

# Two and three-dimensional computed tomographic anatomy of the enamel, infundibulae and pulp of 126 equine cheek teeth. Part 1: Findings in teeth without macroscopic occlusal or computed tomographic lesions

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## Results

### *Pulpar configurations and apical anatomy of the first mandibular cheek teeth (Triadan 306 and 406)*

Twelve first mandibular cheek teeth (306 and 406) were examined: 10 teeth (83%) had 6 pulp horns, and the remaining 2 (17%) had 5 pulp horns. The 2 teeth with only 5 pulp horns were found in the same horse, in which no abnormalities were detected on occlusal surface examination, and both teeth were missing pulp horn 6 (most rostral pulp horn). Of the 10 teeth with 6 pulp horns present, the most common configuration was observed in 5 teeth (50%), wherein the 4 most rostral pulp horns (1, 2, 4 and 6) would coalesce apically, and the 2 most caudal pulp horns (3 and 5) joined together slightly further apically. These teeth were 1.5–3.5 years post eruption. With increasing age the number of interpulpal communications between pulp horns decreased, although the 2 most caudal horns (3 and 5) always coalesced. All 306 and 406 cheek teeth examined had 2 roots; one rostral and one caudal. The caudal root divided into 2 separate apical foramina at an earlier age than the rostral root. Pulp horns 1, 2, 4 and 6 contributed to the rostral root pulp volume, and the caudal root pulp volume consisted of pulp horns 3 and 5.

### *Pulpar configurations and apical anatomy of the sixth mandibular cheek teeth (Triadan 311 and 411)*

All 6 sixth mandibular cheek teeth (311 and 411) examined had 6 pulp horns. A common pulp chamber from which all 6 pulp horns emerged was observed in all teeth (2 teeth) with a post eruption age of 2.5 years or less. With increasing age the number of interpulpal communications decreased; however, regardless of eruption age, pulp horns 3 and 5 joined most coronally, with pulp horns 1, 2 and 4 communicating more apically. All 311 and 411 teeth examined had 2 roots: one rostral and one caudal. The caudal root had a single apical foramen at all ages examined (up to 16.5 years post eruption). The rostral root contained pulp from which pulp horns 1, 4 and 5 derived, and pulp horns 2, 3 and 7 were derived from the caudal root pulp.

### *Pulpar configurations and apical anatomy of the first maxillary cheek teeth (Triadan 106 and 206)*

Twelve first maxillary cheek teeth (106 and 206) were examined: all had 6 pulp horns. The coalescence of the pulp horns had a consistent pattern, although with increasing age the number of interpulpal communications decreased and thus the number of solitary horns increased. In all 106 and 206 teeth, regardless of eruption age, pulp horns 1 and 3 communicated most coronally and were joined further apically by pulp horn 6. All 106 and 206 teeth had 3 roots; one medial root with a greater diameter and 2 smaller lateral roots. Pulp horns 1, 3 and 6 were derived from the rostralateral root pulp, pulp horn 2 was derived from the caudolateral root and pulp horns 4 and 5 were derived from the medial root pulp volume. All 106 and 206 teeth with an eruption age of greater than 2 years had 2 separate apical foramina within the medial root. With increasing age 2 separate apical foramina formed within the rostralateral root.

### *Pulpar configurations and apical anatomy of the sixth maxillary cheek teeth (Triadan 111 and 211)*

Five sixth maxillary cheek teeth (111 and 211) were examined: 3 (60%) had 6 pulp horns and 2 (40%) had 7 pulp horns. All pulp horns were seen to intercommunicate in teeth with an eruption age of 2.5 years or less. All 111 and 211 teeth had 3 roots; one medial and 2 lateral roots. The medial root was distinctly larger. They underwent similar changes with age as the central maxillary cheek teeth, however the main differences were that pulp horn 1 was derived from the rostralateral root pulp volume, pulp horns 2 and if present 7 were derived from the caudolateral root pulp volume, and pulp horns 3, 4, 5 and 8 were derived from the medial root pulp volume.

### *Infundibulae of the first and sixth maxillary cheek teeth (Triadan 106, 206, 111 and 211)*

The first and sixth maxillary cheek teeth differed slightly in the appearance of their infundibulae. The rostral infundibulae of the 106 and 206 teeth contained 2 central circular darkened areas of

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cementum, overlying the 2 central channels found in this tooth, in comparison to the singular central channel found in all other infundibulae of the maxillary cheek teeth. The rostral and caudal infundibulae of the 106 and 206 teeth also had a straighter, less crescent shaped, appearance in comparison to the infundibulae of the central maxillary cheek teeth. The rostral infundibulae of the 111 and 211 teeth appeared very similar to the infundibulae of the central maxillary cheek teeth; however, the caudal aspect of the caudal infundibulae had 2 caudal projections instead of cupping round pulp horn 2 as did the caudal infundibulae of the central maxillary cheek teeth.

A novel finding of this study was the identification of 2 central vascular channels within the rostral infundibulae of the first

maxillary cheek teeth, compared to the singular central vascular channel present in all other maxillary cheek teeth infundibulae. The presence of 2 central vascular channels provides twice the potential portals by which debris and bacteria could enter into the infundibulum; however, such findings are not reflected clinically as their presence is not associated with an increased incidence of caries within the rostral infundibulae of the first maxillary cheek teeth (106 and 206) (Merillat 1921; Baker 1970).

**References**

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Fig o1: 3D CT reconstructions of the enamel (green) and pulp (red) of 6 mandibular cheek teeth displaying the changes in the reserve crown and pulp with increasing age. Ages are in years post eruption. The pulpar volume, number of interpulpar communications and the length of the reserve crown are seen to decrease with increasing age.



Fig o2: 3D CT reconstructions of the enamel (green) and pulp (red) of 6 maxillary cheek teeth displaying changes in the reserve crown and pulp with increasing age. Ages are in years post eruption. The pulpar volume, number of interpulpar communications and the length of the reserve crown are seen to decrease with increasing age.