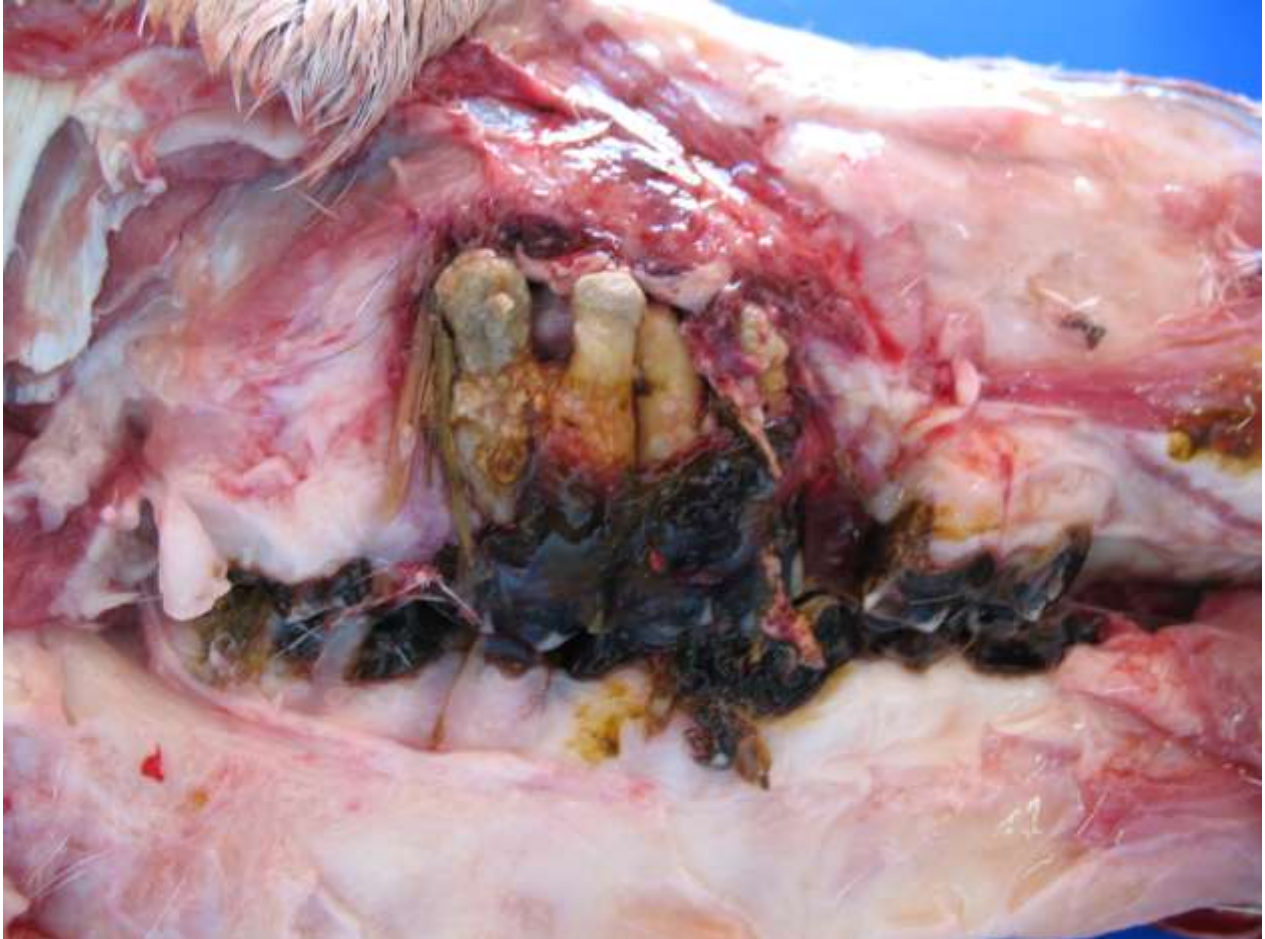
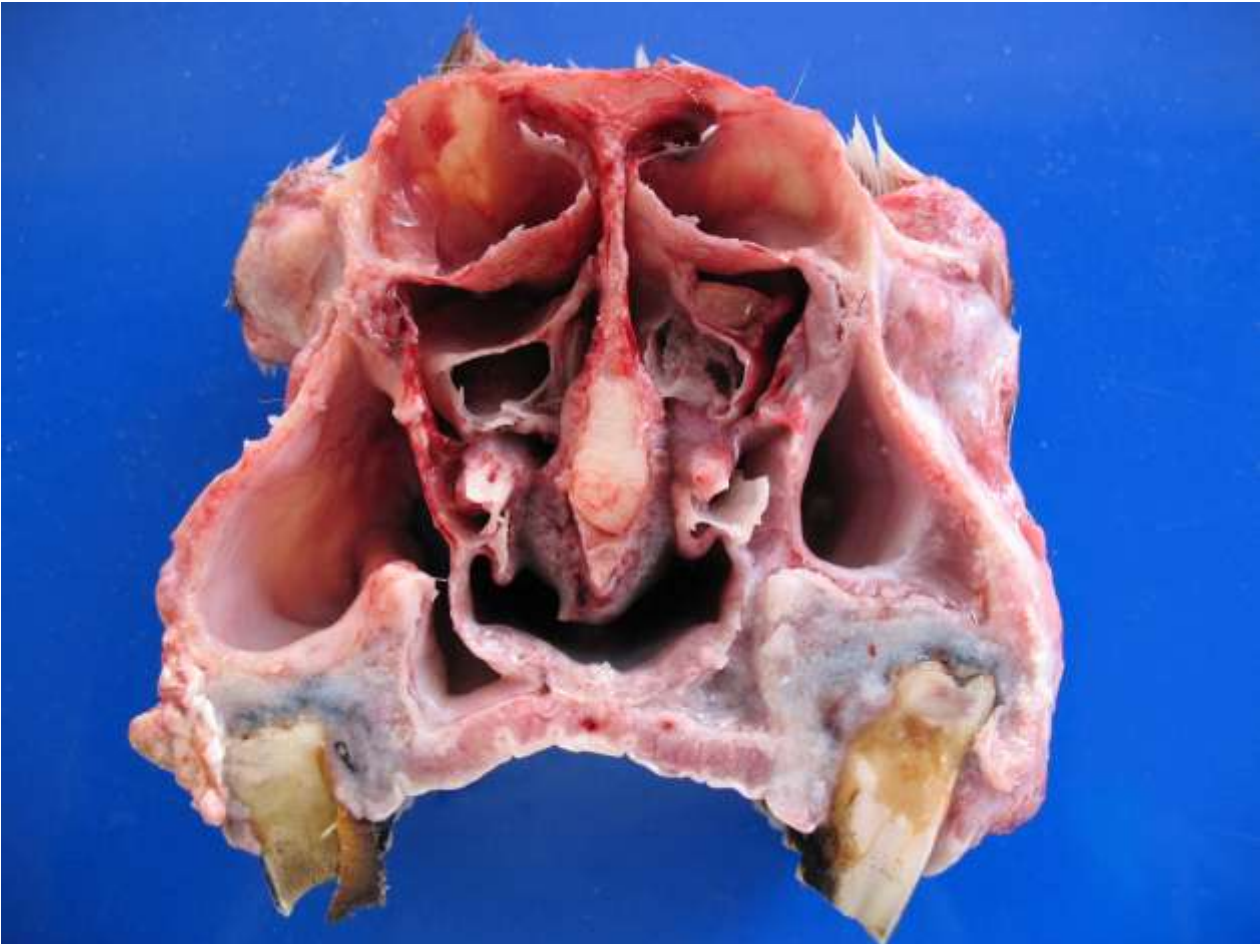


Nutritional Fibrous Osteodystrophy in an Addra Gazelle (*Nanger dama*)

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PHOTOGRAPH 1: Loose maxillary molars and severe periodontitis in an Addra gazelle. Note impacted food (left side of photograph) and severe inflammation in surrounding bone and subcutaneous tissues.



PHOTOGRAPH 2: Nutritional fibrous osteodystrophy in an Addra gazelle. Note the grey fibrous tissue replacing bone around maxillary tooth roots.

DETAILS: Severe swelling of the right side of the face of a 10 years old Male Addra gazelle (*Nanger dama*) was observed but the animal was found dead before treatment could be administered. At necropsy, the swelling was found to be due to very loose cheek teeth (Photo 1), associated inflammation in the maxillary bone and adjacent soft tissues as well as impaction of food material. On section, the tooth root sockets were lined by soft grey material rather than bone (Photo 2). Similar changes occurred to a lesser degree in the mandibular sockets. Skull bones were soft, malleable and thinner than normal. The Gazelle was emaciated with serous bone marrow and epicardial fat atrophy. Histologically, normal bone was largely replaced by mature fibrous connective tissue infiltrated with moderate numbers of lymphocytes, plasma cells and macrophages (fibrous osteodystrophy). Nutritional fibrous osteodystrophy was diagnosed. Other pathological findings included severe diffuse pulmonary oedema, mild dehydration and mild rumen acidosis. Death was most likely caused by the metabolic consequences of severe weight loss due to an inability to properly apprehend and masticate food, culminating in heart failure and subsequent pulmonary oedema.

Nutritional fibrous osteodystrophy is most commonly due to dietary insufficiency of calcium and/or excessive dietary phosphorus, which results in nutritional secondary hyperparathyroidism. Cases are recorded in goats on high concentrate rations but rare in sheep or cattle^{1,2}. Respiratory distress may result from proliferation of poorly ossified tissue that impinges on the nasal cavity. Metabolic bone disease is seen at sites of mechanical stress in adult animals, in this case the maxilla and mandible as a result of mastication and rumination².

The exact nature of the nutritional abnormality in this case was not determined. The disease is known to develop in herbivores fed diets with a Ca:P ratio of 0.8 or lower³ however, lucerne and antelope cubes tested by the National Zoological Gardens of South Africa had Ca:P ratios of 4.22:1 and 1.91:1 respectively (NutriLab, Univ. of Pretoria). Other factors that may play a role include Vitamin D deficiency (in housed animals)⁴, reduced calcium absorption due to endoparasitism⁴, or calcium binding substances such as oxalate in the diet⁵. Nutritional fibrous osteodystrophy is also common in captive reptiles² and has been recorded in free-ranging Dolphin (*Delphinus delphis*)⁶, Opossum (*Didelphis marsupialis*)⁷, and Red Fox⁸. This case highlights the challenges of providing adequate nutrition to captive ruminants and the need for further research on this subject.

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HYPERPARATHYROIDISM IN ALASKAN RED
FOX KITS

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