

Teaching Surf Instructors to Teach



National Surf Schools and Instructors Association Instructors and Coaches Training Manual



Dangers in the Water Part 9

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Bad Things in the Water

Unfortunately for surfers, humans don't surf in their natural environment. In fact, we enjoy the surf but must be mindful of what lies beneath. Similar to the chapter in injuries, this chapter deals with various creatures that live in the ocean and ways surf instructors should deal with the potential dangers they pose to students. Understand that the treatments suggested here are for information to the instructor only. At no time should an instructor advise a student of potential treatments, only advise seeing a physician.



Coral Cuts

A coral cut is the one problem that all surfers know of where the appearance is much better than the problem. A small, harmless-looking cut may quickly develop into an infected wound. Coral reefs are common sources of lacerations and punctures. Corals are animals that have calcified outer skeletons with sharp edges. Coral formations occur in tropical and subtropical waters. Because coral formations are rigid and sharp, injury can occur after accidental contact, leaving a small amount of animal protein and calcareous material in the wound. Some corals contain nematocysts, which can produce a more significant injury.

Coral Cut Symptoms

The inflamed, swollen, red, tender wound develops into a festering sore or ulcer with a pustular (infectious) drainage.

Spreading redness of the skin around the wounded area suggests expanding infection and requires immediate medical attention.

Coral Cuts Treatment

- For minor cuts, gently pull the edges of the skin open and remove embedded coral either by rinsing or using tweezers.
- Scrub directly inside the cut with clean gauze or a cloth soaked in clean, fresh water.
 - If the wound stings, rinse it with acetic acid (vinegar) or isopropyl alcohol.
- Flush the wound with a mixture of one half water and one half hydrogen peroxide to remove coral dust and then flush with fresh water.
 - Rinse daily and apply Bacitracin (an antibiotic) ointment 3-4 times per day.
- If no evidence of infection or open wound is present, an over-the-counter steroid ointment may be used to relieve itching.



- Pain may be relieved with 1-2 acetaminophen (Tylenol) every 4 hours and/or 1-2 ibuprofen (Motrin, Advil) every 6-8 hours.



If bleeding persists, or the edges of a wound are jagged or gaping, the victim likely needs stitches. Taping a cut shut is often an effective alternative, but may leave a more visible scar than suturing. It is not true that using povidone-iodine or other iodine solutions to wash coral cuts will cause coral to grow in the wound. Coral is a marine animal; it can never grow inside the human body.

A popular myth surfer treatment for coral cuts is to urinate on the wound. This may sometimes wash broken pieces of coral from the cut, but urine discharges nematocysts in Australians box jellyfish. Thus, urine may make the injury worse. For large cuts, fever, or any other signs of infection or illness after coral contact, see a doctor.

Oral antibiotics are usually recommended to prevent infection. If infection develops, continue antibiotics for at least 5 days after all signs of infection have cleared. Check for drug allergy prior to starting any antibiotic. A doctor can recommend the right antibiotic. Some antibiotics can cause increased sensitivity to the sun, so use a sunscreen (at least SPF 15) when treating.

Coral Puncture Wounds

True (stony) corals exist in colonies that possess calcareous outer skeletons with pointed horns and/or razor-sharp edges. When these coral colonies grow as sharp spines. Stepping on or bumping against them can cause a puncture wounds that leave part of the coral inside the wound.



- Scrub the wound with soap and water followed by extensive flushing with fresh water.
- Cover the area with heavy duty duct tape for a few days, replacing when necessary. The skin will soften and the fragments migrate to the surface when they can easily be removed.
- If signs of infection, such as pus, redness, or

heat occur, apply topical antibiotic ointment and call the doctor, who may prescribe antibiotics.

Sea Urchin Puncture Overview

Sea urchins have globe to flattened-shaped bodies covered with spines. They are non-aggressive marine animals found all over the world. They live in shallow, rocky bottoms, or hide in sandy cervices. Human contact with sea urchins is either accidental or intentional. People accidentally step on them in shallow surf, or intentionally pick up the urchins, unaware that they must handle the spines with care to avoid injury.



There are several species of sea urchin in the world. Some are more dangerous and poisonous than others. If at all possible, try to see what kind of urchin the barb has come from. For instance, the diadema setosum is a mildly poisonous urchin, easily recognizable by its sinister looking, long black spikes. The Flower Urchin is an innocuous looking urchin, resembling a large flower, but even touching its flowery-looking spines can result in immediate poisoning. The resulting numbness, heart palpitations, and panic can cause drowning.

Sea urchins have two types of venomous organs - spines and pedicellaria. Spines produce puncture wounds. Pedicellaria are small, delicate seizing organs that lie between the spines and release venom when they attach to an object.

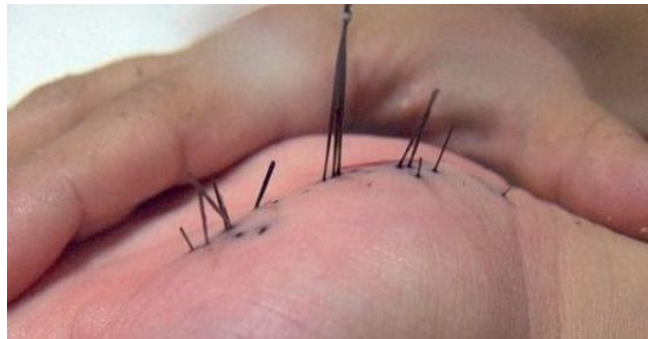
Check to make sure that the spine has not broken off inside your tissue. If a piece remains inside, under the skin, a visit to the doctor will be needed. Leaving any foreign object under the skin, regardless of whether it is poisonous or not, is grounds for infection. Using tweezers, grasp the end of the spine carefully and remove it from the skin. Double check to make sure that all of the spines

- A puncture injury from a sea urchin can cause swelling and redness around the area, which may lead to severe pain and infection.
- Multiple deep puncture wounds may cause fatigue, weakness, muscle aches, shock, paralysis, and respiratory failure. Death may occur.

Sea Urchin Puncture Treatment

Because of the properties of sea urchin spines, the spines dissolve in vinegar. Vinegar is also a natural antiseptic.

- Heat a bowl or container of white vinegar in the microwave until it is hot, but not hot enough to burn the skin.
- Next, immerse the affected area for 30-90 minutes. Repeat as necessary to control pain.
- Submerge the affected area in the vinegar and leave it in the vinegar bath until the vinegar is no longer warm. This will help to dissolve any urchin spine remnants that are not visible to the naked eye, and even help lift spine pieces to the surface of the skin.
- Use tweezers to remove any large spines in the wound.
- Remove the pedicellaria by applying shaving cream to the affected area and gently scrap with a razor.
- Scrub the wound with soap and water followed by extensive flushing with fresh water.
 - Do not close the wound with tape or glue skin.
- If signs of infection, such as pus, redness, or heat occur, apply topical antibiotic ointment and call your doctor, who may prescribe antibiotics. If the patient is started on antibiotics, continue to take them until the patient has used the entire course of the medication. Talk to the doctor about antibiotics and sun sensitivity.



- Relieve pain with the recommended doses of acetaminophen (Tylenol) pain relievers every 4 hours and/or ibuprofen (Advil, Motrin) every 6-8 hours.

The faster these steps can be taken, the less time the open wound will have to fester and form an infection. If an infection does form, a doctor visit is absolutely required. Sea urchins are the lurking porcupines of the ocean. Keeping a vigilant eye out for these spiny animals and avoiding walking at all, or walking barefoot, in areas of open water when the floor is not easily visible will help to avoid stepping on one.

Cone Snail Punctures

Cone Snail can also cause a puncture wound. Most cone snail punctures in Hawaii and similar environments are not dangerous and require no specific treatment other than thorough scrubbing of the wound. Rarely, however, a person stung by a cone snail experiences nausea, headache, or difficulty breathing. If any of these symptoms develop after a sting, get the injured person directly



to an emergency room. In route, hold the bite site below the rest of the body, while keeping the victim as still as possible. Apply a broad pressure bandage over the bite about as tight as an elastic wrap to a sprained ankle. This slows the venom's spread through the lymph system. Make sure arterial circulation is not cut off by making sure fingers or toes stay pink and warm.

Fire Coral

Fire corals are not true corals. They are members of the Cnidaria phylum family, and although fire coral looks like coral, it is more closely related to jellyfish and other stinging anemones. Fire corals have a bright yellow-green and brown skeletal covering and are widely distributed in tropical and subtropical waters. The very small nematocysts on fire corals contain tentacles that protrude from numerous surface pores (see Jellyfish Sting). In addition, fire corals have a sharp, calcified external skeleton that can scrape the skin.

Fire Coral Symptoms

If you teach in an area where fire coral is located, watch for these symptoms:

- Within 5-30 minutes following skin contact with fire coral, an immediate burning sensation or a stinging pain develops.
 - A red rash with raised wheals or vesicles appears, and itching develops.
 - Lymph gland swelling may occur over time.
 - Rarely, nausea and vomiting have been reported.

Fire Coral Cuts Treatment

The following guidelines are suggested to treat fire coral cuts:

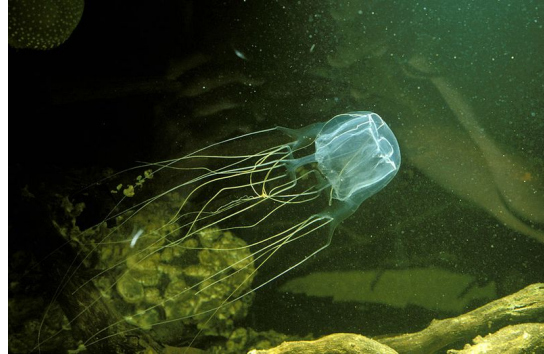
- Rinse with seawater. Avoid fresh water because it will increase pain. Apply topical acetic acid (vinegar) or isopropyl alcohol.
 - Remove tentacles with tweezers.
 - Immobilize the extremity because movement may cause the venom to spread.

- Apply hydrocortisone cream 2-3 times daily as needed for itching.
- Discontinue immediately if any signs of infection appear.

If the person who has come into contact with fire coral develops shortness of breath; swelling in the tongue, face, or throat; or other signs of an allergic reaction, treat for an allergic reaction. If no signs of allergic reaction are present, pain may be relieved with 1-2 tablets of acetaminophen (Tylenol) every 4 hours and/or 1-2 tablets of ibuprofen (Motrin, Advil) every 6-8 hours.

Jellyfish

Small but deadly, these jellyfish are the cause of more human deaths a year than sharks, crocodiles, and stonefish combined. Its poison is extremely potent. They are found mostly in the tropical Indo-Pacific region, with some species living in tropical and subtropical oceans including the Atlantic Ocean and the eastern Pacific Ocean.



Free-swimming *Scyphozoan medusae* jellyfish include the familiar disk-shaped animals that are often found floating along the shoreline. The bodies of most range in diameter from about 1 to 16 inches (2 to 40 centimeters); however, some species are considerably larger with diameters of up to 6 1/2 feet (2 meters).

The bulk of the *Scyphozoan medusae* jellyfish consists of almost ninety-nine percent water. Like their close relatives, sea anemones and corals, jellyfish have no head, heart, skeleton, or brains



Immediate First Aid - Box Jellyfish

1. Douse or spray the sting liberally with vinegar.
2. Pluck off any visible tentacles carefully - try not to use your fingers, use your fins, a towel, etc. instead to brush them away.
3. For severe pain, try applying a hot pack. If heat makes the sting feel worse, try applying a cold pack or ice to the sting.
4. Get medical help for severe reactions. ***IMMEDIATE MEDICAL ATTENTION MAY BE REQUIRED*** when blisters are formed as their stinging may bring about ***anaphylactic shock***.

Portuguese Man-of-War

Similar to the Jellyfish, this is a type of Physalia found in the Atlantic, Indian, and Pacific Oceans. Although similar in looks to a shell, don't touch it. It has long tentacles that give a powerful and venomous sting, capable of killing or paralyzing fish, or in rare instances, humans. They are identified by their gas-filled bladders, which sit at the surface of the water, while the rest of them is submerged. Their name comes from their resemblance to the Portuguese 18th-century armed sailing ship,



the man-of-war, at full sail.

Immediate First Aid - Portuguese Man-of-War

1. Rinse the area liberally with seawater or fresh water to remove any tentacles stuck to the skin. This can be from a spray bottle or in a beach shower. Do not apply vinegar. A study shows that vinegar in these stings sometimes *makes the sting worse*. (Portuguese man-of-wars belong to a different family than **box jellyfish** [*Carybdea alata*] and therefore must be treated separately.)
2. For severe pain, try applying heat or cold, whichever feels better to the victim.
3. Few Portuguese man-of-war stings cause life-threatening reactions, but this is always a possibility. Some people are extremely sensitive to the venom; a few have allergic reactions. Consider even the slightest breathing difficulty, or altered level of consciousness, *a medical emergency*. Call for help and use automatic epinephrine injector if available.

The Clinging Jellyfish of New Jersey

This is an invasive species that was first found in the Shrewsbury River in 2016 and has now spread to the Metedeconk River, near the point it reaches Barnegat Bay – north of the Mantoloking Bridge in New Jersey. This jellyfish carries paralysis toxins that cause your muscles to tense up and also causes intense pain.



Irukandji Jellyfish

This is the smallest jellyfish in the world but also one of the most dangerous. Their sting is 100 times stronger than a cobra and may cause the Irukandji syndrome, which involves nausea, muscle cramps, excruciating back and kidney pains, a burning sensation of the skin and face, headaches, vomiting, and a feeling of impending doom. While most jellyfish have stingers only on their tentacles, the Irukandji also has stingers on its stomach.



Stingrays

Stingrays are bottom-dwelling fish that usually are encountered while surfers are entering or exiting the water, particularly when they step off their boards after a ride. Their tail has a sharp spine that can penetrate wet suits and water shoes. Surfers who have been stung exhibit puncture wounds or lacerations, usually on their foot or leg, and pain significantly more than would be guessed by the wound's appearance. In many cases,

the surfer suffers significant muscle spasms and is unable to walk or even bend their knee for a few minutes. Additionally, fragments of the bony barb on the tail are normally left in the wound.

Initial treatment with hot-water immersion inactivates the heat-labile toxin. Retained barb parts should be removed from the wound as soon as possible. Shuffling the feet while walking through shallow water can prevent stings since stingrays are shy and normally scatter when they are alerted to human presence.



Sea Bather's Eruption

Sea bather's eruption is a rash, which affects the bathing suit-covered areas of the skin, rather than exposed areas, after swimming in the sea. It is a hypersensitivity reaction caused by stings from the stinging cells (also called nematocysts) of the larval forms of certain sea anemones.

When the rash occurs (and you have taken off your swimming suit and showered), an application of diluted vinegar or rubbing alcohol may neutralize any toxin left on the skin. An ice pack will also help to relieve any pain. The most useful treatment is 1% hydrocortisone lotion applied 2-3 times a day for 1-2 weeks. Topical calamine lotion with 1% menthol may also be soothing. Non-steroidal anti-inflammatory drugs such as ibuprofen and aspirin (but not in children) will help reduce pain and inflammation.



Sea Lice

Similar to Sea Bather's Eruption, sea lice are small larvae from marine life. When under pressure, they can scratch (in the case of crabs) or release inflammatory, stinging cells (in the case of jellyfish) that cause itching and redness. Sea lice creep underneath swimmers' bathing suits and sting or scratch beachgoers. They can cause itchy, red rashes, nausea, headaches and lethargy. The rashes are also commonly known as "seabather's eruption" because of the intense itching those afflicted experience.

Stonefish

This is known as the world's most poisonous fish. It lays camouflaged on the bottom of the ocean floor, patiently awaiting its prey. It has venomous neurotoxins, which it emits from the glands at the base of its dorsal fin spines when it is disturbed or threatened. It consumes its victim in a whopping 0.015 seconds by opening its jaws very fast. Not easily seen due to their similarity in appearance to rocks or coral, they can also survive outside of the water for up to 24 hours.

They are found in the coastal regions of the Indo-Pacific and some species live in rivers.

While these fish are very poisonous and often deadly, they can be eaten when prepared properly.

Sharks

Unfortunately, shark attacks on surfers represent an unwanted and sometimes, a fatal risk that surfers take. Also, unfortunately, surf instructors, like swimmers, are in the water where sharks sometimes swim. The first authenticated Great White attack on a wind surfer took place off the Pacific Coast of North America in September 1995. The surfer, Michael Sullivan, was attacked about 1 km off Davenport Landing, just north of Santa Cruz, California. His black wetsuit had purple accents, and his 2.8-m sailboard was lime green with a clear Mylar sail and trimmed with red and black margin.



There were 41 confirmed unprovoked shark attacks on surfers along the West Coast of North America during the Twentieth Century. The Great White Shark was determined to be the causal species in all but two. It has been suggested that Great White attacks on surfers are the result of the attacking shark mistakenly identifying the surfer for a seal. However, recent evidence is suggesting there is doubt as to whether all White Shark attacks on surfers are the result of "*mistaken identity*." Research has show that when it comes to a motionless dummy the water, great white sharks can easily differentiate between seals and surfboards and will only approach the surfboards with great caution and curiosity.

There are primarily three types of sharks that attack people, Great White, Tiger, and Bull sharks. Bull sharks are the least known of the three. But experts note that the specie's preference for coastal waters less than a hundred feet (30 meters) deep makes bulls potentially the most dangerous sharks of all. Bull sharks inhabit quite shallow waters, thus they have the most opportunity to interact with humans. They are among the most common sharks in Florida waters and are often encountered by surfers and



swimmers near shore. They are also one of the few warm-water, coastal sharks that will attack bigger prey. However, though the predators may come in close proximity to humans, statistics suggest that swimmers, surfers, and divers have little to fear from bull sharks.

Shark Attacks

Bull sharks happily tolerate the murky water found in estuaries and bays. Such conditions can sometimes play a role in spurring shark attacks on humans. The sharks are especially at home in areas with lots of freshwater inflow, such as brackish river mouths. The abundance

This Great White shark suddenly appeared during a lesson in Blueys Bay, Australia. The instructor did not get his class out of the water immediately

of such habitat along the coasts of the northern Gulf of



Mexico east of the Mississippi River makes this area especially suited to the sharks.

World's Most Dangerous Shark Areas

The International Shark Attack File (ISAF) tracks shark attacks all over the world. The following section describes the most dangerous shark attack beaches in the world.

New Smyrna Beach (below), Florida, is known as the “Shark attack capital of the world. The local Blacktip Sharks above have a difficult time telling people from food.

Maui has the highest number of confirmed, unprovoked shark attacks recorded in the Hawaiian chain since 1882. There have been just over 100 reports of unprovoked attacks in the entire Hawaiian island chain (the most, 34, occurring off of Maui). Hawaii is home to about 40 different shark species, including the occasionally aggressive tiger shark, and so incidents (including fatalities) do occur.



Located in KwaZulu Natal, bordering Mozambique in a corner of South Africa, Kosi Bay is a series of four lakes that eventually connects to the warm Indian Ocean through an estuary. Zambezi sharks (the South African name for their aggressive Bull sharks) are known for making forays in search of food deep into freshwater lakes and rivers, particularly the fish rich Kosi Bay.



“Shark Alley” is a narrow channel between two small islands off the coast of Gansbaai, east to Cape Town. It is also home to one of the densest populations of great whites in the world.

Australia's coastal waters are filled with sharks of all kinds. While the greatest number of shark attacks take place on the east coast, most fatal attacks occur in the colder southern waters, home of more seals and great whites (pointers).

Near San Francisco, California, Stinson Beach and the Point Reyes Seashore (including the mouth of Tomales Bay), are located in an area known as the Red Triangle (a region marked by its high density of great white sharks).

The Umhlanga Rocks, on the KwaZulu Natal coast just north of Durban, South Africa, has protective nets. Otherwise, this would be a dangerous place to surf.

Sharks favors reefs and so do surfers—one for the waves, the other for the fish. Recife, a lovely beach town on Brazil's northeast coast, boasts a coral reef that attracts copious numbers of sharks that come to feed in the area. Which is why, according to the ISAF's regional map of "confirmed unprovoked shark attacks" (covering 1931–2006), the state of Pernambuco (where Recife is located) boasts the highest number of shark attacks by far for all of South America

According to the ISAF, Grand Bahama Island has seen only 4 unprovoked attacks since 1749 (none fatal), but that's still more than all others in the Bahamas. And besides, West End on Grand Bahama is home to what experienced divers call "Tiger Beach"—a spot 20 miles off this coastline that "a lot of very big sharks call home."

Safe Surfing Rules for Sharks

- Watch the outside carefully before you start your lesson for possible signs of shark activity. If one shows up, **USE YOUR HAND SIGNAL AND GET STUDENTS OUT NOW.**
- Do not enter the water if sharks are known to be present, and leave the water quickly and calmly if one is sighted. Do not provoke or harass a shark, even a small one.
- If your lessons are early in the mornings, try to stay in shallower water until the sun is higher.
 - Surf with other people, and don't move too far away from the group in the water.
- Stay out of the water at dawn, dusk, and night, when some species of sharks may move inshore to feed.
 - Do not enter the water if you have open wounds or are bleeding in any way. Sharks can detect blood and body fluids in extremely small concentrations.
- Avoid murky waters, harbor entrances, and areas near stream mouths (especially after heavy rains), channels, or steep drop-offs. These types of waters are known to be frequented by sharks.
- Do not wear high-contrast clothing or shiny jewelry. Sharks see contrast very well.
- Refrain from excessive splashing. Sharks are known to be attracted to such activity.
- If fish or seals start to behave erratically, leave the water. Be alert to the presence of dolphins, particularly if they are acting erratic, as they are prey for some large sharks.
 - Stay away from dead animals in the water.
- Surf at beaches patrolled by lifeguards, and follow



their advice if they signal to leave the water.

- If you do encounter a shark under the water, always maintain eye contact when a shark is approaching you, if you are aware of its presence it is less likely to attack you.

Things to tell your students.

- Constantly turn your board in different directions when waiting for a wave. You're less likely to be approached when doing so because you appear more like an active predator.
- Moving around makes it more obvious that you're a living, healthy, animal, and not just floating as if dead or unaware.
- Be conscious of your surroundings. Stay close together and as close to shore as possible
- Don't float in deep channels between surf breaks.
- Avoid surfing in murky water, which makes it harder for a shark to see what you are.
- Avoid surfing near flowing river mouths that release dirty water, which can contain dead and decaying animals.

Bacteria in the Sand

While infections are often a problem in polluted waters, the most recent source of infections are from sand. An obvious difference between water and sand exposure is that people are less likely to ingest sand, with the notable exception of small children.

A number of recent studies and articles have looked at the presence of indicator bacteria" (total coliform, fecal coliform, E. coli and enterococcus in sand. MRSA (methicillin-resistant staphylococcus aureus) has been found in California beaches. It's a bacteria that can cause infections in various parts of the body. At some beaches, researchers have noticed a correlation between bacteria levels in the water and extreme ("spring") tides. In particular, the highest bacteria levels are often associated with ebb (outgoing) tides under spring tide conditions.



In addition to finding bacteria, the pattern of bacteria distribution appears to be different at different beaches. In general, researchers in California found the highest levels in wet sand and/or near storm drain outlets. They also found higher levels at "enclosed" beaches than at open ocean beaches. Researchers in Florida found the highest levels in dry sand. Some researchers noted higher concentrations at beaches with the highest human usage, while other researchers at different locations did not observe this pattern. A significant amount of research is still ongoing.

Brain Eating Amoebas

When conditions are favorable, the amoeba cysts turn into trophozoites -- the feeding form of the amoeba. These amoebas can be found in warm places around the globe. Over half of all infections have been in Florida and Texas.

N. Fowleri is found in:

- Warm lakes, ponds, and rock pits
- Mud puddles
- Warm, slow-flowing rivers, especially those with low water levels
- Untreated swimming pools and spas
- Untreated well water or untreated municipal water
- Hot springs and other geothermal water sources
- Thermally polluted water, such as runoff from power plants
- Aquariums
- Soil, including indoor dust

Initial Symptoms

Within the first week of infection, include headache, fever, nausea, vomiting, and stiff neck. Later symptoms include confusion, loss of balance, seizures, and hallucinations. Death typically occurs within 12 days

Prevention

Always assume that there is a low level of risk anytime you swim, dive, or SUP in warm freshwater in the South. It can also happen in lakes with artificial wave making. It is recommended to hold your nose shut or use nose clips when you go into the water. The NSSIA also recommends you have jugs of fresh water available to rinse off when you get out of the water.