

DENTAL DAY AT THE ZOO

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LIONS, BEARS & HOGS, OH MY!

Providing dental care for exotic animals comes with a unique set of challenges. Often, specialized equipment and expertise is needed to deal with the unique anatomy and dental pathologies found in exotic species. For example, a tiger maxillary canine tooth may have a 2" to 2 3/4" long crown and up to a 4" long tooth root. This means equipment designed for domestic cats or dogs, or even for a human, will not be long enough for a tiger root canal.

The Peter Emily International Veterinary Dental Foundation (PEIVDF) is a public charitable organization that provides dental care to captive exotic animals around the world. During these dental procedures, they train both veterinary and human dentists to work with some of the unique challenges of exotic animal dentistry. Over the past few years, the PEIVDF team has done a number of dental procedures at Cheyenne Mountain Zoo, including root canals for African lions and ring-tailed lemurs, and surgical management of lumpy jaw in a Bennet's wallaby.

The Cheyenne Mountain Zoo is home to about 950 animals. In order to provide dental care for our collection, we regularly collaborate with veterinary and human dentists. In March 2014, Cheyenne Mountain Zoo assembled a team of Zoo staff, vets, veterinary technicians, and PEIVDF dentists to anesthetize and do dental work for a mountain lion, a spectacled bear, and a red river hog. All three cases had been previously evaluated for suspect dental pain with oral radiographs. Patient-side blood-gas and serum chemistry equipment from Abaxis helped us monitor and address potential anesthetic complications and helped make the day a success.

VetScan i-STAT Results *Figure 1*

Patient	Anesthesia Time	Source	pH	pCO2	pO2	BE	HCO3	tCO2	sO2	iCa	Glu	Hct	Hb
Mtn Lion	15 min	Arterial	7.207	67.2	262	-1	26.7	29	100	1.35	120	35	11.9
Mtn Lion	2 hrs	Venous	7.342	42.1	68	-3	22.8	24	92	1.28	111	32	10.9
Mtn Lion	3 hrs	Venous	7.334	43.2	48	-3	23.0	24	81	1.24	129	29	9.9
Bear	30 min	Venous	7.259	49.3	33	-5	22.1	24	55	1.20	96	43	14.6
Hog	30 min	Venous	7.432	52.1	139	10	34.7	36	99	1.19	82	29	9.9

VetScan VS2 Comprehensive Diagnostic Panel

Patient	ALB (g/dL)	ALP (U/L)	ALT (U/L)	AMY (U/L)	tBili (mg/dL)	BUN (mg/dL)	Ca (mg/dL)	Phos (mg/dL)	Creat (mg/dL)	Glu (mg/dL)	Na (mmol/L)	K (mmol/L)	ALB (g/dL)	Glob (g/dL)
Mtn Lion	3.7	<5	29	337	0.4	33	9.9	5.9	1.7	122	148	4.0	6.1	2.5
ISIS Reference Values +/- SD	3.7 +/- 0.5	22 +/- 24	43 +/- 24	409 +/- 171	0.2 +/- 0.1	29 +/- 8	10.3 +/- 0.6	4.9 +/- 1.4	2.4 +/- 0.7	146 +/- 51	153 +/- 5	4.2 +/- 0.5	7.4 +/- 0.6	3.7 +/- 0.7



Tocho is an 8-year-old neutered-male mountain lion (55 kg) with chipped maxillary canine teeth and pulp exposure. Ten weeks earlier, he had surgery to correct a torn anterior cruciate ligament, so his dental work was scheduled during his post-op recheck exam. While on stall rest to recover from the cruciate surgery, keepers noted that Tocho had mouth sensitivity when eating.

Tocho had been trained for injections, so the day of the procedure he was pole-injected with an anesthetic cocktail and transported to the Zoo hospital. He was intubated and anesthesia was closely monitored. Serial i-STAT measurements showed he initially had an acute respiratory acidosis (low pH, high pCO₂) due to hypoventilation, that was corrected with positive pressure ventilation (see Figure 1).

Intra-oral dental radiographs confirmed open tooth roots for Tocho's maxillary canine teeth. Local and systemic analgesics were given, and bilateral root canals were performed. Concurrently, the cruciate surgery site was assessed and found to have good healing and joint stability. Within two days of anesthesia, the mouth sensitivity appeared to resolve and Tocho was returned to his exhibit.



CASE 2 / OSITO THE SPECTACLED BEAR



Osito is a 15-year-old male spectacled bear (171 kg) with chronic upper lip trauma and dental malocclusion causing intermittent lip entrapment. Previous lip biopsy and cultures were consistent with a chronic traumatic lip injury.

Osito was hand-injected with his anesthetic cocktail with the help of positive reinforcement training. Once under general anesthesia, he was brought to the Zoo hospital, intubated and closely monitored. Patient-side i-STAT and serum chemistry showed he was a stable anesthetic patient with no obvious underlying health concerns.

Following a full oral exam and intraoral dental radiographs, the right maxillary canine tooth crown length was reduced and the tooth was capped. Sharp edges of the right maxillary tooth buccal surface were removed. While the lip abrasion continues to be monitored, there has been some reduction in lip inflammation following the dental work.



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CASE 3 / ARI THE RED RIVER HOG

Ari is a 13-year-old female red river hog (78 kg) who had weight loss and a tooth root lucency (abscess) noted on oral radiographs some months earlier. She had improved clinically with a course of antibiotics, but the dental pathology had not yet been addressed.

Ari was hand-injected with her anesthetic cocktail and transported to the Zoo hospital. Like the other patients, she was intubated. Anesthesia monitoring included patient-side blood gas and serum chemistry readings. She showed no obvious health concerns.

Intraoral radiographs confirmed devitalization of the left maxillary 2nd incisor and 2nd premolar tooth. Systemic and local analgesics were given, and both teeth were extracted. Anesthetic recovery was smooth and uneventful, and her appetite was normal again by evening.

CONCLUSION

Patient-side i-STAT and serum chemistry bloodwork capabilities help with medical work-up and anesthetic monitoring for Zoo animals. In this case, we safely anesthetized and performed dental work concurrently on a mountain lion, a spectacled bear, and a red river hog, thus helping keep our animals comfortable and healthy.



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