted cardiac defibrillator.

Potential candidates with any of the following should be investigated to exclude a disqualifying condition:

- Exertional chest pain, dyspnea, palpitations, or syncope
- Unexplained syncope/near syncope
- Heart murmur
- Hypertension
- Family history of premature death (sudden/unexpected or cardiac) before age 50, cardiac disease before age 50, cardiomyopathy, arrhythmia, or channelopathy

It is strongly recommended that these candidates be evaluated in consultation with a physician trained in diving medicine and possibly a cardiologist. Successful treatment of disqualifying cardiac disorders may result in a candidate becoming suitable for diving. For example, a candidate with coronary artery disease (including previous myocardial infarction) who has been successfully revascularized may be suitable for diving if inducible ischemia can be excluded and adequate exercise capacity demonstrated (for example, in an exercise stress test). The capacity to sustain exercise at 6 MET (metabolic equivalent of task; 1 MET approximates resting metabolic rate, assumed to approximate an oxygen consumption of 3.5 mL/kg/min; 6 MET approximates an effort of six times resting metabolic rate, approximating an oxygen consumption of 21 mL/kg/min is a pragmatic expectation for a recreational diver, but there may be an occasional need to exercise transiently at higher levels during diving. Similarly, a candidate with a history of paroxysmal arrhythmia who has undergone successful pathway ablation may be suitable for diving. Candidates with any of the above diagnoses who wish to consider diving after appropriate treatment are best referred to a physician trained in diving medicine for evaluation.

Asymptomatic candidates over 45 years of age with risk factors for coronary artery disease should undergo evaluation by a physician. Individuals with a predicted 5-10 year risk of a cardiovascular event >10% using a cardiac risk calculator should be investigated for coronary disease unless they provide a credible history of exercise capacity which renders significant coronary disease very unlikely. A coronary calcium score is a suitable initial investigation, and a myocardial perfusion scan, stress echocardiogram, or CT coronary angiogram should be considered in following up a positive calcium score. Consideration of a tailored investigation pathway for the individual diving candidate is ideally undertaken by a cardiologist in consultation with a physician trained in diving medicine. Candidates who prove to have inducible ischemia or obstructive lesions justifying intervention should not dive until completion of the intervention and demonstration of its success. Candidates with non-obstructive coronary disease not requiring invasive intervention should have aggressive management of risk factors and may be suitable for diving if adequate exercise capacity can be demonstrated. Although an exercise ECG is relatively insensitive to early coronary disease, it has the advantage of demonstrating exercise capacity and can be modified to test sustained exercise at 6 MET.

Left ventricular hypertrophy (LVH) is a risk factor for arrhythmias, which may be induced by exercise or immersion. Candidates for diving with this condition should be counseled about the risks of diving.

A patent foramen ovale (PFO) that exhibits right-to-left shunting with no or minimal provocation is a risk factor for serious neurological decompression sickness. In established divers, such lesions are usually discovered by bubble contrast echocardiography conducted after a relevant episode of decompression sickness. These divers are usually advised either to cease diving, modify their diving to reduce venous bubble formation (venous bubbles crossing from right to left are almost certainly the vectors of harm in this setting), or to have the PFO repaired. Occasionally, new diver candidates have a previously discovered PFO, and in such cases an objective assessment of the shunting behavior of the lesion is required in order to adequately counsel the candidate about the implied risks in diving. If not already done, this is best achieved using bubble contrast transthoracic echocardiography at rest and with provocative maneuvers. It is strongly recommended that the results of such tests are discussed with a physician trained in diving medicine. Routine screening of all diving candidates for PFO is not recommended.

In relation to some specific cardiovascular diagnoses: Treated hypertension with adequate control is acceptable in diving in the absence of other risk factors that would meet a risk threshold indicating screening for coronary artery disease. Atrial fibrillation that is adequately rate-controlled in a candidate without inducible myocardial ischemia and who exhibits adequate exercise capacity is acceptable in diving. However, many such candidates are anticoagulated and the risks of diving whilst anticoagulated would need to be understood and carefully considered by the candidate. This is best achieved through discussion with a physician trained in diving medicine.

Immersion pulmonary edema is a problem that has been seen in swimmers, compressed gas divers, and freedivers. The condition may be under-diagnosed. Risk factors include hypertension, valvular disease, diastolic dysfunction, cardiomyopathies, pulmonary hypertension, hyperhydration, immersion, cold stress, constrictive garments, exercise, and for compressed gas divers, increased breathing resistance (affected by equipment, gas density, and body position), and for freedivers, pulmonary squeeze due to compression during descent. A single episode of immersion pulmonary edema may contra-indicate further diving if no modifiable risk factors are found. Repetitive cases represent a strong contra-indication. A diver or new diving candidate with such a history should be referred to a physician trained in diving medicine for discussion of the relevant issues.

Candidates with pacemakers may be able to dive, though pacemaker-dependent candidates should consider the risks carefully. The pathologic process that necessitated the pacemaker should be considered as should the candidate's functional capacity (see above). Pacemakers must be certified by the manufacturer as able to withstand the pressure changes involved in recreational diving. Devices vary in this regard, but diving beyond 30 meters/100 feet with any of them is unwise.

Severe Risk Conditions

- Active inflammatory bowel disease
- Gastric outlet obstruction of a degree sufficient to produce recurrent vomiting
- Chronic or recurrent small bowel obstruction
- Severe gastroesophageal reflux
- Achalasia
- Paraesophageal hernia
- Gastroparesis

Relative Risk Conditions

- Inflammatory bowel disease when quiescent
- Functional bowel disorders

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

References

Bennett PB, Cronje FJ, Campbell E, Marroni A, Pollock NW. Assessment of Diving Medical Fitness for Scuba Divers and Instructors. Flagstaff, AZ: Best Publishing. 2006; 241 pp.

Vote D. Gastrointestinal issues – consider them before returning to diving. https://www.diversalertnetwork.org/medical/articles/Gastrointestinal_Issues

US Navy Diving Manual, Volume 2, Revision 7. Gastrointestinal distension.NAVSEA 0910-LP-115-1921. Naval Sea Systems Command: Washington, DC, 2016: 3-31-3-32.

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 (eg, in hemophilia) may be difficult to distinguish from decompression illness. Thrombophilic disorders (hereditary or acquired) may facilitate vascular thrombosis and susceptibility to DCS.

Relative Risk Conditions

- Sickle cell disease
- Polycythemia vera
- Leukemia
- Hemophilia/Impaired coagulation
- Recent blood transfusion
- Recent thrombotic episodes
- Hereditary hypercoagulability conditions
  - Factor V Leiden
  - Prothrombin 20210A
  - Protein C deficiency
  - Protein S deficiency
  - Antithrombin deficiency

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:

- Epilepsy or 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
- Recurrent episodes of loss of consciousness or fainting

Relative Risk Conditions

Complicated migraine headaches, particularly if severe, frequent or presenting with neurological manifestations eg, motor, sensory or cognitive disturbance.

- 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
- Parkinson's disease

References

Bennett PB, Cronje FJ, Campbell E, Marroni A, Pollock NW. Assessment of Diving Medical Fitness for Scuba Divers and Instructors. Flagstaff, AZ: Best Publishing. 2006; 241 pp. 173-188.

Burkett JG, Nahas-Geiger SJ. Diving Headache. Curr Pain Headache Rep. 2019;23(7):46.

Massey EW, Moon RE. Neurology and diving. Handb Clin Neurol. 2014;120:959-969.

Rosinska J, Łukasik M, Kozubski W. Neurological complications of underwater diving. Neurol Neurochir Pol. 2015;49(1):45-51.

UK Diving Medical Committee, Neurological disease. http://www.ukdmc.org/medical-conditions/neurological-disease/

ORTHOPEDIC

Mobility above and under the water is an essential requirement for any sport or recreational diver. Entering the water from shore or a dive boat, underwater propulsion and exiting into a dive boat or onto shore should be possible without great difficulty.

Relative impairment of mobility, particularly on a boat or ashore with equipment weighing up to 30 kg/66 lb (or significantly more in the case of cold water or for more equipment intensive activities, for example), must be assessed. Orthopedic conditions of a degree sufficient to impair exercise performance may increase the risk.

In some cases, like amputations resulting in various degrees of disability, it would be advisable to judge case by case by a physician trained in diving medicine.

Relative Risk Conditions

- Amputation
- Scoliosis: must also assess impact on respiratory function and exercise performance

- Aseptic necrosis: possible risk of accelerated progression due to the effects of decompression
- Disc prolapse
- Habitual luxation (eg, shoulder, hip, patella)
- Degenerative joint diseases

Temporary Risk Conditions

- Back pain
- Fractures until complete healing of bone and soft tissue and positive weight bearing tests taking into consideration the weight of the used dive gear on land
- Muscle-tendon and ligament injuries
- Completion of physiotherapy/rehabilitation regimes

References

Moeller JL. Contraindications to athletic participation. Physic Sportsmed. 1996; 24(9): 57-75.

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 noncompressible. 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 may be prone to reinjury with marked overpressurization during vigorous or explosive Valsalva maneuvers. The larynx and pharynx must be free of obstruction to airflow. The laryngeal and epiglottic structures must function normally to prevent aspiration. Mandibular and maxillary function must be capable of allowing the candidate to hold a scuba regulator mouthpiece. Individuals who have had mid-face fractures may be prone to barotrauma and rupture of the air-filled cavities involved.

Severe Risk Conditions

- Monomeric tympanic membrane (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
- Symptomatic nasal or sinus polyps
- Ménière's disease

Relative Risk Conditions

- Recurrent otitis externa
- Significant obstruction of external auditory canal

A pneumothorax that occurs while diving may be catastrophic. As the diver ascends, trapped gas 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. Individuals who have experienced spontaneous pneumothorax are at risk of recurrence, and 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 (eg, pleurodesis, apical pleurectomy) or may not totally correct it (eg, resection of blebs or bullae). A high-resolution CT (HRCT) scan of the lungs may reveal cysts or blebs that represent a risk. Persons who have no parenchymal abnormality on HRCT and have had bilateral surgical pleurodesis (including VATS pleurodesis) may be cleared to dive. However, in most cases, a history of spontaneous pneumothorax will be an absolute contraindication to diving. Traumatic pneumothorax is not a problem as the likelihood of subsequent spontaneous pneumothorax is vanishingly low.

Structural disorders of the chest or abdominal wall 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.

The emergence of COVID-19 has placed an additional layer of complexity related to fitness to dive evaluations. It is beyond the scope of this document to prescribe or mandate specific tests or timelines related to fitness to dive determinations. What is of importance is awareness of the potential body systems effected by COVID-19, and to take a thoughtful and thorough history related to disease course, time since the infection resolved, and state of physical and mental health at the time of the examination.

Clinical factors that are important to consider include symptom severity during the infection and need for intensive care (e.g., ventilator support). Disease severity likely correlates with the extent of pulmonary injury and potential cardiac involvement, and in the case of intubation, may be associated with severe deconditioning, muscle atrophy and even post-traumatic stress. As such, assessment of the diver with a history of COVID-19, may require more than just a pulmonary evaluation. At the time of this publication, the medical community does not have sufficient data to support arbitrary requirements for specific testing, nor duration of post-infection convalescence after which individuals can be considered safe to return to diving.

The following documents provide current guidance on investigation of COVID-19 patients prior to diving. This is an area that is evolving and updated often; please see these resources for more current information and considerations regarding these issues.

UC San Diego Guidelines for Evaluation of Divers during COVID-19 pandemic

Centers for Disease Control and Prevention, People Who Are at Higher Risk for Severe Illness

European Committee for Hyperbaric Medicine and European Underwater and Baromedical Society, COVID-19 Pandemic – Position Statements

For those looking for aseptic practices, the following resources may be useful:

Divers Alert Network Europe

Divers Alert Network Americas

Severe Risk Conditions

- History of spontaneous pneumothorax (see notes)
- Impaired exercise performance due to respiratory disease
- Respiratory impairment secondary to cold gas breathing
- Pulmonary hypertension