Rounds Notes
Animal Health Department
Medical Rounds
"medicine for all"
NATIONAL MARINE LIFE CENTER
Caring for Stranded Marine Animals
Rounds Notes
Veterinary Research Department
Under the microscope
rwilliams@nmlc.org

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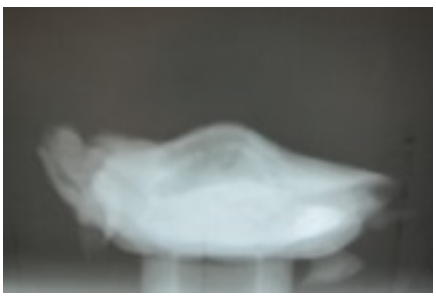
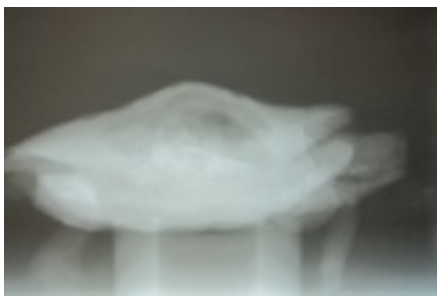
Headlines News:

Mountains of the Moon

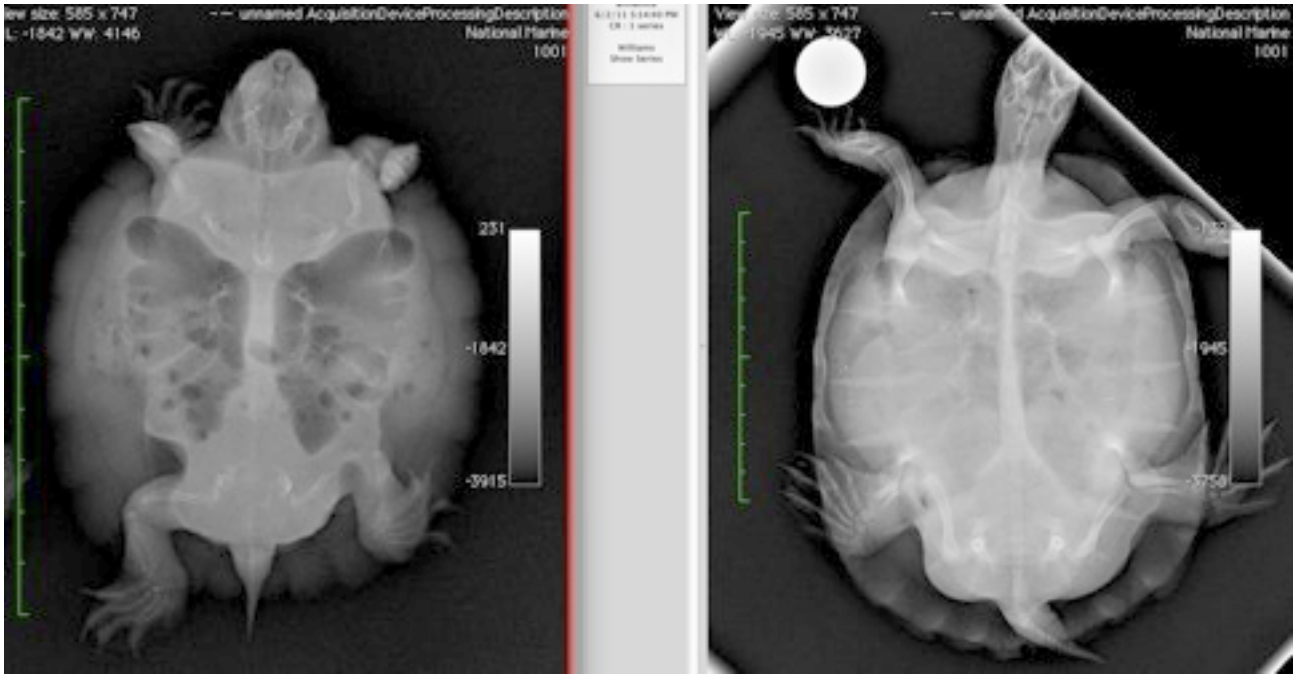


Perhaps not, but their carapaces' are mis-shapen and remind one of a mountain range and serve as inspiration for their names. The NMLC was once again asked by the state to help with red-bellied cooters that were not qualified for release. We accepted 4 red-bellied cooters, unfortunately, one died by the time it reached our center. The other three are named Bruce, Pierce, and Vesuvius. Why the rolling and mis-shaped shells ? The soft to the touch and general squishy nature is a major clue. These three remaining turtles are suffering from metabolic bone disease, a constellation of problems that result in soft bones that allow for the deformation of skeletal system, and the risk of permeant disability and even death.


The disease stems from a number of problems that revolve around calcium, phosphorus and vitamin D3, with important roles of the skin, intestines, liver and kidneys, so as you can see, you need a fully healthy turtle, the right diet and environment to make a healthy skeletal system.

This condition is more correctly called nutritional secondary hyperparathyroidism, and here is what happens. Young growing herbervious reptiles are at greatest risk. Diets need to be rich in calcium and more importantly balanced in calcium (2 parts) to phosphorus (1 part) as excess phosphors causes the same problems, due to what has been explained to me as a mass action effect. Next you need to absorb the calcium, from your intestines. Intestinal absorption is dependent on vitamin D3. Vitamin D is acquired in the diet, where vegetable sources tend to concentrate vitamin D2, which needs to be converted to the active from vitamin D3 in the skin by exposure to UVB radiation. Vitamin D also undergoes metabolism in the liver. In the wild reptiles bask in the sun to warm their bodies, increase their metabolism, and convert vitamin D in their skin. In captivity we can provide a UVB source such as the mercury vapor bulbs used at the center. We're fond of the ExoTerra Solar Glo 125W, a self ballasted mercury vapor bulb with optimal levels of UVB UVA and heat, with a UVB penetration of 30cm. Since we can't see UV light, this property of the bulbs can diminish but they will still appear bright, so they are marked and changed according to the manufactures directions. Without this metabolic calcium the body robs the stored calcium in the shell and bones, because muscle and nerve conduction are dependent on sufficient calcium in the blood. This process is controlled by the parathyroid glands. When blood calcium (ionized calcium) levels are low, the parathroids release parathyoid hormone (PTH) which stimulates the breakdown of bone to release calcium, up regulates calcium absorption from the intestines, and decreases calcium excretion by the kidneys. Too much PTH and the bones start to get soft, the shell buckles under its own weight, activity is hampered, and the low blood calcium thing that started the whole mess may be come dangerous in and of itself.



Diagnosis:

We used a combination of traditional film radiographs, digital radiography, and blood work to identify the problem. Compare the overall poor mineralization of the affected red-bellied cooter to the left (enlarged to the same relative size) to Catch22, a captive raised cooter with normal bone density, it is also remarkable to see the quality difference in digital radiographs (thank's Vineyard Veterinary Clinic for the use of the cassettes and processing for this study).

Treatment:

We opted for a slow and staged treatment regime. We started by providing a quality environment with clean water, adequate heat, an enriched diet (romain and red leaf lettuce with reptomin® and a cuttlebone) and UVB and UVA source. Next we started to supplement the diet with liquid calcium glubinate (starting at 23 mg/kg orally once a day then twice a day). Then we will add vitamin D3 at 400iu/kg. Once all the cooters have adequate serum ionized calcium levels we will consider calcitonin salmon, 20iu q 7 days, 2-3 injections. We will give the cooters six months and assess our progress.

So where are we now. The cooters are so much brighter then when they first arrived, their shells look better, they are stronger and eating better, and while the largest "Bruce" has adequate calcium levels, Vesuvius is still hypocalcemic and at risk. But it's a long road to recovery, and

date	Jun 14, 2011	Bruce
time	8am	
operator	Williams	
doctor	Williams	
Glu mg/dl	63	
Na mmol/L	131	
K mmol/L	4.7	
TCO2 mmol/L	40	
iCa mmol/L	1.33	
Hct %PCV	28	
Hb calc g/dl	9.5	
at 37°C		
pH	7.478	
PCO2 mmHg	51.9	
PO2 mmHg	111	
HCO3 mmol/L	38.5	
BEecf mmol/L	15	
sO2 calc %	99	

date	Jun 14, 2011	Vesuvius
time	9am	
operator	Williams	
doctor	Williams	
Glu mg/dl	61	
Na mmol/L	131	
K mmol/L	5.5	
TCO2 mmol/L	39	
iCa mmol/L	below range	
Hct %PCV	18	
Hb calc g/dl	6.1	
at 37°C		
pH	7.528	
PCO2 mmHg	44.8	
PO2 mmHg	58	
HCO3 mmol/L	37.3	
BEecf mmol/L	15	
sO2 calc %	92	

shell deformations are likely permeant and set in bone, even if we can get these cooters to 'firm up', but they seem comfortable and behave normally, so we will continue to do our best for them.

Sea Turtles:

turtle tank 1 is a go

Final tests on turtle tank 1 are nearing completion and the system is preforming according to plan.

Seals:

dry resting final touches

A seal dry holding is being completed and the seal tank 1 system is preforming according to plan, bio-testing with green crabs seemed to have worked well and the crabs are doing fine, not the least bit crabby.

Terrapins, Cooters, and Turtles, oh my . . .:

bye, bye, blue sky

Our batch of red-bellied cooters were all released in a mass MASS Wildlife event. Also in the where-are-they-now catagory is Teanna who was also sucessfuly released in sutiable habitat on Cape Cod, with a stern warning to avoid houses and windowsill depressions in the future.

C Rogers Williams VMD

Sea Rogers Williams VMD
attending veterinarian and director of science

[STAF Bridget Dunnigan,]