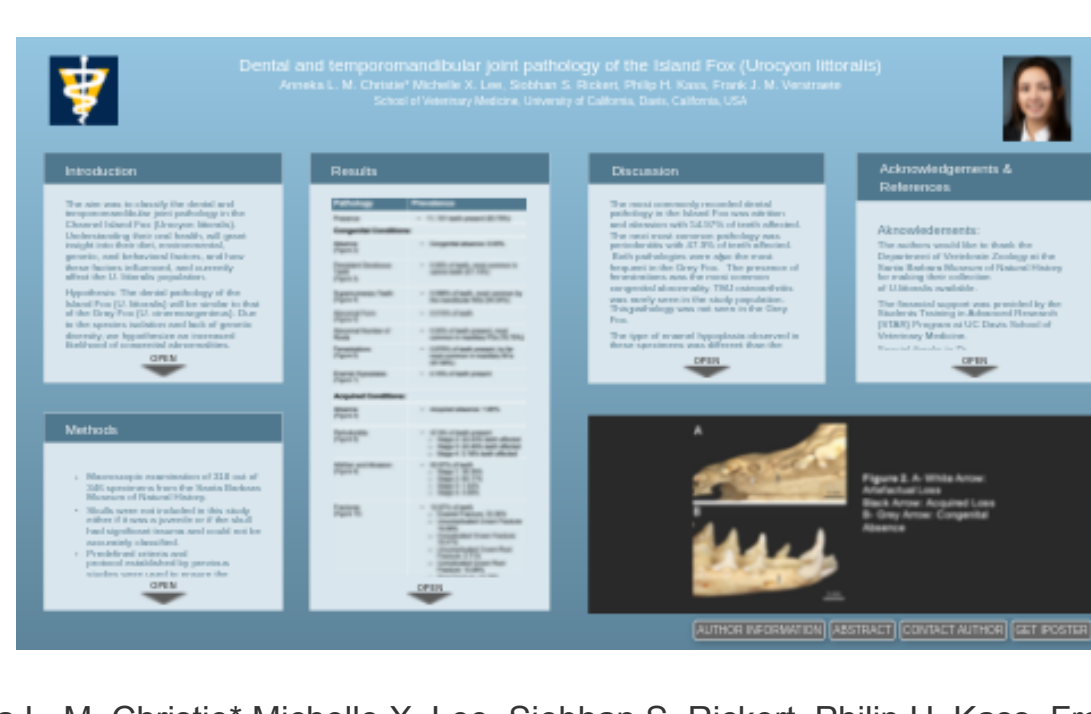


Dental and temporomandibular joint pathology of the Island Fox (*Urocyon littoralis*)



Annika L. M. Christie* Michèle X. Lee, Siobhan S. Rickert, Philip H. Kass, Frank J. M. Verstraete

School of Veterinary Medicine, University of California, Davis, California, USA



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INTRODUCTION

The aim was to classify the dental and temporomandibular joint pathology in the Channel Island Fox (*Urocyon littoralis*). Understanding their oral health, will grant insight into their diet, environmental, genetic, and behavioral factors, and how these factors influenced, and currently affect the *U. littoralis* population.

Hypothesis: The dental pathology of the Island Fox (*U. littoralis*) will be similar to that of the Gray Fox (*U. cinereoargenteus*). Due to the species isolation and lack of genetic diversity, we hypothesize an increased likelihood of congenital abnormalities.

About this species:

- The Channel Island Fox is the largest native mammal of the Channel Islands and are found nowhere else in the world.³
- Six of the eight Channel Islands are inhabited by *U. littoralis* and each island has its own subspecies.
- Dental formula: I 3/3, C 1/1, P 4/4, M 2/3
- Diet: Terrestrial mammals, marine life, insects, fruit and other plant material.³
- Their population plummeted in the 1990s due to predation and competition, to the point of near extinction.³ Targeted recovery programs were very successful and this species is now classified as near-threatened.¹

METHODS

- Macroscopic examination of 318 out of 346 specimens from the Santa Barbara Museum of Natural History.
- Skulls were not included in this study either if it was a juvenile or if the skull had significant trauma and could not be accurately classified.
- Predefined criteria and protocol established by previous studies were used to ensure the thorough examination of specimens while continuing consistency across species for future comparison.
 - Presence of teeth was recorded; missing teeth were categorized as congenital absence, acquired, or artifactual loss.
 - Congenital and developmental abnormalities: persistent deciduous teeth, supernumerary teeth, abnormal form, abnormal number of roots, fenestrations, and enamel hypoplasia.
 - Acquired pathology: periodontitis, attrition/abrasion, fractures, periapical lesions, and temporomandibular joint osteoarthritis (TMJ-OA).

RESULTS

Pathology	Prevalence
Presence	• 11, 191 teeth present (83.79%)
Congenital Conditions:	
Absence (Figure 2)	• Congenital absence: 0.03%
Persistent Deciduous Teeth (Figure 3)	• 0.06% of teeth, most common in canine teeth (57.14%)
Supernumerary Teeth (Figure 4)	• 0.098% of teeth, most common by the mandibular M3s (54.54%)
Abnormal Form (Figure 5)	• 0.015% of teeth
Abnormal Number of Roots	• 0.50% of teeth present, most common in maxillary P3s (76.79%)
Fenestrations (Figure 6)	• 0.876% of teeth present, by far most common in maxillary M1s (97.96%)
Enamel Hypoplasia (Figure 7)	• 0.16% of teeth present
Acquired Conditions:	
Absence (Figure 2)	• Acquired absence: 1.82%
Periodontitis (Figure 8)	• 47.9% of teeth present <ul style="list-style-type: none"> Stage 2: 22.23% teeth affected Stage 3: 22.49% teeth affected Stage 4: 3.18% teeth affected
Attrition and Abrasion (Figure 9)	• 53.97% of teeth <ul style="list-style-type: none"> Stage 1: 30.35% Stage 2: 65.17% Stage 3: 1.42% Stage 4: 3.06%
Fractures (Figure 10)	• 10.87% of teeth <ul style="list-style-type: none"> Enamel Fracture: 33.36% Uncomplicated Crown Fracture: 16.68% Complicated Crown Fracture: 18.41% Uncomplicated Crown-Root Fracture: 2.71% Complicated Crown Root Fracture: 13.06% Root Fracture: 15.78%
Periapical Lesions (Figure 11)	0.21% of teeth, most common on maxillary P4s (43.48%)
TMJ Pathology (Figure 12)	• 3.36% of skulls affected

DISCUSSION

The most commonly recorded dental pathology in the Island Fox was attrition and abrasion with 54.97% of teeth affected. The next most common pathology was periodontitis with 47.9% of teeth affected. Both pathologies were also the most frequent in the Gray Fox.² The presence of fenestrations was the most common congenital abnormality. TMJ osteoarthritis was rarely seen in the study population. This pathology was not seen in the Gray Fox.

The type of enamel hypoplasia observed in these specimens was different than the typically expected lesion that resembles the hypoplasia that occurs as a result of canine distemper virus. Those lesions were completely absent in these specimens therefore the atypical enamel hypoplasia observed, was classified separately.

This is currently an ongoing project. The next steps consist of conducting further data analysis to investigate differences between subspecies, sex, other species, and chronological/generational differences. This individual project is also a part of a larger ongoing study of the dental and temporomandibular joint pathology of all North American mammalian carnivores.

ACKNOWLEDGEMENTS & REFERENCES

Acknowledgements:

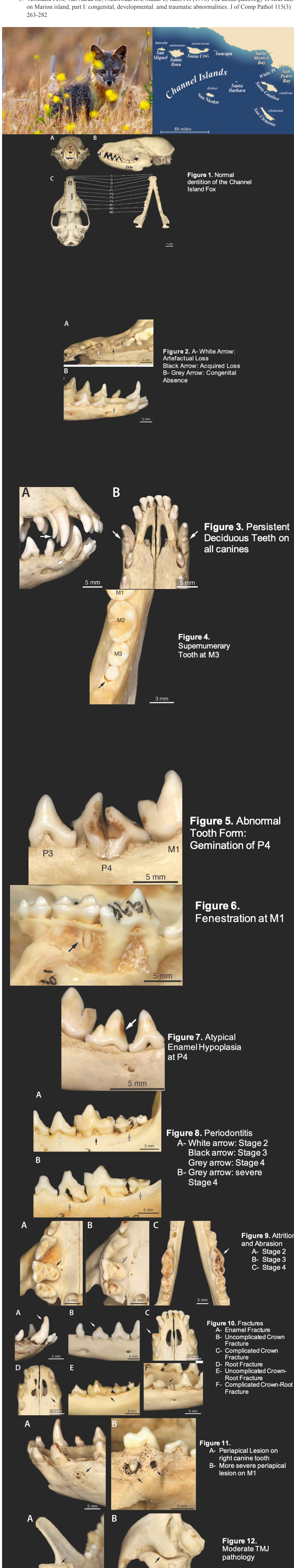
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AUTHOR INFORMATION

Annika Christie is a third year veterinary student at UC Davis School of Veterinary Medicine. She will be tracking small animal medicine but has an interest in wildlife and exotics as well. She is currently undecided about specializing yet but is captivated by many fields such as surgery, internal medicine, zoological medicine and more. If there are questions about this research project, her email is achristie@ucdavis.edu

ABSTRACT

The dental pathology of the Island Fox (*Urocyon littoralis*) includes the presence and incidence of dental diseases in the examined mammal specimens. By understanding *U. littoralis* dental pathology we can infer their oral health, granting insight into diet, environmental, genetic, and behavioral factors, and how these affect the *U. littoralis* population and its critical role in the Channel Islands ecosystem. Additionally, the study will contribute to ongoing research on North American carnivores' dental health and its role in species survival. Research on the dental and temporomandibular joint (TMJ) pathology will provide helpful insight into possible environmental pressures, and behavioral or genetic factors affecting *U. littoralis*. The hypothesis of this study is that *U. littoralis* will have similar pathology to the Gray Fox and Kit Fox. Due to the species isolation and lack of genetic diversity, we hypothesize an increased likelihood of congenital abnormalities. This study relies upon predefined criteria and protocol established by previous studies to macroscopically classify congenital, developmental, and acquired dental and TMJ abnormalities. These criteria will ensure a thorough examination and create consistency across species for future comparison. Data catalogued will include date, collection location, age, sex, subspecies, and examination findings. The sample size will include 346 specimens as determined by the Santa Barbara Museum of Natural History's collection. The magnitude of the association between the presence or absence of specific forms of dental pathology and individual characteristics measured on a nominal or ordinal scale will be quantified using prevalence odds ratios and 95% confidence intervals.