



When Should Kids Start Scuba Diving?

By DR. DAVID SAWATZKY



Photo courtesy: Kids Sea Camp

once spent a large amount of time reviewing the details of a twelve-year-old boy who died while scuba diving and thought it would be useful to look at all the things a parent should consider before enrolling their child in a scuba course or discover scuba program (the twelve-year-old died on a discover scuba dive). I trained and certified my stepson when he was 14 and my own kids are now twelve and 14, so the topic is very important to me as well.

When scuba diving started, it tended to appeal to fit, young men. Women rapidly joined in and divers not only became older, but older people started taking up diving. The minimum age at which training agencies would certify a person as

a diver dropped quite rapidly and kids as young as age eight can now be taken diving, certified as a junior diver at age twelve and a full diver at age 15 (different agencies have slightly different ages).

Kids mature at different ages. There are both physical and mental considerations as to when a child should take up diving. In fact, there are some adults who should not take up diving for some of the same reasons!

Physical considerations

All babies have an open (patent) foramen ovale (PFO) in their heart. When a baby is born and takes their first breath, the pressures change in the heart and lungs and a flap of tissue is pushed over the hole

The lungs of kids up to about age twelve are anatomically different than adult lungs

Kids Sea Camp have certified over 7000 youths, with a 100% safety success rate. Camps like this can help children learn in a safe, specialised, and experienced environment

between the left and right atrium (the hole is necessary for the fetus to survive while it is not breathing). If the flap does not completely cover the hole, the person is left with an atrial septal defect.

Even if the flap does completely cover the hole, for a short part of every heartbeat the pressures in the atria reverse allowing the flap to lift and a small amount of blood to move through the hole. Over time, the flap usually becomes permanently attached to the underlying tissue. As a result, the

percentage of children with a PFO declines as they get older.

In adults, about 10% will have a large PFO, 30% will have a small PFO, and many, many more will have a small communication that can be found at autopsy with very careful inspection. Only the large PFOs seem to have any relevance in diving and only if the diver is doing dives that generate large numbers of intravascular bubbles.

If the PFO is going to close, it usually happens by age six, although some can close later. Clearly younger divers should not be doing dives with significant decompression stress and a good argument can be made that adults should also avoid dives that can be expected to cause significant numbers of intravascular bubbles, as 10% of adults will have a large PFO.

Children's bones are different from adult bones in that kids' bones have growth plates. Growth plates are areas near the ends of a long bone where the bone grows and gets longer. These areas have an increased blood supply relative to the rest of the bone and theoretically would be at increased risk of decompression sickness. Damage to a growth plate can result in it fusing. If this happens before the bone has finished growing it will be shorter than it should be in the adult.

The long bones in the arms and legs stop growing and the growth plates fuse around age 16 in girls and 18 in boys. However, the growth plates in the spine do not fuse until a person is in their mid-twenties! We do not know if this is a real or just a theoretical concern, as the data does not exist and no ethics committee would ever approve a study to answer this question. The only safe option is for younger divers to avoid dives with significant decompression stress.

The Eustachian tubes in kids up to about age twelve are harder to open to allow equalization of the middle ear than in adults. Therefore, more kids will have trouble equalizing their ears than adults. This is not really a problem, because if you cannot equalize, you cannot dive. Just be aware that more kids will have trouble with this skill.

The lungs of kids up to about age twelve are anatomically different than adult lungs. They have proportionally smaller airways and those airways tend to be more reactive. Therefore, a high percentage of kids will have problems with "reactive airways disease" or "asthma"; however, a large number of them will "grow out of it" as their lungs mature. I spent several summers providing medical care at cadet camps (minimum age twelve) and a large number of the kids arrived with inhalers.

These lung differences increase the

risk that kids will suffer from pulmonary barotrauma, mostly arterial gas embolism (AGE). Pulmonary barotrauma is a shallow water problem and fatalities have occurred in six foot (2m) deep swimming pools. The twelve-year-old scuba diving fatality I reviewed most likely died from AGE after a controlled ascent from approximately 15 feet (4.5m) depth to the surface.

Kids can certainly breathe off a scuba tank in very shallow water but I have real concerns about any child less than age twelve diving. In addition, any child with a history of any lung problem should be carefully screened by a physician knowledgeable about diving medicine, including appropriate investigations, before they try diving. Any adult with a history of lung problems after age twelve also needs the same careful screening.

The buddy system breaks down when one of the two divers is so much smaller than the other that they would not be able to assist the larger diver in an emergency

Kids (and small adults) are at increased risk of developing hypothermia. Heat loss is proportional to body surface area and inversely proportional to body mass. What this means is that small people have relatively more skin area in relation to their total body weight than larger people. Therefore, small people cool down much faster than larger people. Most kids have this problem.

In addition, kids are growing and changing their size and shape rapidly. This makes it almost impossible to keep them in a well-fitting wetsuit or drysuit. Remember that heat is lost in any water that is colder than the human body (37°C or 98°F) so even in the tropics kids can become hypothermic. Kids are usually smaller than adults. This makes it difficult to find equipment that fits them correctly, although the selection is much better than it used to be.

Even if appropriately sized gear can be obtained, the buddy system breaks down when one of the two divers is so much smaller than the other that they realistically would not be able to assist the larger diver in an emergency. This is frequently a problem with adult divers and even more likely to be a problem if a child is diving with an adult.

Diving as a threesome (two larger divers and one smaller) also has problems as threesomes are over represented in

diving fatalities. At the same time, do you really want two kids diving together? Maybe the mother would be a better dive partner for a younger diver, although mom is not always smaller than dad.

Psychological considerations

Young kids are often amazingly cool divers. They have absolutely no understanding of the dangers and risks of what they are doing! They need to be able to understand the gas laws and some basic anatomy/physiology as it relates to diving.

Kids up until about age eleven are often limited to "concrete thinking". They can learn things and recite them back to you perfectly but they are not able to apply them or to react appropriately in a different or unfamiliar situation. Kids may know the gas laws and pass every exam but still hold their breath and rocket to the surface during a dive, without understanding the danger of what they are doing. My stepson was (is) very bright but it was not until he was 14 years old that he could apply the math and physics of diving to novel situations and I felt confident that he was old enough to scuba dive safely.

Kids often do not have the discipline to dive safely. They might not perform pre-dive checks correctly, nor follow the rules and dive safely. I believe this is even more of a problem now than it was in the past.

Younger divers may not have the reasoning skills or mental capacity to figure out a situation and react appropriately, to help themselves or their buddy.

Kids often have difficulty dealing with fear and frustration. When diving they cannot just stop, or have a temper tantrum. They must continue to deal with the uncomfortable situation logically and rationally, maintain control of themselves, and, at a minimum, correctly perform a slow, controlled ascent to the surface.

Children grow up and mature at very different rates. Therefore, it is impossible to determine an exact age when they can be safely taught to dive. The bottom line is that they have to have the physical size as well as the mental and emotional maturity not only to understand the dangers of diving and take care of themselves in an emergency, but also to be able to assist their dive buddy.

I believe all certified divers should have to meet the same standards. Most young people will not be able to do that until they are somewhere between twelve and 16 years old. I also believe well-meaning parents have to be very aware of the potential danger of encouraging a child to take up diving when the child really has no interest. Meanwhile kids can snorkel and improve their swimming skills and comfort in the water. Mine are both competitive swimmers but not yet divers. []