SCUBA - self contained underwater breathing apparatus

5 million sport scuba divers in U.S.

250,000-400,000 new certifications annually in U.S.

Diving occurs in oceans, freshwater lakes, rivers and quarries
Pre-dive exams for new certifications

Diving related injuries and emergency care

- Even if don’t practice near dive site, many patients may return home with dive related problems

Certification to continue diving

- FP, IM, ED, Anesthesia, Psychiatry, ENT, Pulmonary, Cardiology, Neurology, Dermatology all care for divers
RSTC - Recreational Scuba Training Council has uniform medical assessment form for diving fitness

Principles for disqualification:

- Diving would cause a deterioration in the medical condition
- Medical condition represents and increased risk for diving injury for both the diver and dive buddy
Relative contraindications:
- Hx of CABG/PCTA/stent for CAD
- MI
- HTN
- Dysrhythmia requiring medication
- Valvular regurgitation
- Asymptomatic MVP
- Pacemakers

Absolute contraindications:
- Intracardiac shunts
- Asymmetric septal hypertrophy
- Valvular stenosis
- CHF
PFO allows venous gas emboli to bypass the lungs and move right to left.

VGE can pass directly to brain/other organs and cause symptoms of DCS.

65% of divers with serious DCS had PFO vs. 5 in controls.

Workup if undeserved AGE/DCS and want to continue diving.
Relative contraindications:

- Hx of RAD
- Hx of EIB
- Hx of solid tumor
- Cystic or cavitating lung lesion
- Hx of pneumothorax
- Hx of restrictive disease
Absolute contraindications:

- Active RAD
- EIB, COPD, or hx of same with abnormal PFTs or positive challenge
- Restrictive diseases with exercise impairment
- History of spontaneous pneumothorax
Asthma historically thought to be absolute contraindication to diving

Air trapping associated with constrictive airway disease, bronchospasm and mucous plugging

Increased risk for AGE

More recently, may not be absolute contraindication
Asthma and Diving Recommendations

- Mild to moderate asthmatics with normal screening spirometry can be considered candidates for diving (FEV1/FVC 85%)

- If diver has attack, use screening spirometry to monitor and no diving until airway function returns to normal

- There is always an increased level of risk with asthma - potential diver needs to be aware of risk
Exercise, cold-induced, emotional asthma should **NOT** dive

Asthmatics requiring “rescue inhaler” should not dive - unknown when attack may occur

Asthmatics on chronic bronchodilator and inhaled steroids are thought to be able to dive. BSAC recommends no diving if needed rescue inhaler in last 48 hours or if any asthma symptoms
### Relative contraindications:
- Migraines
- Hx of head injury
- Herniated nucleus pulposus
- Peripheral neuropathy
- Trigeminal neuralgia
- Hx of spinal cord or brain injury without deficit
- Hx of cerebral gas embolism without residual pulmonary air trapping
- Cerebral palsy without seizure activity

### Absolute contraindications:
- Hx of seizures, except childhood febrile
- Intracranial tumor or aneurysm
- Hx of CVA or TIA
- Hx of spinal cord injury with deficits
- Hx of type II DCS with neurological deficit
Relative contraindications:

- Recurrent OM or sinusitis
- EAC obstruction
- Hx of significant cold injury to pinna
- ETD
- Hx of TM perforation
- Hx of tympanoplasty or mastoidectomy
- Significant hearing impairment
- Facial nerve paralysis, not due to barotrauma
- Full prosthodontic devices
- Hx of mid face fracture
- Unhealed oral surgery sites
- Hx of head or neck therapeutic radiation
- Hx of TMJ
Absolute contraindications:

- Monomeric TM
- Open TM perforation
- PE tubes
- Hx of stapedectomy
- Hx of ossicular chain surgery
- Hx of inner ear surgery
- Hx of round window rupture
- Facial nerve paralysis from barotrauma
- Inner ear disease other than presbycusis
- Uncorrected upper airway obstruction
- Laryngectomy full or partial
- Tracheostomy
- Uncorrected laryngocele
- Hx of vestibular decompression sickness
Relative contraindications:

- PUD
- IBD
- Malabsorption states
- Functional bowel disorders
- Post gastrectomy dumping syndrome
- Paraesophageal or hiatal hernia
Absolute contraindications:

- High grade gastric outlet obstruction
- Chronic or recurrent small bowel obstruction
- Enterocutaneous fistulae that do not drain freely
- Esophageal fistula
- Severe GERD
- Achalasia
- Unrepaired abdominal wall hernias that may contain bowel
Relative contraindications:
- Hormonal excess or deficiency
- Obesity
- Renal insufficiency

Absolute contraindications:
- Diabetics on insulin therapy or oral anti-hypoglycemic medication secondary to potential loss of consciousness due to hypoglycemia
- Some diabetics may dive under carefully specified conditions
Diving is ABSOLUTELY contraindicated in any stage of pregnancy.

Venous gas emboli formed during decompression may result in fetal malformations.
Relative contraindications:

- Developmental delay
- Hx of drug or alcohol abuse
- Hx of previous psychotic episodes
Absolute contraindications:

- Inappropriate motivation to dive - to please partner or spouse
- To prove oneself in the face of personal fears
- Claustrophobia and agoraphobia
- Active psychosis or while on psychotropic medications
- Hx of panic disorder
- Drug or alcohol abuse
Relative contraindications:
- Sickle cell trait
- Acute anemia

Absolute contraindications:
- Sickle cell disease
- Polycythemia
- Leukemia
Relative contraindications:

- Amputation
- Chronic back pain
- Scoliosis - assess impact on pulmonary function
- Aseptic necrosis - may cause risk of progression due to inadequate decompression
Absolute contraindications:

- Impairment of mobility that would affect diver safety
- Acute or chronic orthopedic injury
What is the most common reason for diving accidents and fatalities?
PANIC BEHAVIOR
Come back soon!

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Kona, Hawaii
Diving Resources

- Diver’s Alert Network - DAN
  www.diversalertnetwork.org
  1-919-684-4326

- Diving Medicine Online www.scubadoc.com

- Undersea and Hyperbaric Medicine Society
  UHMS www.uhms.org

- Scubamed www.scubamed.com