

By Paul S. Auerbach, M.D., M.S.

Coral Scrapes

Q: I was snorkeling in Bonaire over a patch of elkhorn coral and dove down to get a closer look at a sea fan. A dive boat zoomed by and I got shoved by the swell. My knee scraped against a horn of coral. I was surprised that it stung. Rubbing it didn't help. When I got back to the hotel, one of the cooks told me to rub it with meat tenderizer, but we didn't have any. Now it's been two weeks and the skin on my knee doesn't seem to be healing. What should I do?

A: Coral scrapes are the most common injuries from marine life incurred by divers and snorkelers. The surface of coral is covered by soft living material, which is easily torn from the rigid (abrasive) structure underneath, and thus deposited into the scrape or cut. This greatly prolongs the wound-healing process by causing inflammation and, occasionally, initiating an infection. Cuts and scrapes from sharp-edged coral and barnacles tend to fester and take weeks or even months to heal.

The Treatment

1. Scrub the cut vigorously with soap and water, and then flush the wound with large amounts of water.
2. Flush the wound with a half-strength solution of hydrogen peroxide in water. Rinse again with water.
3. Apply a thin layer of bacitracin, mupirocin (Bactroban), or other similar antiseptic ointment, and cover the wound with a dry, sterile, and non-adherent dressing. If no ointment or dressing is available, the wound can be left open. Thereafter, it should be cleaned and re-dressed twice a day.

If the wound develops a pus-laden crust, you may use "wet-to-dry" dressing changes to remove the upper non-healing layer in order to expose healthy, healing tissue. This is done by putting a dry sterile gauze pad over the wound (without any underlying ointment), soaking the gauze pad with saline or a dilute antiseptic solution (such as 1- to 5-percent povidone-iodine in disinfected water), allowing the liquid to dry, and then "brutally" ripping the bandage off the wound. The dead and dying tissue adheres to the gauze and is lifted free. The pink (hopefully), slightly bleeding tissue underneath should be healthy and healing. Dressings are changed once or twice a day. Wet-to-dry dressings are used for a few days, or until they become non-adherent. At that point, switch back to #3 above.

4. If the wound shows any sign of infection (extreme redness, pus, swollen lymph glands), the injured person (particularly one with impairment of his or her immune system) should be started by a qualified health professional on an antibiotic, taking into consideration the possibility of a *Vibrio* infection. *Vibrio* bacteria are found more often in the marine environment than on land, and can rapidly cause an overwhelming illness and even death in a human with an impaired immune system (e.g., someone with AIDS, diabetes or chronic liver disease).

Coral poisoning occurs if coral abrasions or cuts are extensive or are from a particularly toxic species. Symptoms include a wound that heals poorly or continues to drain pus or cloudy fluid, swelling around the cut, swollen lymph glands, fever, chills and fatigue. If these symptoms are present, the injured person should see a physician, who may elect to treat the person with an antibiotic or corticosteroid medication.

Sea Urchin Spine Punctures

Q: I was chasing a big marble ray underwater near Cocos Island - I wanted to photograph it - and wasn't paying attention to my buoyancy. I brushed by a rock wall and suddenly felt severe burning in my arm and elbow. There were 15 black sea urchin spines sticking out of my forearm. The spines had gone right through my diveskin. I remembered hearing that it helps to urinate on a sea urchin sting, so I tried it, but it didn't help. Most of the black spots on my arm have disappeared, but I still can see two, and my wrist is starting to swell. What should I do?

A: Some sea urchins are covered with sharp venom-filled spines that can easily penetrate and break off into the skin. Others (found in the South Pacific) may have small pincerlike appendages that grasp their victims and inoculate them with venom from a sac within each pincer. Sea urchin punctures or stings are painful wounds, most often of the hands or feet. If a person receives many wounds simultaneously, the reaction may be so severe as to cause extreme muscle spasm, difficulty in breathing, weakness and collapse.

The Treatment

1. Immerse the wound in non-scalding hot water to tolerance (110 to 113 F / 43.3 to 45 C). This frequently provides pain relief. Other field remedies, such as application of vinegar or urine, are less likely to diminish the pain. If necessary, administer pain medication appropriate to control the pain.
2. Carefully remove any readily visible spines. Do not dig around in the skin to try to fish them out - this risks crushing the spines and making them more difficult to remove. Do not intentionally crush the spines. Purple or black markings in the skin immediately after a sea urchin encounter do not necessarily indicate the presence of a retained spine fragment. The discoloration more likely is dye leached from the surface of a spine, commonly from a black urchin (*Diadema* species). The dye will be absorbed over 24 to 48 hours, and the discoloration will disappear. If there are still black markings after 48 to 72 hours, then a spine fragment is likely present.
3. If the sting is caused by a species with pincer organs, use hot water immersion, then apply shaving cream or a soap paste and shave the area.
4. Seek the care of a physician if spines are retained in the hand or foot, or near a joint. They may need to be removed surgically, to minimize infection, inflammation and damage to nerves or important blood vessels.
5. If the wound shows any sign of infection (extreme redness, pus, swollen regional lymph glands) or if a spine has penetrated deeply into a joint, the injured person (particularly one with impairment of his or her immune system) should be started by a qualified health professional on an antibiotic, taking into consideration the possibility of a *Vibrio* infection (see #4 under "Coral Scrapes").
6. If a spine puncture in the palm of the hand results in a persistent swollen finger(s) without any sign of infection (fever, redness, swollen lymph glands in the elbow or armpit), then it may become necessary to treat the injured person with a seven- to 14-day course of a non-steroidal anti-inflammatory drug (e.g., ibuprofen) or, in a more severe case, oral prednisone, a corticosteroid medication.

Lionfish, Scorpionfish & Stonefish Envenomations

Q: Last week I got a saltwater aquarium with an anemone and a small lionfish. I saw the lionfish swimming through the anemone and thought it was going to hurt the anemone, so I reached in the tank and pushed the lionfish away. It nailed me on the fingers, and now they're all swollen and blistered. Is there anything I can do?

A: Lionfish (as well as scorpionfish and stonefish) possess dorsal, anal and pelvic spines that transport venom from venom glands into puncture wounds. Common reactions include redness or blanching, swelling and blistering (lionfish). The injuries can be extraordinarily painful and occasionally life-threatening (in the case of a stonefish).

The Treatment

Soaking the wound in non-scalding hot water to tolerance (110 to 113 F / 43.3 to 45 C)

- may provide dramatic relief of pain from a lionfish sting,
- is less likely to be effective for a scorpionfish sting, and
- may have little or no effect on the pain from a stonefish sting, but it should be done nonetheless, because the heat may inactivate some of the harmful components of the venom.

If the injured person appears intoxicated or is weak, vomiting, short of breath or unconscious, seek immediate advanced medical care.

Wound care is standard, so, for the blistering wound, appropriate therapy would be a topical antiseptic (such as silver sulfadiazene [Silvadene] cream or bacitracin ointment) and daily dressing changes. A scorpionfish sting frequently requires weeks to months to heal, and therefore requires the attention of a physician. There is an antivenin available to physicians to help manage the sting of the dreaded stonefish.

Stingray Envenomation

Q: My daughter was walking in the surf near Panama City, Fla., when she got stung. She was barefooted and said something wrapped up around her foot right before she felt the pain. One of the lifeguards pulled out a small spine, and then she saw a doctor. He put her on an antibiotic, but the cut on her foot doesn't seem to be healing. What should she do?

A: A stingray does its damage by lashing upward in defense with a muscular tail-like appendage, which carries up to four sharp, swordlike stingers. The stingers are supplied with venom, so that the injury created is both a deep puncture or laceration and an envenomation.

The pain from a stingray wound can be excruciating and accompanied by bleeding, weakness, vomiting, headache, fainting, shortness of breath, paralysis, collapse and occasionally, death. Most wounds involve the feet and legs, as unwary waders and swimmers tread upon the creatures hidden in the sand.

The Treatment

1. Rinse the wound with whatever clean water is available. Immediately immerse the wound in non-scalding hot water to tolerance (110 to 113 F / 43.3 to 45 C). This may provide some pain relief. Generally, it is necessary to soak the wound for 30 to 90 minutes. Gently extract any obvious piece of stinger.
2. Scrub the wound with soap and water. Do not try to sew or tape it closed - doing so could promote a serious infection by "sealing in" harmful bacteria.

3. Apply a dressing and seek medical help. If more than 12 hours will pass before a doctor can be reached, start the injured person on an antibiotic (ciprofloxacin, trimethoprim-sulfamethoxazole or doxycycline) to oppose *Vibrio* bacteria.
4. Administer pain medication sufficient to control the pain.

Prevention of Stingray Injuries

1. Always shuffle your feet when wading in stingray waters.
2. Always inspect the bottom before resting a limb in the sand.
3. Never handle a stingray unless you know what you are doing or unless the stingrays are definitely familiar with divers and swimmers (e.g., the rays in "Stingray City" off Grand Cayman Island in the British West Indies). Even then, respect them for the wild creatures they are - the less you handle them the better for them and for you, too.

Sea Bather's Eruption, Seaweed Dermatitis & Swimmers Itch

Q: I was swimming for exercise out in front of my hotel in Cozumel when my entire body started to tingle. I didn't see anything in the water, so I kept swimming. A few minutes later, I swam into a swarm of tiny pulsating brown blobs. They didn't have any tentacles that I could see. The stinging got pretty bad, especially underneath my bathing suit. I hosed off on the beach and jumped in the shower, and that seemed to help. Now I have an ugly red rash under my neck and where my bathing suit goes. I'm having trouble sleeping, and it seems like I'm tired all the time. What should I do?

Sea Bather's Eruption

Often misnamed "sea lice" (which are true crustacean parasites of fish, and which inflict miniscule bites), sea bather's eruption occurs in sea water and involves predominately bathing suit-covered areas of the skin, rather than exposed areas. The skin rash distribution is very similar to that from seaweed dermatitis, but no seaweed is found on the skin.

The cause is stings from the nematocysts (stinging cells) of the larval forms of certain anemones, such as *Linuche unguiculata*, and thimble jellyfishes. The injured person may notice a tingling sensation under the bathing suit (breasts, groin, cuffs of wetsuits) while still in the water, which is made much worse if he/she takes a freshwater rinse (shower) while still wearing the suit. The rash usually consists of red bumps, which may become dense and confluent (i.e., run together in a mass). Itching is severe and may become painful.

The Treatment

Treatment consists of immediate (for decontamination) application of vinegar or rubbing alcohol, followed by hydrocortisone lotion 1 percent twice a day. Topical calamine lotion with 1 percent menthol may be soothing.

If the reaction is severe, the injured person may suffer from headache, fever, chills, weakness, vomiting, itchy eyes and burning on urination, and should be treated with oral prednisone.

The stinging cells may remain in the bathing suit even after it dries, so once a person has sustained sea bather's eruption, the clothing should undergo machine washing or be thoroughly rinsed in alcohol or vinegar, then be washed by hand with soap and water.

Seaweed Dermatitis

Sea bather's eruption is easy to confuse with "seaweed dermatitis." There are more than 3,000 species of algae, which range in size from 1 micron to 100 meters in length. The blue-green algae, *Microcoleus lyngbyaceus*, is a fine, hairlike plant that gets inside the bathing suit of the unwary aquanaut in Hawaii and Florida waters, particularly during the summer months. Usually, skin under the suit remains in moist contact with the algae (the other skin dries or is rinsed off), and becomes red and itchy, with occasional blistering and/or weeping. The reaction may start a few minutes to a few hours after the victim leaves the water.

The Treatment

Treatment consists of a vigorous soap-and-water scrub, followed by a rinse with isopropyl (rubbing) alcohol. Apply 1 percent hydrocortisone lotion twice a day. If the reaction is severe, oral prednisone may be administered.

Swimmer's Itch

Also called "clamdigger's itch," swimmer's itch is caused by skin contact with cercariae, which are the immature larval forms of parasitic schistosomes (flatworms) found throughout the world in both fresh and salt waters. Snails and birds are the intermediate hosts for the flatworms. They release hundreds of fork-tailed microscopic cercariae into the water.

The affliction is contracted when a film of cercariae-infested water dries on exposed (uncovered by clothing) skin. The cercariae penetrate the outer layer of the skin, where itching is noted within minutes. Shortly afterwards, the skin becomes reddened and swollen, with an intense rash and, occasionally, hives. Blisters may develop over the next 24 to 48 hours.

Untreated, the affliction is limited to 1 to 2 weeks. Persons who have suffered swimmer's itch previously may be more severely affected on repeated exposures, which suggests that an allergic response may be a factor.

The Treatment

Swimmer's itch can be prevented by briskly rubbing the skin with a towel immediately after leaving the water, to prevent the cercariae from having time to penetrate the skin. Once the reaction has occurred, the skin should be lightly rinsed with isopropyl (rubbing) alcohol and then coated with calamine lotion. If the reaction is severe, the injured person may be treated with oral prednisone.

Because the cercariae are present in greatest concentration in shallow, warmer water (where the snails are), swimmers should try to avoid these areas.

Jellyfish Stings

"Jellyfish" is the term commonly used to describe an enormous number of marine animals that are capable of inflicting a painful, and occasionally life-threatening, sting. These include fire coral, hydroids, jellyfishes (including "sea wasps") and anemones. The stings occur when the victim comes into contact with the creature's tentacles or other appendages, which may carry millions of small stinging cells, each equipped with venom and a microscopic stinger.

Depending on the species, size, geographic location, time of year and other natural factors, stings can range in severity from mild burning and skin redness to excruciating pain and severe blistering with generalized illness (nausea, vomiting, shortness of breath, muscle spasm and low blood pressure). Broken-off tentacles that are fragmented in the surf or washed up on the beach can retain their toxicity for months and should not be handled, even if they appear to be dried out and withered.

The dreaded box jellyfish (*Chironex fleckeri*) of northern Australia contains one of the most potent animal venoms known to man. A sting from one of these creatures can induce death in minutes from cessation of breathing, abnormal heart rhythms and profound low blood pressure (shock).

The Treatment

BE PREPARED TO TREAT AN ALLERGIC REACTION FOLLOWING A JELLYFISH STING. If possible, carry an allergy kit, including injectable epinephrine (adrenaline) and an oral antihistamine. The following therapy is recommended for all unidentified jellyfish and other creatures with stinging cells:

1. If the sting is believed to be from the box jellyfish (*Chironex fleckeri*), immediately flood the wound with vinegar (5 percent acetic acid). Keep the victim as still as possible. Continuously apply the vinegar until the victim can be brought to medical attention. If you are out at sea or on an isolated beach, allow the vinegar to soak the tentacles or stung skin for 10 minutes before attempting to remove adherent tentacles or to further treat the wound. In Australia, surf lifesavers (lifeguards) may carry antivenin, which is given as an intramuscular injection a first aid measure.
2. For all other stings, if a topical decontaminant (e.g., vinegar, isopropyl [rubbing] alcohol, one-quarter-strength household ammonia or baking soda) is available, apply it liberally onto the skin. If it is a liquid, continuously soak a compress. (Be advised that some authorities advise against the use of alcohol because of scientific evaluations that have revealed that some nematocysts discharge because of this chemical's application.) Since not all jellyfish are identical, it is extremely helpful to know ahead of time what works for the stingers in your specific geographic location.

Apply the decontaminant for 30 minutes or until pain is relieved. A paste made from unseasoned meat tenderizer (do not exceed 15 minutes' application time, particularly upon the sensitive skin of small children) or papaya fruit may be helpful. Do not apply any organic solvent, such as kerosene, turpentine or gasoline.

Until the decontaminant is available, you may rinse the skin with sea water. Do not simply rinse the skin gently with fresh water or apply ice directly to the skin. A brisk freshwater stream (forceful shower) may have sufficient force to physically remove the microscopic stinging cells, but non-forceful application is more likely to cause the cells to fire, increasing the envenomation. A non-moist ice or cold pack may be useful to diminish pain, but take care to wipe away any surface moisture (condensation) prior to the application.

3. After decontamination, apply a lather of shaving cream or soap and shave the affected area with a razor. In a pinch, you can use a paste of sand or mud in sea water and a clamshell.
4. Reapply the primary decontaminant for 15 minutes.
5. Apply a thin coating of hydrocortisone lotion (0.5 to 1 percent) twice a day. Anesthetic ointment (such as lidocaine hydrochloride 2.5 percent or a benzocaine-containing spray) may provide short-term pain relief.

6. If the victim has a large area involved (entire arm or leg, face, or genitals), is very young or very old, or shows signs of generalized illness (nausea, vomiting, weakness, shortness of breath or chest pain), seek help from a doctor. If a person has placed tentacle fragments in his mouth, have him swish and spit whatever potable liquid is available. If there is already swelling in the mouth (muffled voice, difficulty swallowing, enlarged tongue and lips), do not give anything by mouth, protect the airway and rapidly transport the victim to a hospital.

Ciguatera Poisoning

Q: We were on a liveaboard in Fiji, and the cook served us a meal of jack from a real monster someone hauled up during our crossing. In retrospect, I probably shouldn't have eaten it, because when I asked him whether it was safe, he said: "Sure, because when the flies are attracted to the fish, it's OK." About an hour after we ate, most of us got sick, throwing up and having diarrhea. I felt like I was floating and my lips started burning. Now I feel dizzy and generally miserable. What happened?

A: Ciguatera fish poisoning involves a large number of tropical and semitropical bottom-feeding fish that dine on plants or smaller fish, which have accumulated toxins from microscopic dinoflagellates, such as *Gambierdiscus toxicus*. Therefore, the larger the fish, the greater the toxicity. The ciguatoxin-carrying fish most commonly ingested include the jack, barracuda, grouper and snapper.

Symptoms, which usually begin 15 to 30 minutes after eating the contaminated fish, include abdominal pain, nausea, vomiting, diarrhea, tongue and throat numbness, tooth pain, difficulty in walking, blurred vision, skin rash, itching, tearing of the eyes, weakness, twitching muscles, incoordination, difficulty sleeping and occasional difficulty in breathing. A classic sign of ciguatera intoxication is the reversal of hot and cold sensation (hot liquids seem cold, and vice versa), which may reflect general hypersensitivity to temperature.

Persons can become severely ill shortly after they are poisoned, with heart problems, low blood pressure, deficiencies of the central and peripheral nervous systems, and generalized collapse. Unfortunately, many of the debilitating, but not life-threatening, symptoms may persist in varying severity for weeks to months.

The Treatment

Treatment is for the most part based upon symptoms without any specific antidote, although certain drugs are beginning to prove useful for aspects of the syndrome, such as intravenous mannitol for abnormal nervous system behavior and abnormal heart rhythms. A physician must undertake these therapies.

Prochlorperazine may be useful for vomiting; hydroxyzine or cool showers may be useful for itching. There are chemical tests to determine the presence of ciguatoxins in fish and in the bloodstream of humans, but not yet a specific antidote. If a person displays symptoms of ciguatera fish poisoning, he/she should see a physician promptly.

During recovery from ciguatera poisoning, the injured person should exclude the following from the diet: fish, fish sauces, shellfish, shellfish sauces, alcoholic beverages, nuts and nut oils.

Diving While On Medications for Stings

In general, it is safe to dive while taking an antibiotic or corticosteroid medication. If a wound infection is more than minor or is expanding, however, diving should be curtailed until it becomes minor, is no longer progressing and can be easily covered with a dressing.

In or out of the water, corticosteroid medication should always be taken with the understanding that a rare side effect is to cause serious deterioration of the head ("ball" of the ball-and-socket joint) of the femur, the long bone of the thigh.

Most injuries from animals result from chance encounters. Be an alert diver, and respect their personal space. If you're injured, follow the advice you find here, and call DAN.

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