

Gastrointestinal Issues

Consider them Before Returning to Diving

By Dr. David Vote.

INTRODUCTION

Specific medical problems with the gastrointestinal tract (GI system) do not generate many calls on the DAN Medical Information Line. But each year, however, callers ask DAN about fitness-to-dive questions involving the GI system.

Since the GI system contains air spaces, we should view them in relation to scuba diving, along with diseases of the oesophagus, stomach, small and large intestines. Like diseases of other body systems, GI problems can weaken individuals and restrict them from certain types of physical activity.

In this series of frequently asked questions, physicians have determined which disease conditions might not be compatible with the physiology of scuba diving. Many individuals with chronic, long-term disease stop diving altogether, while others experiencing more acute disease may only have to wait out their current illness to resume diving. Physicians use their experience and theory to make the most prudent decision when or if one should return to diving. That is what DAN tries to provide with this article and others like it.

More and more individuals with special health concerns are considering scuba for their recreational activity; others may wish to remain in scuba after they develop

a medical condition. Articles such as this help address this need for new divers and aid the instructors and stores that are responsible for providing training. Although study data linking medical illnesses to diving is limited, we will continue to do our best to find answers for some of these difficult questions.

Don't Overlook It

Fitness to dive with gastrointestinal conditions doesn't have as high a profile as other conditions, but divers should not be complacent about obtaining such a medical evaluation. Several GI conditions can significantly affect dive safety.

The No-Nos

Two classes of conditions can contain absolute contraindications:

- 1) those that can cause gastric and intestinal gas-trapping at depth; this can lead to subsequent expansion - and possible rupture - on ascent; and
- 2) conditions that increase the risk of vomiting underwater, which can lead to panic, rapid ascent, aspiration or drowning.

Relative contraindications involve conditions that can be surgically repaired or have a pattern of acute episodes followed by long symptom-free periods. Many factors prevent patients with such gastrointestinal conditions from diving:

- 1) Scuba diving in remote locations or from a boat with minimal or no definitive medical care for emergencies;
- 2) Fluid and electrolyte losses that can occur with acute conditions and rendering the individual more susceptible to DCI and heat stroke;
- 3) Head-down positions, common in diving, which increase tendency to regurgitate; and
- 4) Chronic bowel inflammation, which can cause poor nutrition and hence a general lack of cardiovascular fitness.

Those with either condition should recover general strength and fitness and then resume diving.

COMMON ACUTE CONDITIONS

Gastroenteritis with Vomiting / Diarrhoea

Condition: This irritation of the large and small bowel can lead to diarrhoea, vomiting, fever, abdominal pain and cramping, loss of appetite and general weakness. Caused by various bacteria or viruses, it may also indicate other gastrointestinal disease. Often mild and lasting only a day or two, it can be severe and cause life-threatening dehydration.

Fitness and Diving: Malaise and dehydration can both adversely affect divers; one should postpone diving until symptoms have subsided and hydration is normal. To maintain or regain hydration, take extra fluid as tolerated. Divers should remember that medications used to control nausea, vomiting and diarrhoea may have some adverse side effects, such as sedation.

Small Bowel Obstruction

Condition: Obstruction of the small bowel refers to the intestinal blockage due to adhesions (external bands), scarring, external compression, twisting or entrapment of the bowel within a hernia (see Hernias). Vomiting and abdominal pain are symptoms.

Fitness and Diving: Almost all individuals with bowel obstruction will be hospitalised. Because of possible over-distension and rupture, those with such an obstruction should avoid diving until the underlying problem has been corrected.

CHRONIC CONDITIONS

These conditions are lifelong or of long duration.

Gastro-oesophageal Reflux ***(“Heartburn” or “Waterbrash”)***

Condition: “Reflux” is a backward flow of acid or food from the stomach into the oesophagus. Symptoms include burning upper abdominal or chest pain, sour taste or food regurgitation, which can happen when divers are in the head-down position. Symptoms can be exacerbated by:

- drinking alcohol
- smoking
- an ulcer or hiatal hernia
- certain medications such as aspirin or non-steroidal anti-inflammatory drugs (NSAIDs)
- a tight-fitting belt or wetsuit.

Physicians treat reflux with medications or through surgery.



Fitness and Diving: While most people may experience occasional mild heartburn, if reflux of gastric contents occurs while one is diving, a diver could be at significant risk. Aspirating food or acid into the lungs or into the regulator could be fatal. Individuals with significant reflux should not dive.

Achalasia

Condition: A disorder of the oesophageal smooth muscle, achalasia has two components: the lower oesophageal sphincter that does not relax with swallowing and

abnormal contractions that replace the normal movement of the oesophagus.

Fitness and Diving: Food and secretions can collect in a pool in the lower oesophagus and cause regurgitation when the diver is in the head-down position. As with reflux, diving is not recommended.

Inflammatory Bowel Disease

Condition: Inflammatory bowel disease (IBD) can result from ulcerative colitis or Crohn’s disease. The major symptoms are diarrhoea, which can be bloody; abdominal pain; nausea; and vomiting, often with fever and weight loss.

Commonly, IBD usually occurs to divers aged 20 to 40 years and who experience the following:

- 1) Intermittent disease with long periods of normal bowel functioning; and
- 2) Complications including anaemia, electrolyte disturbances, de-hydration, poor absorption of fluids, liver disease and generalised fatigue.

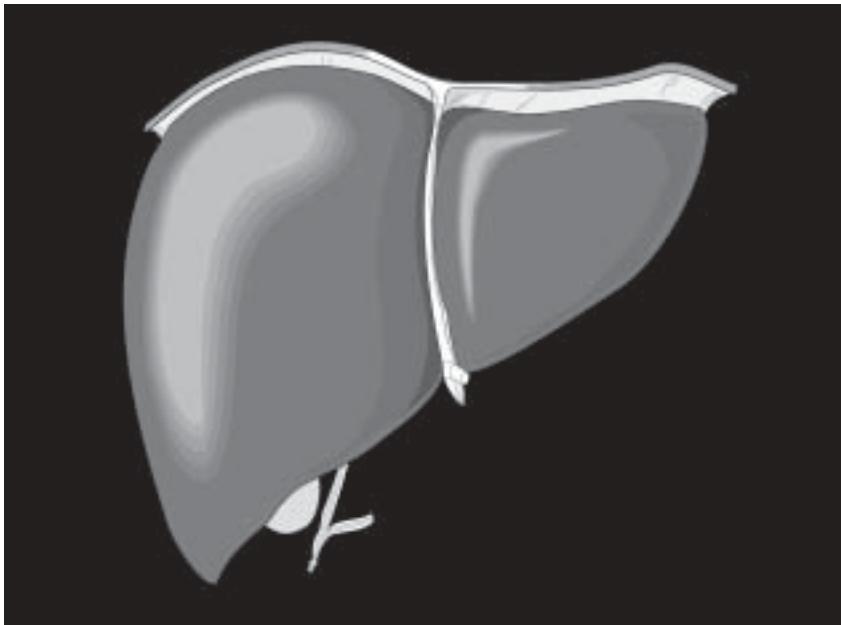
Drug treatment often involves corticosteroids, which can impair one’s ability to fight infections.

Fitness and Diving: Someone with symptomatic IBD should not dive until treatment has caused remission. A person experiencing no significant complication of IBD or its treatment and has adequate cardiovascular fitness could consider diving.

Abdominal Surgery

Condition: This is a surgical procedure in which a portion of the intra-abdominal contents or the abdominal wall has been removed, manipulated or repaired.

Fitness and Diving: Diving in the ocean exposes the skin to innumerable microorganisms. To minimise infection, divers should allow surgical wounds to heal fully before diving. A small proportion of abdominal wounds may develop into incisional hernias, leading to bowel entrapment. One should avoid swimming or lifting heavy objects such as scuba tanks until the abdominal muscles have fully recovered from surgery (4-6 weeks). As for when to resume swimming and diving, a surgeon can best assess the wound's status.



In addition, the fatigue and lack of general fitness present after any surgery can limit a diver. Gradual exercise under the direction of a doctor may help the diver regain cardiovascular performance and general fitness.

Hernias

Condition: A hernia is the protrusion of a loop or portion of an organ or tissue through an abnormal opening, usually in the abdominal wall (in the groin, or inguinal region, alongside the artery

supplying the thigh, through an unhealed, surgical incision) or in the diaphragm. Hernias can also occur internally, when the bowel protrudes through a narrow opening or pocket in the peritoneum, the abdomen's internal lining.

Bowel protruding into a hernia can become entrapped, causing an obstruction or damage to the bowel. Surgical repair is usually recommended for hernias.

Fitness and Diving: During an ascent, a trapped segment of bowel containing gas will expand; it could rupture and compromise its blood supply. For this reason, individuals should not dive with an unrepaired hernia.

Hiatal Hernia

Condition: In a hiatal hernia, part of the stomach protrudes into the chest cavity through the diaphragm's oesophageal opening. Two main types of hernia are distinguishable,

since they have different implications for fitness to dive.

In a sliding hiatal hernia, the upper portion of the stomach slides upward in the space occupied by the oesophagus. This hernia can cause gastro-oesophageal reflux, but it often has no symptoms. A para-oesophageal hernia is a protrusion of the stomach through a separate opening of the diaphragm.

Fitness and Diving: Significant gastro-oesophageal reflux should be treated before diving, but a sliding hiatal hernia does not by itself contraindicate diving. Part of the stomach can become trapped within a para-oesophageal hiatal hernia, and, during ascent, could rupture. Thus, para-oesophageal hiatal hernia is considered a contraindication to diving.

A few who have had surgical repair of their hiatal hernia (e.g., fundoplication) can suffer from gas-bloat syndrome, which is associated with gaseous distension of the stomach. This is believed to occur due to one's inability to expel swallowed air by belching. During an ascent, this distension can also lead to gastric rupture. The symptom usually resolves within a few weeks. If the distension persists, however, diving is not advised.

Peptic Ulceration

Condition: A peptic ulcer is a breakdown of the inner lining of the stomach or duodenum, the first part of the small intestine. Acid and pepsin, the chief active principal in gastric juice with acid, play major roles in creating and developing this ulcer. Peptic ulcer includes duodenal ulcer (DU) and gastric ulcer (GU); both are chronic diseases, often caused by a bacterium *Helicobacter pylori*. They may be caused by stress or by ingesting drugs, most commonly, aspirin and non-steroidal anti-inflammatory drugs such as ibuprofen and naproxen. Peptic ulcer is caused when defenses provided by the mucous membrane fail to protect the lining of the stomach from the corrosive effects of acid and pepsin.

Fitness and Diving: Symptoms can be sudden, severe and disabling. Usually consisting of pain in the upper central abdomen, it is often described as a sharp, burning or gnawing pain. Complications include bleeding, which can cause anaemia, general fatigue and a reduced tolerance for exercise. Other complications include perforation, which requires immediate surgery, and obstruction of the duodenum.

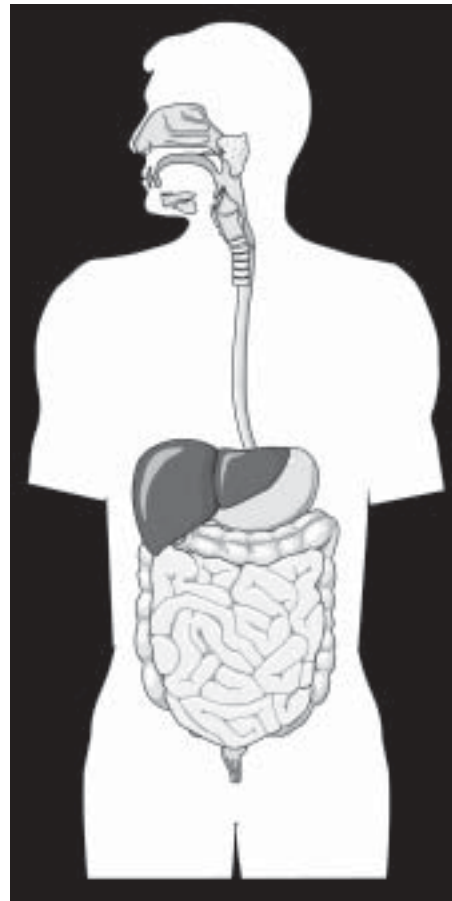
Diving is not recommended for individuals with symptoms of peptic ulcer disease. However, one who is symptom-free for more than a month may consider diving.

Some medications used to control stomach acids may cause side effects. Check with your physician. Peptic ulcer may also be corrected by surgery. After abdominal surgery and

all activities have returned to normal, one may consider scuba diving (see “Dumping Syndrome”).

Dumping Syndrome

Condition: Following peptic ulcer surgery, some patients experience wide-ranging symptoms called dumping syndrome. Symptoms often occur in the early post-surgery period. Experienced within 30 minutes after eating, these symptoms include palpitations, lightheadedness, sweating and a drop in blood



pressure upon standing. Late dumping syndrome, which occurs 30 minutes to three hours after eating, can involve any of these symptoms or additional confusion and even loss of consciousness.

Fitness and Diving: For obvious reasons, diving is not recommended with these symptoms.

Ileostomy and Colostomy

Condition: An “ostomy” is an opening created surgically to allow the bowel to empty through the abdominal wall. Connection of the end of the small bowel and the large bowel in this manner are known, respectively, as ileostomy and colostomy.

The continent, or moderate, ileostomy is a loop of small bowel fashioned under the skin with a nipple valve to prevent spillage. Ileal effluent collects in this reservoir, which must be emptied with a soft rubber catheter. The second type opens directly onto the abdomen, requiring an external ileostomy or colostomy appliance.

Fitness and Diving: The direct type of ileostomy and colostomy poses no danger to the diver. Ensuring a secure fit of the external bag can prevent spillage of faecal material. A continent ileostomy poses theoretical risk if gas swallowed during the dive cannot escape through the ileostomy site.

For one with continent ostomy, an gastroenterologist or surgeon should make an individual assessment.

Oesophageal Diverticulae

Condition: Diverticula, protrusions of the oesophagus wall, can occur at various sites, causing a number of symptoms, ranging from halitosis, or

offensive breath, to regurgitation of saliva and food particles and difficulty in swallowing.

Fitness and Diving: Because of the risk of aspirating pooled secretions and food debris when one dives in the head-down position, oesophageal diverticula may disqualify one for diving.

Diverticular Disease of the Colon

Condition: Diverticulae consist of herniations, or saclike protrusions of the inner lining through the outer muscular wall. Most common in the large bowel, these diverticulae become more common with advancing age. The incidence ranges between 20 and 50 percent in Western populations over 50. The most frequent complication, diverticulitis, is inflammation in or around the diverticular sac. Such inflammation may vary from small, localised abscesses to generalised peritonitis or inflammation of the stomach lining.

Fitness and Diving: Uncomplicated small or large bowel diverticula should pose no problem to diving. Anyone with symptoms indicating a complication should have prior medical evaluation before clearance to dive.

OTHER CHRONIC INFLAMMATORY DISEASES

Liver Cirrhosis

Condition: Liver cirrhosis, a destructive process resulting from fibrosis of liver tissue, is most

commonly due to toxic substances (alcohol) or viral infections (hepatitis). Complications include bleeding from the oesophagus or stomach, impaired blood coagulation, accumulation of fluid in the abdomen and impaired ability to detoxify medications.

Fitness and Diving: If otherwise fit, divers who, have a normal response to exercise, can dive if they have mild cirrhosis, with no symptoms or secondary complications. Before diving, they should be evaluated by their physicians. In cases where cirrhosis is more severe, the rigors of scuba and the effects of the disease could impair a diver's ability. In such cases, scuba is not recommended.

Chronic Pancreatitis

Condition: Chronic pancreatitis is a progressive and destructive process resulting in fibrosis and calcification of pancreatic tissue. Loss of pancreatic function can reduce or eliminate the production of insulin. Chronic pancreatitis (70-80 percent) has many causes, including chronic alcohol use and gallstones. Endemic in tropical parts of the world, it can be hereditary as one ages, and it can be caused by other illness and disease. It may present as indigestion, nausea or stomach pain; it can be triggered by eating or drinking alcohol. While this disease can cause chronic malabsorption of nutrients leading to severe weight loss, it can also lead to diabetes.

Fitness and Diving: Scuba diving depends on the level of fitness and health of the individual. If a diver's condition has not progressed to the point of needing medication control

for chronic pain, if the diver can eat without the gastrointestinal side effects of pancreatitis, including diabetes, and if the diver can perform exercise without unusual fatigue, then scuba may be permitted. However, the manifestation of continuous and chronic symptoms of pancreatitis would make diving with symptoms unwise.