Veterinary Bioscience: Digestive System

LECTURE 2: TEETH AND TOOTH DEVELOPMENT

DR CHRIS MURRAY

Following graduation from Sydney University, Chris worked in small animal practice for 10 years. She also was the Animal Welfare Officer at Macquarie University for several years. Since coming to Melbourne Veterinary School, Chris has taught first to third year veterinary students in a wide range of subjects, predominantly within the disciplines of veterinary anatomy and physiology.

cmmurray@unimelb.edu.au

INTENDED LEARNING OUTCOMES

At the end of this lecture, students should be able to:

- Describe the general structure of a tooth and explain how the different tissues contribute to tooth function
- Compare the development and general structure of brachydont and hypsodont teeth
- Relate the different embryonic cell types to the dental structures they form

KEYWORDS

Teeth; enamel, dentine, cementum, periodontal ligament, pulp cavity, gingiva, alveolar bone, vestibular, labial, buccal, lingual, palatine and occlusal surfaces, brachydont tooth, hypsodont tooth, deciduous teeth, dental lamina, tooth bud, enamel organ, dental papilla, dental sac, odontoblast, ameloblast, cementoblast, osteoblast.

LECTURE OVERVIEW

Structure of a simple tooth:

The general structure of teeth will be explained using a simple brachydont (short-crowned) tooth as an example. The crown is the part of the tooth covered by enamel, and the root is embedded in the tooth socket in the jaw (alveolar) bone. Teeth are comprised of three different types of mineralized tissue, the shiny white enamel, and the dentine and cementum, which are both slightly yellowish. The dentine forms the framework

of the tooth and is found in both the crown and the root, surrounding the central pulp cavity. The cementum surrounds the dentine of the root and may also contribute to the bulk of the crown in hypsodont (high crowned) teeth. The periodontal ligament originates in the alveolar bone and inserts in the cementum, holding the tooth in place in the socket. The structure of hypsodont teeth will be compared to that of the brachydont.

Tooth development:

In many animals, a temporary set of teeth develops first, and is then replaced by a permanent set. Teeth develop from oral epithelium (ectoderm) and neural crest-derived mesenchyme, which go on to form an enamel organ. The ectoderm gives rise to the enamel-forming cells, which remain on the outside of the tooth until they are worn off following eruption. The cementum and dentine are produced by mesenchyme-derived cells. The permanent tooth develops in the space vacated by the temporary tooth and exerts pressure on it, causing it to be shed. Brachydont teeth have a short period of growth and eruption and the root forms during eruption. Hypsodont teeth have a prolonged period of growth and eruption, and the root starts to develop at some period after eruption has commenced.

FURTHER READING

McGeady TA, Quinn PJ, Fitzpatrick ES, Ryan MT: *Veterinary Embryology*. (2006)

Singh B, *Dyce Sack and Wensing's Textbook of Veterinary Anatomy,* 5th edition (2018)