J S Afr Vet Assoc. 2026;97:36-38
https://doi.org/10.36303/JSAVA.744
Open Access article distributed under the terms of the Creative Commons Attribution-Non-Commercial Works 4.0 South Africa License (CC BY NC)
https://creativecommons.org/licenses/by-nc/4.0

J S Afr Vet Assoc
ISSN 2224-9435 EISSN 1019-9128
© 2026 The Author(s)
CASE REPORT

Elodontoma-like lesions in a Cape ground squirrel (*Geosciurus inauris*)

G Steenkamp,[1,2] D Elliott[1,3]

[1] *Department of Companion Animal Clinical Studies, Faculty of Veterinary Science, University of Pretoria, South Africa*
[2] *Centre for Veterinary Wildlife, Faculty of Veterinary Science, University of Pretoria, South Africa*
[3] *Valley Farm Animal Hospital, South Africa*
Corresponding author, email: *gerhard.steenkamp@up.ac.za*

Lesions affecting the apices of continuously growing (hypselodont) teeth have been reported in several captive rodent and lagomorph species and have been described as odontogenic dysplasia, pseudo-odontomas, odontomas and elodontomas. To date, such lesions have not been described in Cape ground squirrels (*Geosciurus inauris*). This report describes the clinical presentation, diagnostic imaging findings and outcome of a captive male Cape ground squirrel presented with severe respiratory distress. Computed tomography revealed extensive lesions affecting the apices of all four incisor teeth, resulting in near-complete obstruction of the nasal passages and marked involvement of the mandibular incisor tooth apices. As histopathological examination was not performed, the lesions are described as elodontoma-like lesions in this report. Due to the severity of the lesions and poor prognosis, euthanasia was recommended; however, the animal died shortly after discharge. This case expands the range of species affected by elodontoma-like lesions and supports the hypothesis that these lesions are primarily associated with captivity.

Keywords: rodent, incisor, hamartoma, nasal passages, stridor

Introduction

Cape ground squirrels (*Geosciurus inauris*) are rodents native to the semi-arid regions of southern Africa. They are ground-dwelling animals that inhabit burrow systems, which may be excavated by the squirrels themselves or appropriated from other species, and may be shared with non-sympatric species such as yellow mongooses (*Cynictis penicillata*) and meerkats (*Suricata suricatta*) (Chimimba & Bennett 2005).

Cape ground squirrels are primarily herbivorous, with insects contributing only a minor component of their diet. Plant material consumed includes bulbs, seeds, leaves, grass stems, and the roots and stems of other plants (Chimimba & Bennett 2005). Dentally, they possess the formula I2/2 C0/0 PM1/1 M3/3 (Chimimba & Bennett 2005; Gautam & Verhagen 2012). The maxillary and mandibular incisor teeth are hypselodont (elodont), characterised by open apices and continuous production of enamel and dentine, allowing lifelong tooth elongation and eruption (Renvoisé & Michon 2014). In contrast, the cheek teeth are bunodont, with relatively short crowns and closed roots (Renvoisé & Michon 2014).

High rates of dental attrition and abrasion resulting from digging and gnawing behaviour necessitate continuous incisor tooth growth, making hypselodonty advantageous in these species (Renvoisé & Michon 2014). The maxillary incisor tooth apices may terminate rostral to the cheek teeth (Class I), between the first and last cheek teeth (Class II), or caudal to the last cheek tooth (Class III) (Norval et al. 2025b). Mandibular incisor teeth extend along the full length of the mandible to the base of the coronoid process (Norval et al. 2025a). The temporomandibular joint in rodents is adapted for rostrocaudal mandibular translation during mastication and lacks a retroarticular process (Herring 2003).

Lesions arising at the apices of rodent incisor teeth have been described using various terms, including odontogenic dysplasia, pseudo-odontomas, odontomas, and elodontomas (Berman & Rice 1980; Finkel et al. 1979; Philippart et al. 1994; Boy & Steenkamp 2006; Mancinelli & Capello 2016). Elodontomas are hamartomatous proliferations originating from the apical region of hypselodont teeth and have been documented in several captive rodent species, including tree squirrels, black-tailed prairie dogs, voles, and lagomorphs (Boy & Steenkamp 2006; Pilny & Hess 2004; Imai et al. 2018; Zaheer et al. 2021). These lesions can reach considerable size and are typically diagnosed using skull radiography (Boy & Steenkamp 2006; Zaheer et al. 2021). Histopathological examination is required for definitive classification of these lesions.

The pathogenesis of elodontomas remains poorly understood. Dietary factors, cranial trauma, and dental trauma associated with captivity have been proposed as contributing factors (Boy & Steenkamp 2006). To the authors' knowledge, only one report documents elodontomas in wild rodents (Sainsbury et al. 2004).

Elodontomas affecting the maxillary incisor tooth apices commonly result in respiratory compromise due to encroachment into the nasal passages (Boy & Steenkamp 2006; Phalen et al. 2000). Norval et al. (2025b) suggested that the severity of respiratory signs is influenced by the anatomical position of the maxillary incisor tooth apices, with Class I and II species being at greatest risk. The clinical consequences of elodontomas affecting the mandibular incisor teeth have not been well described.

As elodontomas enlarge typically, abnormal incisor tooth growth, surface crenation becomes visible radiographically, malocclusion, gingivitis, and eventual cessation of tooth eruption may occur (Boy & Steenkamp 2006). Treatment options for maxillary elodontomas are limited and include rhinotomy and extraction of the affected incisors, both of which present

Figure 1: Cape ground squirrel undergoing CT examination positioned in a VetMouseTrap™ (University of Illinois, Urbana, IL, USA) only with oxygen supplementation.

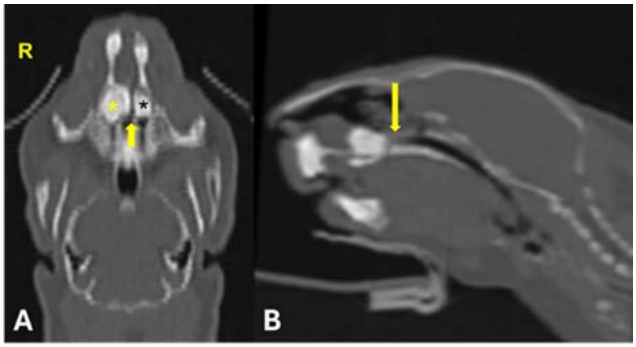

Figure 2: A dorsal (A) and sagittal (B) CT image in a bone window of a Cape ground squirrel head. Two elodontoma-like lesions are present. In (A) the right elodontoma-like lesion (yellow asterisk) is much larger than the one on the left (black asterisk). A narrow passage between the elodontoma-like lesions (yellow arrow) is the only patent region of nasal passage. On sagittal view (B) the obstruction of the nasal passage and nasopharynx caudal to the elodontoma-like lesions (yellow arrow) is evident.

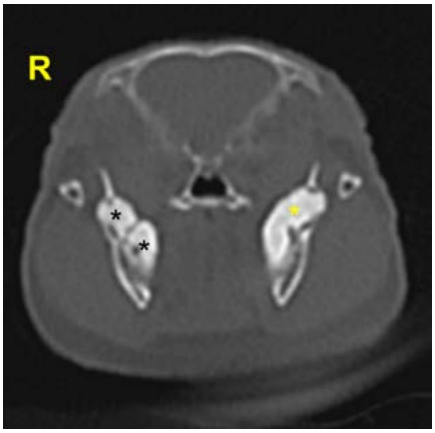

Figure 3: Transverse CT image in a bone window of the caudal mandible of a Cape ground squirrel. The larger right elodontoma-like lesions (black asterisks) appear bilobed whereas the left elodontoma-like lesion (yellow asterisk) does not. Both elodontoma-like lesions obliterate or destroy the surrounding mandibular cortex.

significant technical challenges (Wagner & Johnson 2001; Capello 2002).

This report documents the first known case of elodontoma-like lesions in a Cape ground squirrel and describes the clinical presentation, diagnostic findings, and outcome in a captive individual. The description of this case and its outcome was approved by the University of Pretoria Faculty of Veterinary Science Research Committee (REC144-25).

Patient presentation

A three-year-old castrated male Cape ground squirrel was presented to the Exotic Animal Clinic at the Onderstepoort Veterinary Academic Hospital with severe respiratory distress. Marked abdominal effort was observed during respiration. The owner reported progressive deterioration over several weeks, reduced appetite, and apparent pain on mouth opening. There was no history of trauma, toxin exposure, or infectious disease, and no nasal discharge was observed.

On initial examination, lung auscultation was unremarkable, and an upper respiratory obstruction was suspected. The squirrel was placed in an incubator with supplemental oxygen. Following consultation with the Dentistry and Maxillofacial Surgery Service, computed tomography (CT) of the head was performed using a VetMouseTrap™ system (University of Illinois, Urbana, IL, USA) to allow oxygen supplementation only during imaging (Figure 1).

Non-contrast CT imaging of the head and thorax was performed (Siemens Emotion Duo, Siemens Medical Systems, Forchheim, Germany). Elodontoma-like lesions affecting all four incisor teeth were identified (Figures 2 and 3). The maxillary elodontoma-like lesions caused severe compression of the nasal passages, leaving less than a 1 mm diameter airway (Figure 2). The mandibular elodontoma-like lesions occupied much of the region associated with the coronoid process and the attachment sites of the masticatory muscles (Figure 3).

Management and outcome

Given the extensive nature of the lesions, the high anaesthetic risk, and the absence of viable treatment options for the mandibular elodontoma-like lesions, the prognosis was considered poor and euthanasia was recommended. The owner elected to attempt short-term palliative management at home using nonsteroidal anti-inflammatory medication and corticosteroid nebulisation.

The animal died approximately 35 minutes after discharge. No histopathological examination was performed in this case.

Discussion

Since no histopathology was available for the lesions present in this animal, elodontoma-like lesions were preferred to describe the very dense periapical hard tissue structures, resembling elodontomas. This is the first documented case of elodontoma-like lesions in a Cape ground squirrel. The species shares ecological and dietary similarities with black-tailed prairie dogs, in which odontomas are well documented in captivity (Pilny & Hess 2004). In their 2006 paper, Boy & Steenkamp argued that since these lesions affect elodont teeth and not bunodont, an alternative term to odontoma should be used reflecting the differences in elodont and brachyodont tooth formation. They favoured the term elodontoma. The occurrence of elodontoma-like lesions in yet another captive rodent species lends further support to the hypothesis that this condition is strongly associated with captivity (Boy & Steenkamp 2006).

Radiographic screening of a large museum collection of wild South African rodents failed to identify elodontomas or elodontoma-like lesions, although sample sizes per species were limited (Norval et al. 2025b). Future studies including larger numbers of individuals across all age groups and species are required to determine the true prevalence of elodontomas or elodontoma-like lesions in wild populations. It is also possible that affected wild individuals may experience reduced survival due to predation or compromised feeding ability.

Cape ground squirrels are classified as a Class I species based on maxillary incisor tooth apex position, rendering them particularly susceptible to nasal obstruction from elodontoma-like lesions (Norval et al. 2025b). In this case, near-complete obliteration of the nasal passages was evident on CT imaging, confirming the clinical relevance of this classification. While skull radiography remains the primary diagnostic tool for evaluating mineralised tissue pathology in rodents (Norval et al. 2025a; Sainsbury et al. 2004; Zaheer et al. 2021), CT offers superior assessment of lesion extent and airway compromise and is valuable for prognostication.

Treatment of these periapical pathological conditions, regardless of the diagnosis, remains challenging. Surgical options such as rhinotomy or incisor tooth extraction are technically demanding, and alternative approaches such as tracheostomy have not been reported. Haematoma formation immediately postoperative may indeed aggravate the respiratory signs necessitating intensive care. In cases with extensive disease and poor prognosis, euthanasia should be considered.

Conflict of interest

We do not have any conflict of interest to declare.

Ethical approval

Ethics approval was obtained from the Research Ethics Committee of the University of Pretoria's Veterinary faculty, and the acceptance number REC144-25 is clearly stated in the manuscript.

ORCID

G Steenkamp https://orcid.org/0000-0001-8428-7309
D Elliott https://orcid.org/0000-0003-4548-9877

References

Berman, J.J., Rice, J.M., 1980, Odontogenic tumours produced in Fischer rats by methylnitrosourea, *Archives of Oral Biology* 25(4), 213-20. https://doi.org/10.1016/0003-9969(80)90025-4.

Boy, S.C., Steenkamp, G., 2006, Odontoma-like tumours of squirrel elodont incisors-elodontomas, *Journal of Comparative Pathology* 135(1), 56-61. https://doi.rg/10.1016/j.jcpa.2006.03.002.

Capello, V., 2002, Incisor extraction to resolve clinical signs of odontoma in a prairie dog. *Exotic DVM,* 4(1), 9.

Chimimba, C.T., Bennett, N.C., 2005, Order Rodentia. In: J.D. Skinner & C.T. Chimimba (eds). The Mammals of the Southern African Subregion. 3rd ed. Cambridge: Cambridge University Press, pp.77-210. https://doi.org/10.1017/CBO9781107340992.014.

Finkel, M.P., Lombard, L.S., Staffeldt, E.F., et al., 1979, Odontomas in Peromyscus leucopus, *Journal of the National Cancer Institute* 63(2), 407-11.

Gautam, S.H., Verhagen, J.V., 2012, Direct behavioural evidence for retronasal olfaction in rats, *PLoS ONE* 7(9), e44781. https://doi.org/10.1371/journal.pone.0044781.

Herring, S.W., 2003, TMJ anatomy and animal models, *Journal of Musculoskeletal and Neuronal Interactions* 3(4), 391-4.

Imai, D.M., Pesapane, R., Conroy, C.J., et al., 2018, Apical elongation of molar teeth in captive Microtus voles, *Veterinary Pathology* 55(4), 572-83. https://doi.org/10.1177/0300985818758469.

Mancinelli, E., Capello, V., 2016, Anatomy and disorders of the oral cavity of rat-like and squirrel-like rodents, *Vet Clin North Am Exot Anim Pract* 19(3), 871-900. https://doi.org/10.1016/j.cvex.2016.04.008.

Norval, Q., Tordiffe, A.S.W., Steenkamp, G., 2025a, Radiological landmarks as an aid in the interpretation of rodent skull extra-oral projections, *Zoo Biology* 44(3), 283-289. https://doi.org/10.1002/zoo.21897.

Norval, Q., Tordiffe, A.S.W., Steenkamp, G., 2025b, Radiographic screening of indigenous South African rodent incisor teeth for the presence of elodontomas, *Discover Animals* 2, 27. https://doi.org/10.1007/s44338-025-00078-7.

Phalen, D.N., Antinoff, N., Fricke, M.E., 2000, Obstructive respiratory disease in prairie dogs with odontomas, *Veterinary Clinics of North America: Exotic Animal Practice* 3(2), 513-7. https://doi.org/10.1016/S1094-9194(17)30085-3.

Philippart, C., Arys, A., Dourov, N., 1994, Experimental odontomas in osteopetrotic op/op rats, *Journal of Oral Pathology and Medicine* 23(5), 200-4. https://doi.org/10.1111/j.1600-0714.1994.tb01113.x.

Pilny, A.A., Hess, L., 2004, Prairie dog care and husbandry, *Veterinary Clinics of North America: Exotic Animal Practice* 7(2), 269-82. https://doi.org/10.1016/j.cvex.2004.02.001.

Renvoisé, E., Michon, F., (2014), An Evo-Devo perspective on ever-growing teeth in mammals and dental stem cell maintenance, *Front Physiol* 5, 324. https://doi.org/10.3389/fphys.2014.00324.

Sainsbury, A.W., Kountouri, A., DuBoulay, G., et al., 2004, Oral disease in free-living red squirrels (Sciurus vulgaris) in the United Kingdom, *Journal of Wildlife Diseases* 40(2), 185-96. https://doi.org/10.7589/0090-3558-40.2.185.

Wagner, R., Johnson, D., 2001, Rhinotomy for treatment of odontoma in prairie dogs, *Exotic DVM* 3(5), 29-34.

Zaheer, O.A., Ludwig, L., Gardhouse, S., et al., 2021, Diagnosis, treatment, and characterisation with advanced diagnostic imaging of an oral ectopic elodontoma in a pet rabbit (Oryctolagus cuniculus), *Journal of Exotic Pet Medicine* 37, 28-31. https://doi.org/10.1053/j.jepm.2021.01.002.