

Four supernumerary distomolar dysmorphic cheek teeth in a horse: a case report

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Abstract

We present an adult meat horse skull assembled by one of the authors with 4 fourth molars in each quadrant of the permanent dentition (Triadan 112, 212, 312 and 412), from which they were not totally erupted. As few cases of supernumerary molars in maxilla and mandible are reported in horses, this text reports the case anatomically. These seemed to have caused no clinical problems in the animal.

The dentition of the horse is well adapted to its feeding habitat and diet, which normally consists of continuous grazing of rough, poorly-digestible grass [1]. While the incisors are specialised for prehension and cutting food, the premolars and the molars (cheek teeth) function as grinders for mastication [1]. A normal adult equine mouth contains 24 cheek teeth [1], equally distributed on the maxilla and mandible. At the time of eruption, the permanent cheek teeth have long crowns, most of which is unerupted reserve crown that remains embedded in the alveoli [1]. Fully-developed upper cheek teeth have three roots (occasionally four) and the lower cheek teeth have two roots, except the last lower molar, which has three [1]. On the transverse section, equine cheek teeth are rectangular except for the first and last, which are triangular [1].

Supernumerary teeth, also known as polydontia or hyperdentition [2], are defined as the teeth in excess of the normal expected number in any of the arcades [3]. Supernumerary teeth may occur singly, multiply, unilaterally, or bilaterally and in one or both jaws [4]. Supernumerary teeth can be categorized morphologically into two categories [5] : supplemental (or eumorphic) teeth, which resemble teeth from the normal series in crown and root morphology, although not always in size; and rudimentary (or dysmorphic) teeth, which are abnormally shaped and smaller than normal teeth. The presence of supernumerary teeth has been identified in several species.

Polydontia is the most common dental anomaly recorded in some breeds of dogs [6], affecting incisors, premolars and molars. In horses, a low prevalence of polydontia has been

documented: Dixon et al. [7] [8] found ten (0.28%) cases of supernumerary cheek teeth out of 349 horses referred with cheek teeth disorders and Miles and Grigson [5] found 12 supernumerary cheek teeth (2.5%) in 484 museum skulls. In our University curated collection of 5 mandibles and 27 skulls (with complete cheek teeth, with all specimens belonging to Pyrenean Horse), none have supernumerary molars. In equids, supernumerary teeth are usually located at the caudal aspects of the maxillary cheek teeth rows - distomolars- but can be positioned adjacent to normal teeth: lingually/palatally, buccally or rostrally or even in an ectopic location (heterotopic polydontia) [3] [4] [9]. Usually, a single additional cheek tooth occurs, but Wortley [10] reported a case with four supernumerary cheek teeth in an upper jaw.

[\[enlarge\]](#)



Figure 1. Ventral view of the upper-cheek teeth (right molar series).

The aetiology of supernumerary teeth remains unclear, but several theories have been proposed. Supernumerary teeth are a developmental defect and may arise due to localized excessive odontogenic capacity, or from the splitting or dichotomy of a tooth primordium [3] [5] [11], with external trauma also acting as an initiating factor, when teeth germs are affected [9]. In supplemental supernumerary teeth, it is believed that the primordium divides into equal parts, each with the capacity to form a tooth with normal morphology. Haplodont and tuberculate supernumerary teeth may occur due to the division of the primordium into parts that do not have the capacity to form a tooth with normal morphology and size [5]. A localized and independent hyperactivity of the dental lamina is the most accepted cause for the development of supernumerary teeth in humans [8]. According to this theory, the lingual extension of an additional tooth bud leads to a eumorphic tooth, while the rudimentary form arises from the proliferation of epithelial remnants of the dental lamina induced by pressure from the complete dentition [12]. In the literature, human supernumerary teeth are often associated with other developmental disorders, such as cleft lip and palate, cleidocranial dysostosis, and Gardner's syndrome, but concurrent problems have not been reported with equine polydontia. Consideration should be given to atavism as a possible cause for supernumerary teeth, which is probably heritable [5]. Interestingly enough, supernumerary teeth in humans are more common in relatives of affected children than in the general populations, which may provide evidence that heredity does play a role in this disorder [12].

[\[enlarge\]](#)

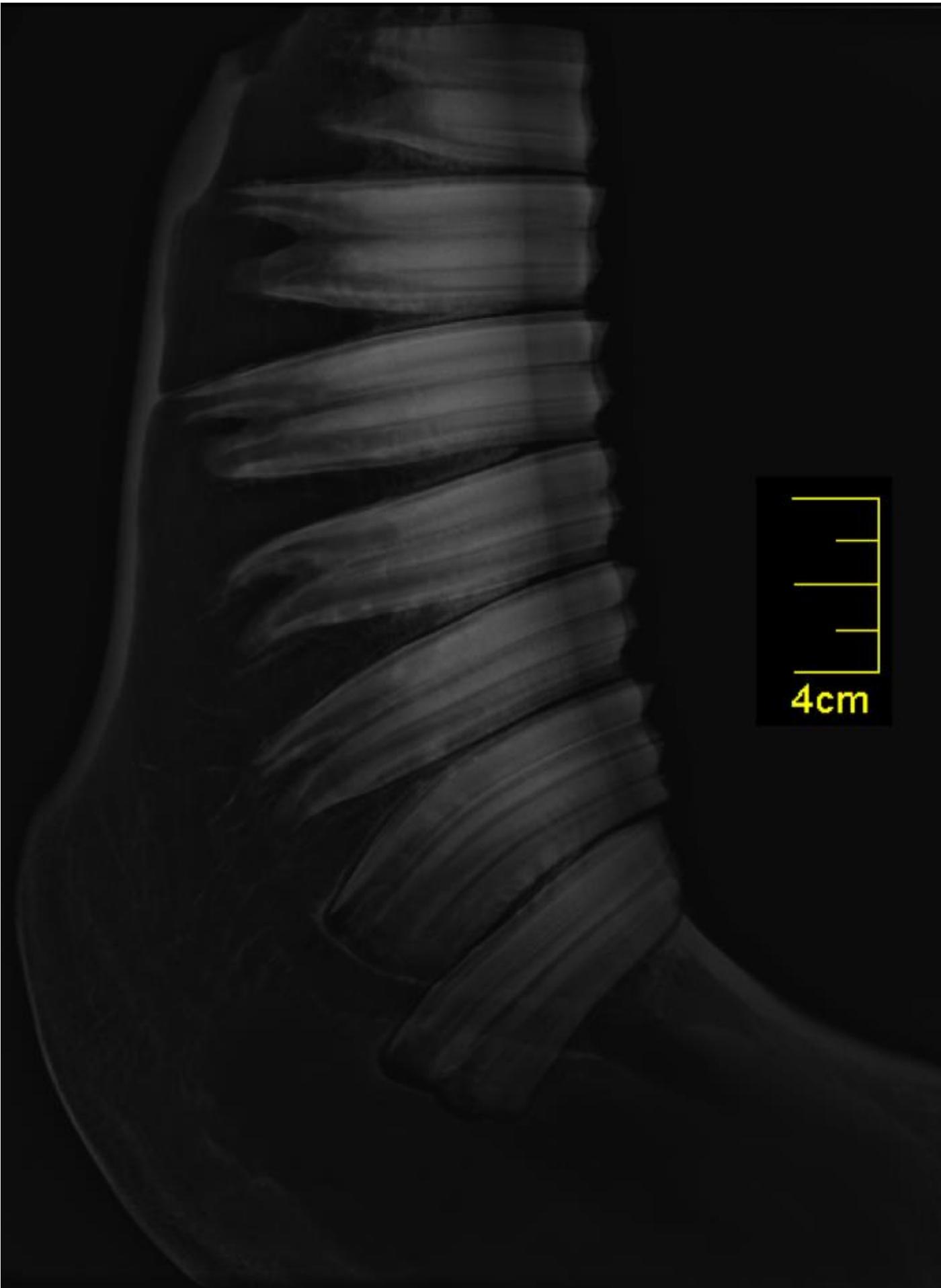


Figure 2. Buccal-to-lingual lateral radiographic view (50 kV, 100 mA, focal distance of 73 cm) of left hemi-mandible, showing the complete cheek teeth.

Polydontia in equids can remain asymptomatic or may appear as behavioural problems when riding, oral dysphagia, facial swelling and mucopurulent nasal discharge.

Case Report

A complete horse skull (cranium + mandible) belonging to Catalan Pyrenean breed, aged more than 50 months (according to molar eruption), was found and assembled by one of the authors (Parés) during field work in the NE Pyrenees on May 24th 2014 (exact place: 42° 34' N, 1° 14' E). The animal had died during its summer mountain grassland grazing but the owner knew neither the exact cause nor date of death. The Catalan Pyrenean breed is an inexpensive horse bred for meat in the harsh environment of the NE part of the Pyrenees along the Spanish-French border [13], and it is compact, broad-built, and predominantly chestnut, with rather short limbs [14]. Genetic analysis suggests that this small population (<4600 individuals) [15] is closely related to the Breton and Comtois breeds [16]. The horses are reared outdoors throughout the year and do not receive any additional food besides some low-quality straw in winter. During summer, they graze on local mountains, sometimes reaching nearly 3,000 m above sea level. They receive no systematic clinical care and concentrates are only given to young animals when they are weaned or prepared for abattoir.

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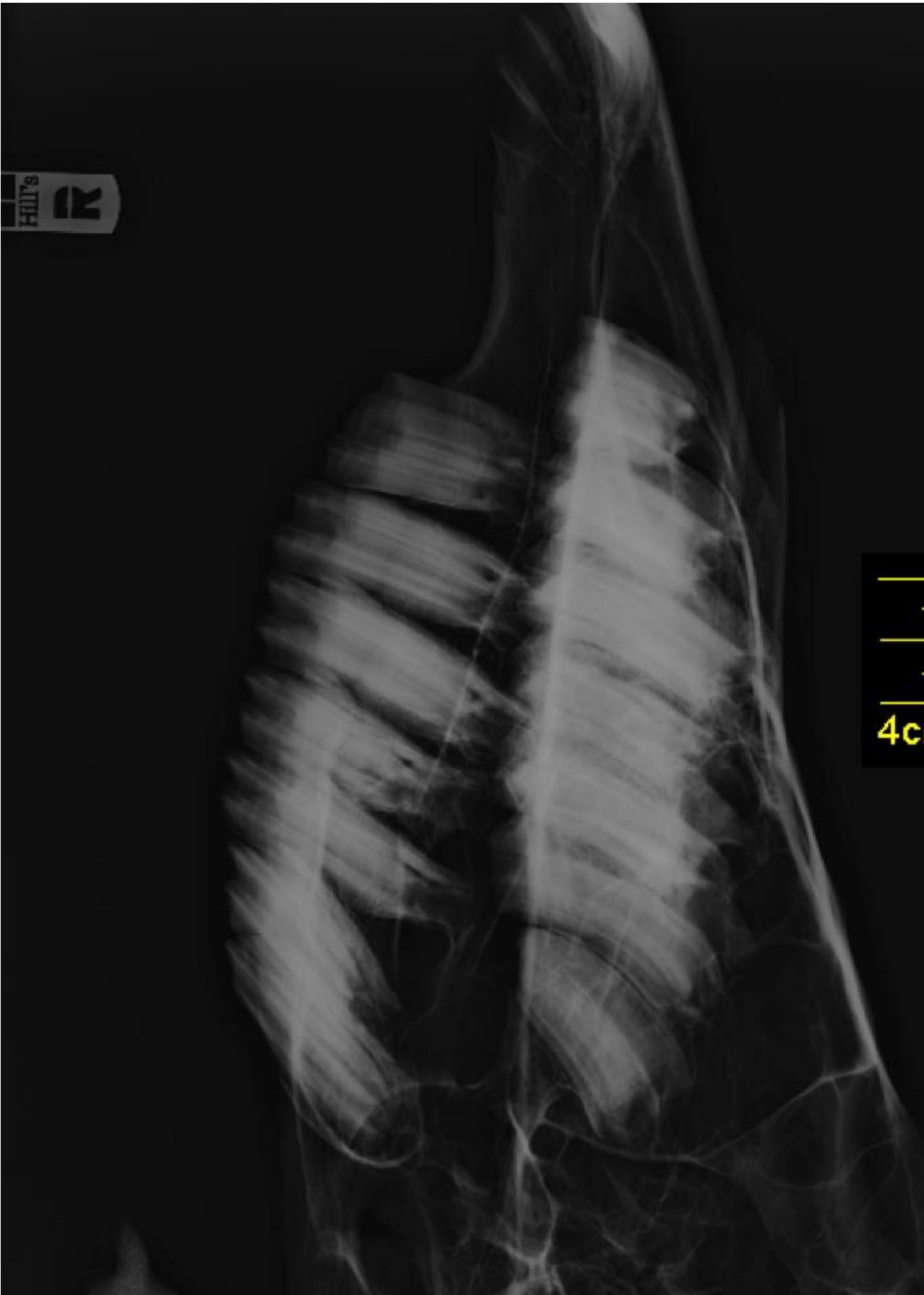


Figure 3. Oblique latero-to-medial radiographic view (70 kV, 160 mA, focal distance of 73 cm) of skull, showing the complete cheek teeth.

A thorough general examination ruled out the presence of any bony skull abnormalities. The examination of the skull revealed the presence of a set of 7 permanent cheek teeth (Figure 1) arranged in all the quadrants (Triadan 112, 212, 312 and 412). The supernumerary teeth were not fully erupted, and were abnormally shaped and adjacent but smaller than the other molars, and were triangular in transverse section. All the extraneous molars were similar to each other.

Radiography

A buccal-to-lingual lateral radiographic view was obtained of the left hemi-mandible by using a radiographic apparatus operated at 50 kV, 100 mA with a film focal distance of 73 cm (Figure 2). An erupting M4, with its occlusal surface not yet levelled to the rest of molar series, was clearly observed. In the oblique latero-to-medial radiographic of the skull, operated at 70 kV, 160 mA, both M4 and M4 were clearly erupted (Figure 3). In the images, all the supernumerary molars presented two roots.

Discussion

In equids, symptoms will usually not be significant until the supernumerary teeth are fully erupted and enough time has elapsed between eruption and the appearance of pathological changes. These may be due to dental overgrowth, diastemata formation or other dental disorders [9]. The clinical case reported here refers to four supernumerary distomolar dysmorphic cheek teeth, in which the animal probably did not present buccal symptoms, and its death was due to other causes (lightning strikes and slips are the most frequent causes of death in CPC horses when they range freely on the mountains).

Declarations

Acknowledgments

Ester Vidal accompanied us to collect this and other bony specimens in the village of Tor, Pallars Sobirà, NE Pyrenees. Xavi Sánchez and Toni Argelich, from the Capellades Veterinarian Clinic, kindly obtained and processed radiographical images.

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