

Observations on the Remarkable (and Mysterious) Healing Process of the Bottlenose Dolphin

Supplemental Online Information

Case Histories

Echo and Nari were known to the staff of the Tangalooma Marine Education and Conservation Centre of the Tangalooma Wild Dolphin Resort (Moreton Island, Australia) and although free ranging returned regularly to the marine station for feeding. Both are alive today. Nari's injury, the care provided by the staffs of Tangalooma and SeaWorld (Gold Coast, Australia), and his recovery have been well documented in movies, photos, and blogs accessible on the internet (Search: "Nari the dolphin"). These histories are based on discussions with Trevor Hassard, who was leading the teams that managed the care of these two animals.

Echo

Echo is a male bottlenose dolphin about 3.5 years of age at the time of his injury and was a regular participant in the feeding program since the age of 6 months.

Day 1: Echo arrived at the feeding station with several large open wounds on the left lateral side of his body both on and below the dorsal fin. The wound on the left side of the body was elliptical in shape, approximately 10 cm wide, and 30 cm long and penetrated completely through the blubber layer (about 3 cm in depth), exposing, but sparing the muscle. The wound appeared to have been caused by a force that was directed caudally, distorting the position of the dorsal fin towards the left side; the cause of the injury, based on the shape of the wound, was likely a shark bite.

Day 2: Echo continued to return to the provisioning station for food and fed normally (1.5-2 kg of fish). The wound showed no change in shape. Exposed blubber layers now appeared white and had accumulated within the wound; granulation tissue could be recognized within the

wound. The usual rigidity of the dorsal fin had been lost, and appeared “floppy” as the animal swam.

Day 3: “Echo’s behavior has not changed, as you might have imagined, and he seems not to protect the wounded side. The wound looks quite clean and Echo’s behavior is quite encouraging.” (**Figure 1A**).

Day 5: Larger amounts of granulation tissue were visible within the wound. The non viable tissue surrounding the wound “seems to be falling away.” Echo exhibited no change in behavior and food intake remained normal. (**Figure 1B**)

Days 15-20: Wounds appeared visibly smaller and “cleaner.” The laceration on the dorsal fin had almost closed and the fin had regained some rigidity. Granulation tissue was evident in left lateral wound.

Day 21: Granulation tissue was still visible within the deepest open laceration, but much of the wound had closed. “The incredible healing rates are very encouraging if not astounding.” (**Figure 1C**)

Day 30: All wounds had closed completely, and surface scars began to deepen in color as the overlying skin began to heal. “Echo appears to be oblivious to his injuries.”

Day 49: Skin and scar tissue were observed to be “coming together.” “Throughout the time frame of Echo’s injury neither his behavior or food intake has changed.” (**Figure 1D**)

Hassard and Hunter conclude: “We are constantly impressed with the healing capabilities of bottlenose dolphin injuries. Echo’s wounds almost certainly mimicked the healing rates of similar wounds recorded in the past. It was almost reassuring to watch Echo’s passive behavior towards his injury and for his behavior and appetite not to vary from normal”.

Nari

Nari is a male bottlenose dolphin, who, like Echo, is a regular participant in the feeding program at Tangalooma, and a frequent companion of Echo. At the time of this injury, Nari was about 12 years old.

Day 1: Nari appeared at the feeding station severely wounded (**Figure 2A**). The injury consisted of a very large semicircular set of jagged wounds many of which extended to muscle and were close to the blow hole. Skin and subcutaneous tissue had been torn away on both sides of the semicircle, exposing damaged muscle. The configuration of the injury suggested that a shark had approached Nari from the dolphin's right side, clamping its jaw just posterior to the blowhole, creating deep wounds that extended across Nari's dorsal surface. Each of the largest wounds, of irregular shape, measured about 15 cm by 30 cm at their longest dimensions and was over 3 cm in depth. Since he had not appeared at the feeding on the previous two days, it was believed that the injury took place two days prior to his return to the Centre. Despite the severity of the wounds he returned from the ocean accompanied by Echo. Nari fed normally and was observed hunting and catching fish under the pier.

Day 3: Nari did not return to feed until three days later. He was caught and transferred from Tangalooma to Sea World, due to the severity of the wound and its proximity to the trachea.

Day 4: A small amount of tissue was surgically removed, Nari was administered oral antibiotics, and placed in a quarantine pool to protect him for another attack during convalescence.

Day 5: Nari had begun to eat normally, and he was swimming within the pool, rather than stationing. (<http://www.youtube.com/watch?v=7CvA62MN17Q&feature=related>) The wound

was said to be “looking better.”

Day 7: White material filled the wound, with pink granulation tissue evident (**Figure 2B**).

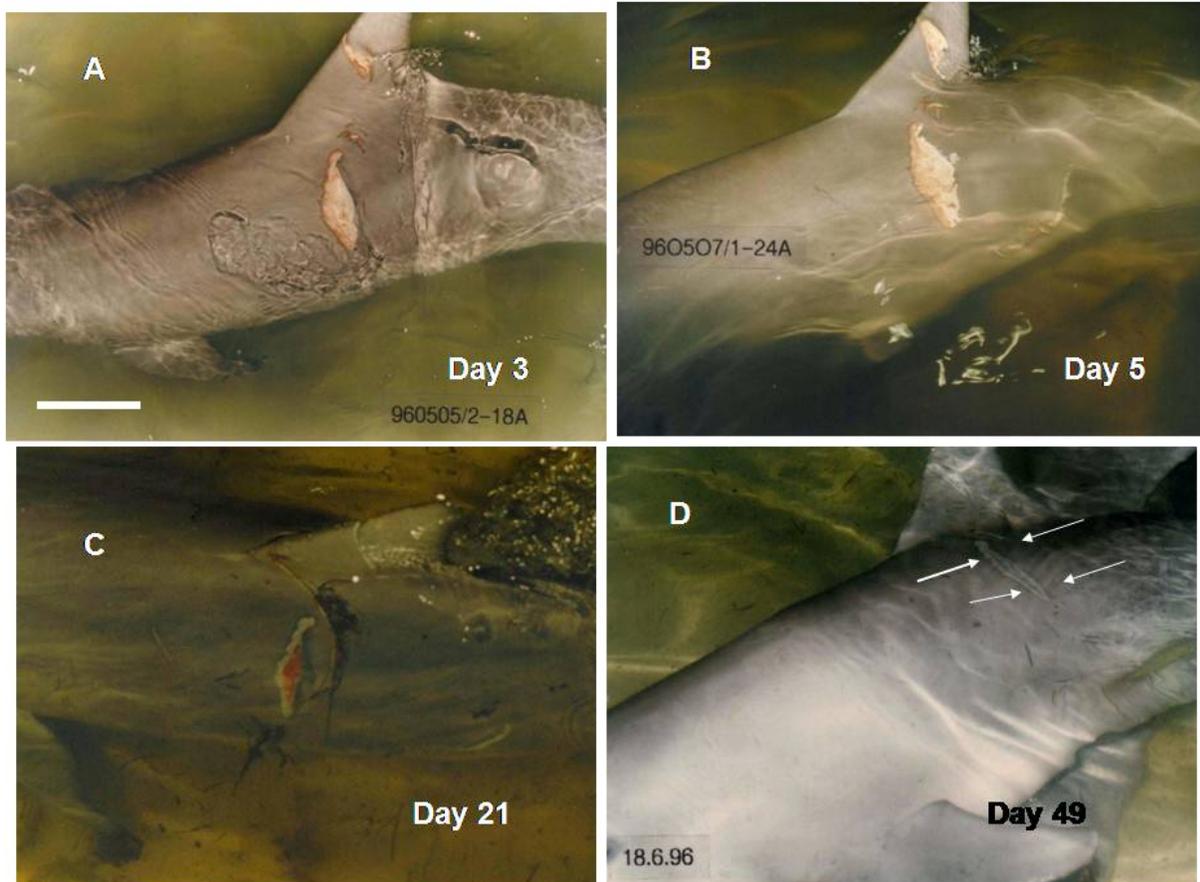
Day 15: Natural debridement of the wound had taken place. The wound was extensively covered with granulation tissue and much of the volume void had been filled beneath the pink tissue (**Figure 2C**). General behavior and swimming movements in the pool were described as near normal (<http://www.youtube.com/watch?v=7CvA62MN17Q&feature=related>).

Day 22: Considerable filling in of the wounds had occurred, with some of the wounds already closed (**Figure 2D**). He approached the dolphin care team eagerly when offered food and swam smoothly in their direction.

Day 28: The wounds had closed.

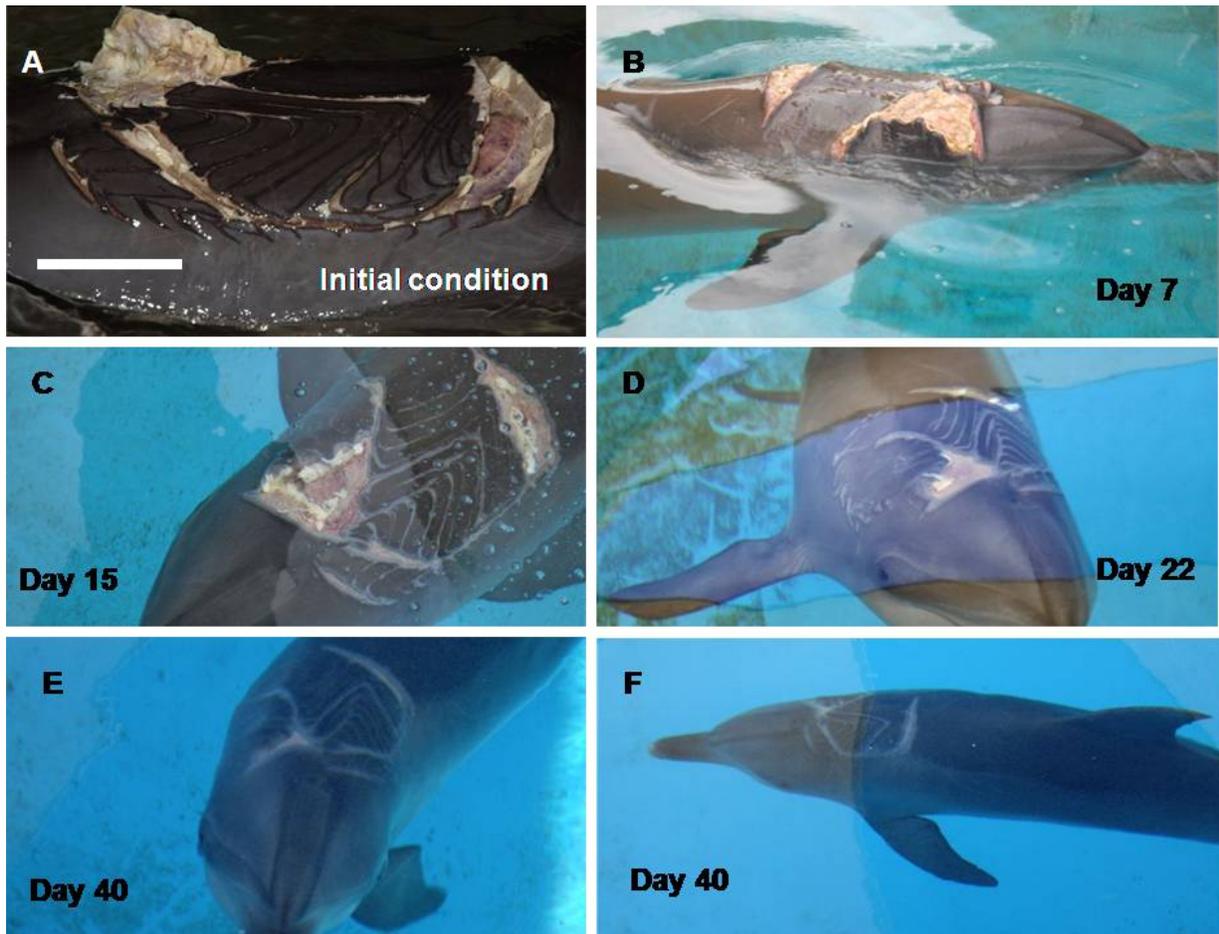
Day 42: Nari was returned to the ocean (**Figure 2E, 2F**).

Figure 1



Echo's injury and recovery. Injury was initially observed on February 5, 1996. Photographs and detailed description of the circumstances they illustrate were provided by Trevor Hassard (Tangalooma Resort). Scale bar in Panel A corresponds to about 30 cm on the animal's surface.

Figure 2



Nari's injury and recovery. Injured animal was first observed on February 13, 2009. Photos were provided by Trevor Hassard who headed the rescue team at Tangalooma. Scale bar in Panel A corresponds to about 30 cm on the animal's surface.