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Successful therapy on upper-jaw fracture in a pregnant bottlenose dolphin (*T. truncatus*) in the Varna Dolphinarium

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Abstract

A pregnant bottlenose dolphin (*Tursiops truncatus*) accidentally broke her upper jaw in the Varna Dolphinarium. Surgical intervention was immediately applied, followed by long-term treatment. Thirty-four days after the incident, the injured dolphin had a still birth. Following successful overall therapy including radiography and ultrasound checkup, the dolphin recovered completely 103 days after the incident, and returned to normal training practices.

In 1991, the Varna Dolphinarium disposed of 4 male and 3 female dolphins (*T. truncatus*), between 4 and 25 years of age. The Dolphinarium is of indoor type, located at the Black Sea shore, and is composed of a large training and show tank and a smaller recreation tank. The main parameters of air and water (temperature, salinity, chlorine content, etc.) are maintained within optimal limits. The animal's daily ration ranges between 7 and 15 kg of food depending upon how busy the daily program is, the season, and the sort of fish. In parallel to that, 25 days each month, the dolphins are administered polyvitaminal additions (Sea Tabs, Ferrascorbin, a.o.).

In the Spring of 1991, changes were observed in both the external appearance and the behaviour of a 12 year old female dolphin, that weighed about 250 kg, named Pipi, testifying to a possible pregnancy. On 30 April 1991 her pregnancy was confirmed by an ultrasonic exam. Following that, Pipi was put under special regimen, involving relaxation of her training program.

On 16 June 1991, at 4:15 p.m., after a fight with two male dolphins, Pipi jumped above the water surface and fell with open mouth over the metal lattice that served as a partition between the two tanks. As a result of that, a copious bleeding from the mouth trauma took place. At 5:20 p.m., the dolphin was taken out of the tank and restrained on a wooden platform. Styptic (PAMBA—0.1 g Ac. p-aminomethylbenzoicum) and anti-stress (Stres-Vitam—20 ml Vetoquinol S.A. (France)) agents were immediately injected. In order to avoid an additional hyperthermic stress the dolphin was enveloped in moist cloths, that were constantly poured over with water. After fixing the mouth open, the oral cavity was examined. An abundantly bleeding lacerated wound was found on the hard palate, located transversely between the 11th and 12th tooth and along the medial line forward towards the rostrum tip. To the left, three teeth of the supramaxillary row were broken. With palpation, abnormal mobility of the rostral maxillary fragment was found, along with dislocation in the dorsoventral plane. Fragments of the fractured bones were palpated through the lacerated mucosa. The kind and the shape of the fracture were specified with the aid of five roentgenographies. There was evidence of a total transverse fracture of both supramaxillary bones with fragment separation along the medial line.

At 7:50 p.m., we proceeded to surgical intervention. Bone fragments were manually repositioned, and the hard palate mucous membrane was tightly stitched up. As a result of that, we succeeded in stopping the arterial bleeding. In order to suppress the weak parenchymal mucous bleeding, 0.15 g of PAMBA were re-injected. Because of the impossibilty of anaesthetization, the pregnancy of the dolphin and the lack of preconditions for interjaw fixation, no metal osteosyntheses were applied. The specific location of the trauma and possible feeding problems counterposed any actions on immobilization of the jaw.

In parallel to the surgical treatment of the wound, 10 ml of Stres-Vitam were injected every hour. We attempted to compensate the dehydration resulting from the prolonged copious bleeding by way of a slow venous infusion of isotonic solutions (5% glucose, Sol. Riugery, Hartmann (Pharmachim Bulgaria)). The surface veins of the fluke and the dorsal fin were used. Because of lack of experience, the access to v. brachiocephlica was not used. With great difficulty, we succeeded in infusing a total of about 300 ml of isotonic solutions. Problems ensued from the quick blood coagulation in the peripheral vessels, probably caused by the injection of styptic agents.

Table 1.

	RBC (10^6/cmm)	WBC (10^3/cmm)	PCV (%)	Hb (gr%)	Iron (g%)	Calcium (mg%)	GOT (Henry U)
Pipi (after the incident)	4.88	8.05	45	19.8	191.99	12.96	150
Pipi (former examinations)	2.55	7.06	40	12.4	—	—	—
Standard*	3.97±0.4	9.78±3.08	43±4	14.4±1.4	173±72	4.9±1.1	188±89

*S.H. Ridgway *et al.*, 1970

At 1:15 a.m. on 14 June, the dolphin's external body temperature began to drop. Periodic tonic-clonal convulsions of the musculature were observed. Following that, the resuscitation procedures were abandoned, 20 ml Tetrasol (20% L.A. oxy-tetracyclin Richter Pharus Austria) was injected, and at 1:20 a.m. the dolphin was placed in a small tank with dimensions of 4 × 3 × 2 m. After accomplishing several rounds, Pipi inhaled air, and after 10 minutes or so took three fishes of 0, 3 kg each, which were carefully handed to her mouth, behind the spot of the transverse laceration. The next two days, the dolphin remained at one place, swam only seldomly, and produced shrill sounds. She seldomly took food (from 0.3 to 1.5 kg). On 15 June, vitamins and mineral additions were redoubled, respectively Sea tabs—4, Ferrascorbin 2 pills, Neurobex. forte 2 pills, Vit. A—1 min.IU, Vit. E-O. 4 g, Vit. C-1. 0 g (Pharmachim, Bulgaria). In parallel to that, oral administration was applied of 2.0 Calcium—20 ml 10% Ca glucones (to stimulate ossification), of Kalium-Magnesium Asparginat Panangin (Gedeon Richter A.O., Hungary) (to compensate for the raised sodium level, accompanying the dehydration), and 5% glucose as energy source. On 17 June, blood samples were taken for morphologic and biochemical investigation, and 20 ml Tetrasol were re-injected. The chematologic results are shown in Table 1. They are typical for a state following loss of blood (weak eryhthricytosis, hemoglobinemy and increased hematocrit). No evidence of an inflammatory process is available (normal amount of leukocytes), and high calcium values are caused by exogenous ingress of this element.

The overall state of depression persisted for a 10 day period. During that time, Pipi took between 0.3 and 2.5 kg fish a day, and there were some days, when she completely refused to eat. On 28 June, Pipi was transferred to the rear tank of the Dolphinarium, together with another, 25 year old female dolphin. In the following days she grew calmer, began to complete easy behaviours, and gradually regained her appetite, reaching up to 7 kg of food a day. At a check-up on 12 July, we found that the palate had healed up completely. The upper jaw front stayed slightly open and flattened dorsoventrally, as a result of which the upper and lower teeth rows showed a displacement of about 1 cm.

On 17 July, early in the morning, a dead dolphin calf was seen at the tank bottom, which was later brought up to the surface by Pipi and delivered to the trainers. Parts of the placenta floated over the water surface. In order to avoid puerperal complications, Cephalexin 4.5 pro die was applied for 5 days, together with Prednisolon—2 times × 20 mg a day, Methylergobrevin—2 times × 375 mg a day (Germed, Germany). In the course of two days, Pipi excreted milk. No excretions from the vulva were observed. The neonate was 0.97 m long and weighted 9.100 kg. It was established at the necropsy that this was a case of still birth (atelectic lung), without macroscopic alterations in other inner organs. Laboratory examinations yielded negative results.

On 25 July, check-up radiography of the jaw was performed. Healing proceeded normally. In parallel to that, by ultrasonic device, the condition of the uterus and the mammae was checked. The involution proceeded in a normal way.

In the course of several days after the birth, Pipi was nervous, whimsical, and showed reduced appetite. Subsequently, she calmed down, but, for almost a month, she only took between 3 and 5 kg of fish daily. Beginning on 15 August, 50 ml of Kaomycin were administered orally for 5 days, after which her appetite recovered to 6 or 7 kg of fish daily. On 15 September, Pipi was left with the other dolphins and began normal training practice. On 25 September, 103 days after the incident, her training program was completely restored. Gratitude is expressed to everyone who contributed to the successful therapy of Pipi.