

ODONTOMAS: TUMOURS OF JUVENILE ANIMALS

Lisa D Schmidt, of SVS Laboratories, discusses the most common oral lesion of cattle – how to diagnose it, and how to treat it.

INTRODUCTION

Recently we received a wedge biopsy from a rising two-year-old crossbred heifer. The animal presented with a lumpy jaw, characterised by a large ridge on the ventral mandible with displaced teeth. Infection was not appreciated during physical examination (Figure 1). The lesion was diagnosed as a compound odontoma. Odontomas are the most common oral lesion of cattle, and are often seen in the rostral mandible and associated with the developing incisors.

TABLE 1:

Species that are reported to have odontomas

Cat
Cattle
Dog
Fish
Horse
Humans
Non-human primates
Rodents (rats, mice)
Sheep
Water buffalo

FIGURE 1: Bovine compound odontoma. The lesion on the ventral mandible was characterised by a large, lobulated, firm to hard mass that displaced teeth. On cut section or radiographically (not shown), masses often have numerous tooth-like structures (also known as denticles).

IMAGE COURTESY OF STEVE HERBERT, VE VETS.



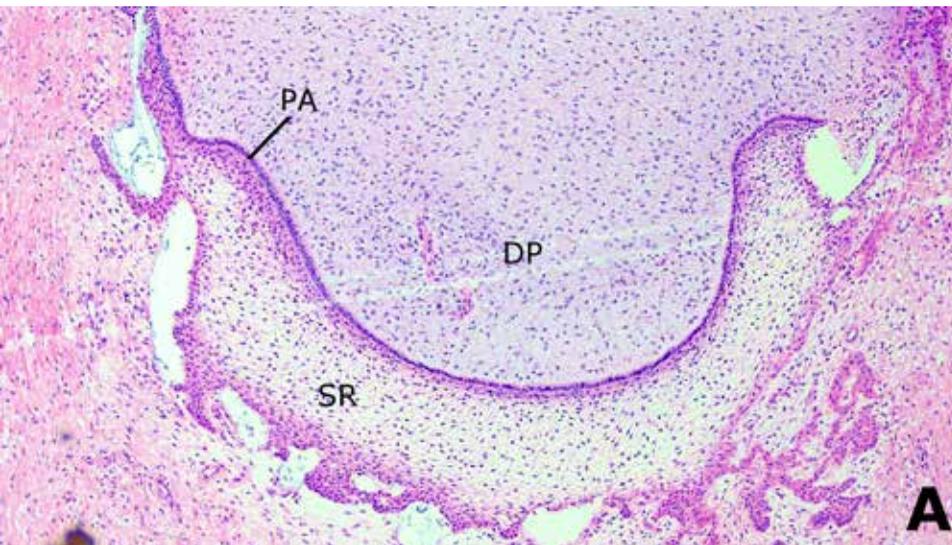
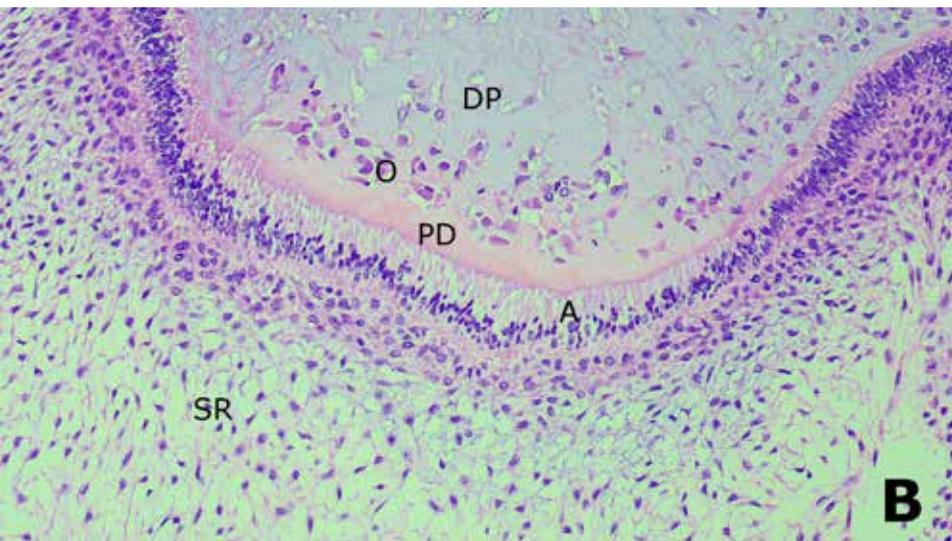
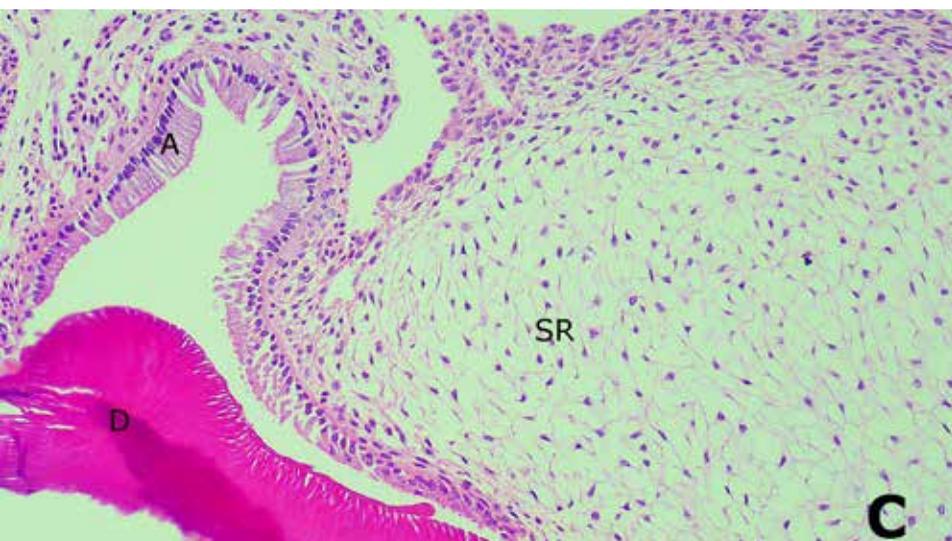


FIGURE 2: Bovine compound odontoma.
A. Early tooth structures are composed of a core of primitive mesenchyme (DP, dental papilla) resembling dental pulp that is surrounded by a layer of odontogenic epithelium (PA) and another zone of mesenchymal cells (SR, stellate reticulum).



B. Other structures that more closely resemble tooth-like structures (aka denticles) have differentiation of the epithelial cells into odontoblasts (O) and ameloblasts (A). A layer of pre-dentin (PD) is present between the odontoblasts and ameloblasts.



C. More mature denticles have a distinct zone of brightly eosinophilic dentin (D).

CLINICAL SIGNS

Odontomas have similar presentation regardless of the species affected, and are similar to the case described above. In general, cattle, horses and other species (see Table 1) present with a firm, facial or mandibular intraoral swelling. An additional presenting complaint in small animals such as dogs and cats is missing teeth or failure of the permanent teeth to erupt. The lesions are often expansile and could be associated with distortion of bony structures, such as nasal septum deviation. These lesions are usually non-painful and blood work tends to be unremarkable. The primary

TABLE 2:
Differential diagnoses for maxillary and mandibular swellings in immature animals

Category	Examples
Trauma	Fracture with callus formation
Infection	Focal sclerosing osteitis
Developmental disorders	Dentigerous cyst Odontogenic hamartomas
Neoplasms	Osteoma Ossifying fibroma Ameloblastoma Ameloblastic odontoma Epithelial odontogenic tumour

exception is that the lesions seen in horses and cattle tend to be larger and associated with facial deformity when compared to lesions in humans and companion animals.

DIFFERENTIAL DIAGNOSES

While odontomas are the most common oral lesion in cattle, they are generally considered rare, and you should have other differential diagnoses in mind when you approach these types of lesion. In juvenile animals, differential diagnoses should include trauma, infection, developmental anomalies and neoplasms (Table 2).

HOW ARE ODONTOMAS DIAGNOSED?

Diagnosis of odontomas can be made based on pathognomonic changes, if present, on radiographs or on computed tomography (CT). In the absence of characteristic lesions seen with imaging, an excisional or wedge biopsy may be submitted for histology.

Radiographs

Radiographically, odontomas present as a radiolucent mass that can be

associated with tooth-like structures (also known as denticles) or mineralised dental material of various sizes. The presence of denticles on radiographs is supportive of an odontoma. Other associated findings include unerupted teeth that are impacted or displaced, and cystic areas associated with the crowns of unerupted teeth. When associated with the maxilla, which is reported in dogs and horses, the lesions may fill the nasal cavities and displace the nasal septum.

Computed tomography (CT)

CT findings are not unlike those seen radiographically. However, the three-dimensional images generated by CT are invaluable to evaluate the extent of the mass and the involvement of other structures to aid in planning for surgical excision of large masses.

Histology

Microscopically, odontomas are composed of epithelial and mesenchymal tissues that recapitulate teeth in various stages of odontogenesis. Odontomas can be classified as compound or complex. Lesions with organised rudimentary tooth structures or denticles are compound odontomas (Figure 2). Tumours with disorganised tooth components are complex odontomas.

HAMARTOMA OR NEOPLASIA?

Odontomas, while considered benign tumours, are better classified as hamartomas. In general, hamartomas are focal malformations composed of tissue elements normally found at that site that are growing in a disorganised mass. Odontomas may contain dentin, enamel, cementum, dental pulp or tissue precursors.

WHY DO ODONTOMAS DEVELOP IN YOUNG ANIMALS?

It is speculated that odontomas may be secondary to local trauma, infections or developmental anomalies, akin to the development of other hamartomas.

However, in some case reports there is no history of trauma or infection. This suggests that developmental dysregulation or anomalies may be a root cause of odontomas.

TREATMENT AND PROGNOSIS

Surgery is the treatment of choice for odontomas. The extent and procedures involved are tumour dependent and beyond the scope of this overview. With thorough debridement, the prognosis is good. Even extensive tumours that invade sinuses have a low chance of recurrence if denticles and epithelial lining are fully excised. However, aftercare may be prolonged and complicated if radical surgery is required to excise the lesion fully. Post-operative complications are reported to include iatrogenic fractures and facial distortion.

SUMMARY

Odontomas are hamartomas that are composed of developing tooth structures or disorganised tooth components. Clinically differential diagnoses should include traumatic, infectious, developmental and neoplastic lesions. Imaging and histopathology are used to diagnose the lesions and CT may be useful for surgical planning. The lesions respond well to complete surgical excision. Lesions submitted for margin analysis should be inked by the submitting clinician. ^(vs)

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