MARINE DERMATOLOGY
Envenomation and Wounds cause by human interaction with the marine environment

- Stinging corals
- Sea Urchins
- Lionfish, Stonefish, Scorpionfish
- Portuguese Man of War
- Box Jellyfish
Stinging Corals

Fire Coral
Presenting Symptoms

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, antibiotic or corticosteroid medication may be required.
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.

4. 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.

5. 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).
Treatment Stinging Corals

The granuloma of coral dermatitis is considered to be a foreign-body reaction.

Treatment with topical or intralesional steroid may be warranted.
Sea Urchin
Sea Urchin
Sea Urchins

Common sense should prevail. Avoid punctures by being aware of sea urchins and wearing protective footwear when wading in shallow waters.

If a joint space has been punctured by a spine or if a granuloma appears on a joint, refer to Orthopedics — this can mean the difference between a temporary problem and the loss of joint function.
Presenting Symptoms

- Acute injury with local pain and swelling, followed by prompt, spontaneous resolution

- Acute injury with secondary infection

- Delayed sarcoidal granuloma formation

- Envenomation-producing systemic symptoms

- Systemic illness as a complication of late onset tenosynovitis

- Complications of small joint spine implantation resulting in swelling and joint destruction. Large joint spine implantation produces inflammation and swelling without destruction
Treatment

All the venomous animals of this phylum have thermolabile venom.

Immerse the affected area in hot water, around 50ºC, for 30 to 90 minutes, especially if there was spontaneous pain.

Therapy varies with the injury. If a spine is able to be removed, do so gently and meticulously, as spines are fragile and break readily. Treat pain with analgesics; treat infection with antibiotics.

There are numerous anecdotal treatments that range from washing the site with urine, ammonia or hot mud to applying poultices and skin softeners. No scientific data supports any of these treatments.
Sea Urchin

Sarcoidal granulomas that are not over joints may respond well to intralesional corticosteroids when limited to skin,

If injury is to joint spaces or presents with systemic reactions, treatment of the patient must be tailored to the individual’s signs and symptoms.
LIONFISH STING
Mechanism of defense

Members of the Scorpaenidae family are divided into two groups regarding their importance to human health: lionfish and scorpionfish. The envenomation caused by scorpionfish is more severe than that caused by lionfish.

The Indo–Pacific lionfish *Pterois volitans* is an invasive marine fish that was introduced in the Western Atlantic during the 1980’s.

Lionfish present long and slender spines covered by an epithelial sheath that contains venom-producing glands in the grooves of upper two-thirds of the spine. The venom flows to the wound when it penetrates the skin of the victim and the epithelium is broken. There are 12 to 13 spines in the dorsal fin, 2 in the pelvic fin and 3 in the anal fin. The pectoral spines do not have venom.
Presenting Symptoms Lionfish

The lionfish is well known for its excruciating local pain, which may radiate throughout the root of the affected limb.

The pain increases in 1 to 2 hours and typically persists for 6 to 12 hours. Pain may last for weeks.

There is marked inflammation, which causes erythema, edema and local heat.

In some cases, it is possible to observe local cyanosis, paleness, vesicles and blisters. Rarely, the sting site presents with skin necrosis.
Lionfish

Lionfish venom may provoke systemic manifestations such as cardiac effects and affect blood pressure. These results are thought to be due to nitric oxide release.

Venom occasionally causes nausea, vomiting, cold sweating, fever, dyspnea, convulsions, abdominal pain and syncope.

Paralysis of the limbs and cardiac failure are infrequently observed
Treatment Lionfish

Lionfish envenomations frequently occur on the upper extremities, with pain as the predominant symptom. Immersing the injured part in warm (45 degrees C) water is considered the first and foremost important treatment as it is reported to relieve pain and inactivate the venom.
Stonefish

Looks like a stone.

Extremely difficult to see.

Often doesn't even look like a fish.

The world's most poisonous fish!!!
Scorpionfish

Looks like a fish.

Difficult to see due to excellent camouflage.
Scorpionfish

pressurized venom glands at the base of their dorsal fin
injects venom upon penetration of one or more of the 12 dorsal spines.

Females 18-36cm in length and the males can get up to 45cm and 1.55kg

Recently, the presence of a type of angiotensin converting enzyme activity in the venom of Scorpaena plumieri.

converts angiotensin I (Ang I) into angiotensin II (Ang II) and inactivates bradykinin, there by regulating blood pressure and electrolyte homeostasis, however, their function in these venoms remains an unknown
Presenting Symptoms Scorpionfish and Stonefish

- Severe stinging pain lasting for several hours
- Rashes on the skin (red-colored welts), bruising
- Swelling of the wound
- Blister formation
- Headaches
- Abnormal heart rate, reduced blood pressure
- Allergic shock or reaction, in some cases
- Shortness of breath; breathing difficulties
- Muscle cramps, abdominal cramps
- Nausea, vomiting, and diarrhea
- Severe fatigue
- Unconsciousness
Treatment Scorpionfish and Stonefish

The basic principles of wound care apply to these injuries after initial evaluation and stabilization of the victim. It is important to relieve pain as promptly as possible and to cleanse the wound of all foreign material using sterile technique if available. Irrigation of the wound may remove venom as well as portions of the integumentary sheath, slime, sand, etc. If any foreign material remains, healing will be delayed or may not occur. Many of these venoms are heat labile and a hot soak (115 F / 45 C) at as high a temperature as tolerated should be tried for 30-90 minutes.
Treatment

The care of these wounds can be summarized as follows:

1. Rest affected area in elevated position
2. Immerse wound in 45 C water for 30-90 minutes or until pain is relieved and does not recur
3. Local anesthetic infiltration if needed for pain relief - no epinephrine
4. Systemic analgesics or narcotics rarely needed
5. Resuscitation as needed
6. General wound care including antibiotics if indicated
7. Foreign body removal
Treatment

In case of severe stings, it could be a medical emergency and prompt attention has to be provided. The treatment measures may include:

- CPR may be provided as necessary, breathing assistance
- Stabilizing the blood pressure
- Pain control medications, steroids
Portuguese Man Of War
Portuguese Man Of War
Portuguese Man Of War

The man-of-war may appear to be a single organism, but it's actually four different organisms that can't function without each other. Each one provides a necessary function for the others to survive.

The top zooid, which resembles a blob with a purple or pink mohawk, is the pneumatophore. It's basically a gas-filled bag that allows the man-of-war to float.

The next two zooids, gastrozoooids and dactylozooids, are the man-of-war's tentacles. The former, as their name implies, are the organism's feeding tentacles. The latter are for defense and capturing prey.

The final zooid, gonozoooids, deal with reproduction.
Mechanism of defense

Cnidocytes, which include nematocysts are composed of small spicules in a spiral structure. They are kept under pressure. Triggering is caused by changes in pressure and/or osmosis, which can lead to movement of venom into the dermis.

A cnidarian with long tentacles can have millions of nematocysts. When an accident happens, many nematocysts initially remain intact in the victim's skin, without discharging its contents.

The venom of nematocysts contains tetramine, 5-hydroxytryptamine, histamine and serotonin, as well as thermolabile high molecular weight toxins, capable of changing ionic permeability and causing cardiac dysfunction.
Mechanism of defense

The venom can also cause hemolysis and renal failure, which develops in later phases. Nontoxic proteins can trigger allergic processes of varying severity. The concentration and potency of the venom varies according to a scale, from corals and anemones to Portuguese men-of-war and some jellyfish.
Presenting Symptoms

The signs and symptoms of envenomation depend of a toxic action (immediate) and an allergic action (immediate and delayed). Intense and immediate pain occurs in areas that came into contact with a burning sensation and a linear erythematous papular or urticarial eruption, with crossed lines.
Treatment

Use vinegar to wash away any remaining nematocysts once the tentacles are removed. The Vinegar prevents a nematocyst from firing.

Soak the affected area in hot water, at 113 degrees Fahrenheit for around 45 minutes to denature the toxin.
Box Jellyfish

Gulf Of Mexico,

Roughly cuboid bell

4 distinct Bundles of tentacles

Photo-by Brad Peterman
Box Jellyfish Mechanism of defense

*C. fleckeri* frequently feeds in shallow water searching for small crustaceans. Shallow waters in proximity to beaches are the most frequent sites of stings.

A mature *Chironex fleckeri*, box jellyfish can weigh up to 6 kg.

The diameter of its semi-transparent cubed bell measured about 20–30 cm. Bundles of 10–15 translucent tentacles hang from each of its four pedalia.

Tentacles of mature specimens are generally flat and may extend up to 3m.
Box Jellyfish

Cnidarians are gelatinous animals with dimorphic life cycles. They can appear in free floating aka. medusa form (jellyfish) and reproduced sexually; or in the form of polyps, which are fixed and reproduce asexually such as corals.

Four types are important for medicine: fixed type, Anthozoa (stinging corals, discussed previously, and anemones).

Medusa forms are the Hydrozoa, Scyphozoa and Cubozoa (cubomedusae).
Box Jellyfish

Location: Kralendijk, Bonaire

Box Jellyfish are active beginning 7 days after each full moon for 96 hours.

Jellyfish are present worldwide, even in freshwater.
Freshwater Jellyfish

This freshwater specimen was found in Beaver Lake, Arkansas in November 26, 2012. Surface water temp 55° F.

Full moon was 2 days later.

Freshwater jellyfish have a nematocyst, however it is incapable of penetrating human skin.
Presenting Symptoms

Local signs of envenomation are intense skin pain with large (0.5–1.0 cm), edematous and erythematous plaques in the stung skin areas.

These wheals resemble whip marks. Blisters follow and leave full-thickness areas of skin necrosis. Healing usually occurs in about 10 days.

Permanent scars with areas of pigmentation change are common.
Presenting Symptoms

The severity of stings is proportional to the bell size, being extremely dangerous for *C. fleckeri*, with a diameter of 15 cm.

Systemic reactions to box jellyfish stings may include: dyspnea, hypotension, unconsciousness, arrhythmias and cardiopulmonary arrest.

*Chironex fleckeri* venom is also cardiotoxic
Treatment

Treatment of jellyfish envenomation is primarily directed at

1. Alleviating the local effects of venom (pain and tissue damage);
2. Preventing further discharge of nematocysts;
3. Controlling systemic reactions, including shock
4. The vast majority of C. fleckeri stings are not life-threatening, with painful skin welts the major finding. However fatalities that do occur usually do so within 5 to 20 minutes of the sting. This unprecedented rapid onset of cardiotoxicity in clinical envenomming suggests that antivenom may need to be given very early (within minutes) and possibly in large doses if a life is to be saved.
Treatment

Oral/topical analgesics, hot water and ice packs are effective painkillers. When only patients presenting with symptoms of Irukandji syndrome were considered, heat still appeared to be superior to analgesics and benzodiazepines. Heat application was not reported to be deleterious.

Application of vinegar (4%–6% acetic acid) for 30 seconds to prevent further discharge of unfired nematocysts remaining on the skin.

Alcohol, methylated spirits and fresh water should be avoided, as they could trigger a massive discharge nematocysts.

Pressure immobilization bandaging should also be avoided. Pressure stimulates additional venom discharge from nematocysts.