# Aquatic Antagonists: Stingray Injury

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Stingrays are widely distributed, especially in warm water. They are common in southern US waters, and roughly 750 stings are reported each year off the US coast.[1] Most stingray injuries occur when a person accidentally steps on a ray as it lies on the sandy ocean bottom. Rays often blend into the background (Figure 1) and may cover themselves with sand for camouflage. When stepped on, they swing their tail in the direction of the foot in a defensive maneuver. Fishermen may sustain upper extremity injury when removing a stingray from a net or fishing line. Severe pain is the most immediate symptom, but various systemic symptoms of envenomization also may occur. Systemic symptoms of envenomization may include severe radiating pain, edema, bleeding, hyperhidrosis, hypotension, salivation, nausea, vomiting, headache, shortness of breath, muscle cramps, and dysrhythmia. Symptoms are dependent on the species, the volume of the venom, and the underlying health of the victim.

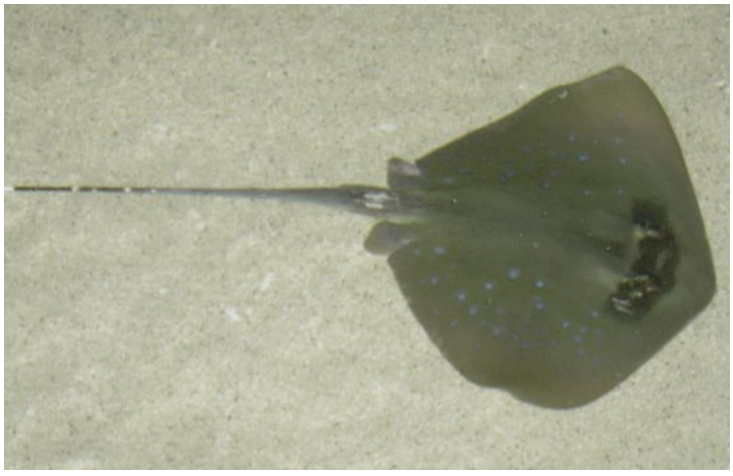

**Figure 1.** Saltwater stingrays often blend with the underlying sand.

Rays live in both salt water and freshwater. Although most injuries caused by stingrays occur in coastal regions of the tropics and subtropics, stingrays also may be seen in aquarium keepers in temperate and landlocked locations.[2] Freshwater rays may have a striking and appealing appearance (Figure 2), making them attractive for hobbyists in search of new specimens.

The venomous spine is embedded in the tail but becomes prominent when the tail is arched. There can be as many as 4 spines at the base of the ray's tail, depending on the species. Once embedded, the spine may be difficult to remove because of backward pointing barbs that embed the spine in the tissue. Exploration of the wound and surgical excision are commonly required.

In an Australian study of 205 injuries related to marine animals, stingray injuries accounted for 46 (22.4%) of the injuries.[3] In another study in tropical northern Australia, 9 of 22 fish-related injuries were caused by stingrays.[4] All patients reported severe pain. Mild systemic effects occurred in one patient. Treatment with hot water immersion was helpful in most cases, but some of the injuries required surgical exploration and debridement.[4]

Data from the New Caledonia Hospital, where about 50 stingray injuries are seen annually, indicate that most injuries affect the lower extremity. The pain is characteristically intense with edema, cyanosis, and erythema, often followed by tissue necrosis.[5] Extensive tissue necrosis has been reported after injury by *Dasyatis kuhlii*, the blue-spotted stingray, and *Dasyatis sephen*, the cowtail ray.[6] Rarely, puncture injuries to the thorax or abdomen can cause death.

In a study of 84 patients injured by the freshwater stingray *Potamotrygon falkneri*, intense pain was the most conspicuous symptom.[7] Victims were

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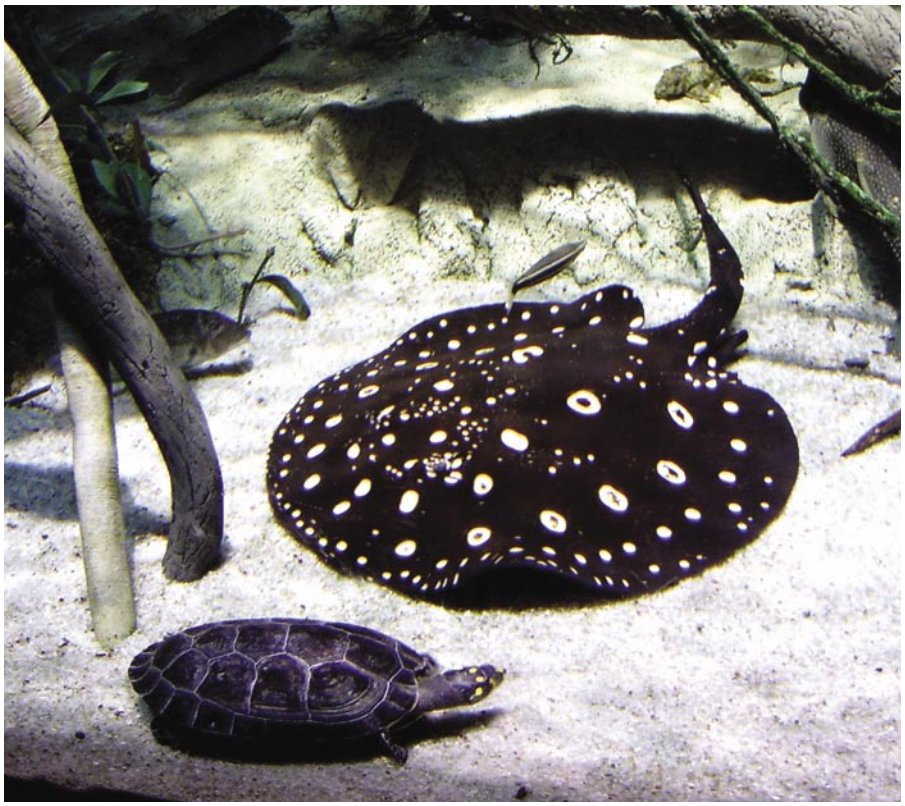

**Figure 2.** Polka dot stingray—a freshwater ray.

commonly fishermen and bathers. Skin necrosis was observed in a high percentage of the patients. Immersion of the affected member in hot water was effective in the initial phases of envenomization, especially in control of the acute pain, but hot water immersion did not prevent skin necrosis.[7]

Invasive fusariosis, caused by *Fusarium solani*, has been reported in a previously healthy adult male who suffered a wound to the hand by a stingray barb while fishing off the eastern coast of Florida. The infection became apparent 2 weeks after surgical excision of the embedded barb.[8]

Although most stingray injuries are inflicted by the stingray's tail, stingray "bites" have been reported under the designation *stingray hickey*, which occurred while feeding rays. The rays attach via suction to the extremity, causing the purpuric lesion.[9]

Immediate care of a person with stingray envenomization requires prompt removal of the person from the water. The toxin is heat labile and pain may respond to immersion of the injured area in hot but not scalding water (113°F or 45°C) for 30 to 90 minutes. Surgical exploration for retained barbs is commonly necessary. Imaging studies may be of benefit in questionable cases. Injury can be prevented by shuffling along the sandy bottom to give the rays a chance to disperse.

## REFERENCES


1. Lalwani K. Animal toxins: Scorpaenidae and stingrays [letter]. *Br J Anaesth*. 1995;75:247.
2. Van Offel JF, Stevens WJ. A stingray injury in a devotee of aquarium fishes. *Acta Clin Belg*. 2000;55:174-175.
3. Taylor DM, Ashby K, Winkel KD. An analysis of marine animal injuries presenting to emergency departments in Victoria, Australia. *Wilderness Environ Med*. 2002;13:106-112.
4. Isbister GK. Venomous fish stings in tropical northern Australia. *Am J Emerg Med*. 2001;19:561-565.
5. Smarrito S, Smarrito F, Leclair O, et al. Surgical management of stingray injuries. about two clinical cases. *Ann Chir Plast Esthet*. 2004;49:383-386.
6. Barss P. Wound necrosis caused by the venom of stingrays. pathological findings and surgical management. *Med J Aust*. 1984;141:854-855.
7. Haddad V Jr, Neto DG, de Paula Neto JB, et al. Freshwater stingrays: study of epidemiologic, clinic and therapeutic aspects based on 84 envenomings in humans and some enzymatic activities of the venom. *Toxicon*. 2004;43:287-294.
8. Hiemenz JW, Kennedy B, Kwon-Chung KJ. Invasive fusariosis associated with an injury by a stingray barb. *J Med Vet Mycol*. 1990;28:209-213.
9. Evans LA, Evans CM. Stingray hickey. *Cutis*. 1996;58:208-210.