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Case Report

Polydent: Multiple Supplemental and Impacted Teeth: A Non-syndromic Case Report

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Abstract

In human, growing more than the expected quota of teeth is rare. In this case, it is described a man who presented with multiple extra supplemental teeth in his permanent dentition, most of which were impacted. No identifiable developmental syndrome was identified.

Key words: Concrecence, cleidocranial dysostosis, diphyodont, gemination, poly-phyodont, mono-morphodont, poly-morphodont, impactions, supernumeraries, supplemental, teeth

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Historically human teeth have been the subject of study for a long time by morphologist, comparative anatomists, paleodontologists, biologists, doctors and dentists. Humans are diphyodont (have 2 sets of teeth, deciduous and permanent) and are poly-morphodont (have different shaped teeth, incisors, canines, premolars and molars). The embryonic stages of odontogenesis occurs early during pregnancy (starting 14 weeks *in utero*) and after birth (until about 20 years)^{1,2}. With the initial ectodermal growth and proliferation of the face and cranium, a stoma forms, then an intraoral dental lamina forms in both jaws of the stoma. For every tooth, a dental bud develops an individual follicle on the dental lamina and each goes through stages of being a histological cap, a bud and bell. From this a tooth forming organelle, an inner and outer ectodermal epithelium encases a mesodermal dental papilla. Enamel grows from the inner dental epithelium and induces subsequent formation of dentine in the underlying mesodermal dental papilla. An enamel crown, with the dentinal body forming the rest of the tooth, root, pulp and periodontal ligament, grows to form each tooth unit². The nature of controlling mechanisms involved, which coordinate the expression of regulatory genes, remains obscure. Yet, epigenetic cell dependant interactions are known to exist, when 2 tissues of different progeny and properties (mesoderm, mesoderm and/or ectoderm) become intimately juxtapositioned an alteration of the developmental course of the interactants manifest³. Human deciduous teeth start erupting after 6 months and all erupt by age 10 years. The number of deciduous teeth in each quadrant is: two incisors (I), one canine (C) and 2 molars (M): this amounts to 2-I + 1-C + 2-M = 5 deciduous teeth in each quadrant, yielding 5 D-teeth X 4 Quadrants = 20 deciduous teeth. A full complement of permanent human teeth is usually 32, namely in four quadrants of the mouth, from the center point there will be two incisors (2-I), one canine (1-C) two pre-molars (2-PM) and three molars (3-M)···[2-I, 1-C, 2-PM, 3-M = 8 per quadrant, X 4 = 32 teeth.]^{2,4,5}. Missing or extra teeth are frequently found in genetic disorders involving ectoderm⁶⁻⁸. Additional teeth are relatively common. The most frequent permanent extra teeth which grow are extra incisors followed by molars (usually a fourth molar or more), then premolars and lastly extra canines⁹. When extra teeth are simple conical shaped, they are called 'supernumerary', but when they resemble morphology in a regular dentition, they are called 'supplemental teeth'¹⁰. When the size or number of

teeth grow (collectively referred to as Tooth Material, TM) exceeds the oral space available and cannot accommodate the erupting crowns (the TM), the teeth become stuck in the bone and are referred to as "impactions in bone"¹⁵. Sometimes supplemental teeth are unusually impacted or disoriented, lying at an angle horizontally or totally inverted, this may affect other teeth in the arch too¹¹. Non-syndromic multiple supernumerary and supplemental teeth occur frequently in families and is influenced by inherited traits¹². Malformations of teeth exist when roots or crowns fuse, concrescence has one crown on one or more roots and gemination occurs when there are two or more distinguishable crowns on one root. Gemination is an autosomal sexually (female) linked dominant gene¹³.

This report records an unusual case of a man unaware of his condition, who presented clinically with multiple supplemental teeth (without any recognizable syndrome) and whose radiographs revealed multiple impactions and the full extent of his condition.

CLINICAL PRESENTATION

A 35 year old man of color presented at a dental clinic complaining of ill-defined tooth ache in his left upper jaw. He had never sought help from any medical health professionals as he never had any problems and enjoyed good health. His medical history revealed nothing unusual and there was no family history of any tooth related troubles. On examination supplemental premolars were noticed in position 35 and 45 as presented in Fig. 1-3. The case was referred for radiography and after the results it was revealed that 8 supplemental teeth were present as shown in Fig. 4a,b and 5.

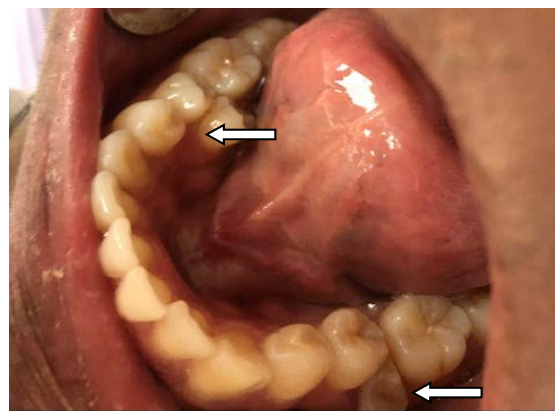


Fig. 1: Lower arch: Note supplemental crowns of premolar (arrows) in position #35 and #45

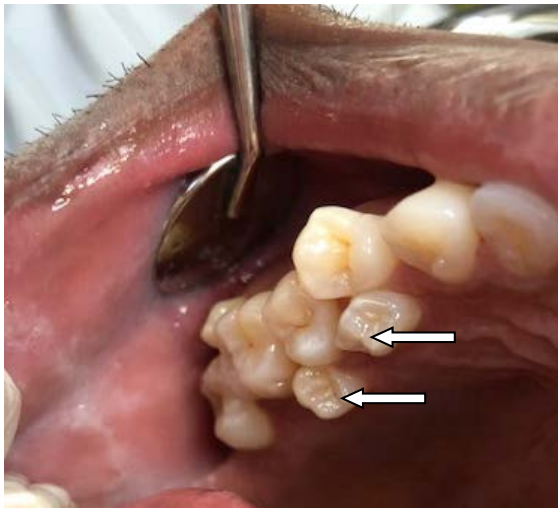


Fig. 2: Upper right maxilla: Note supplemental premolars in the palate opposite #14 and #15

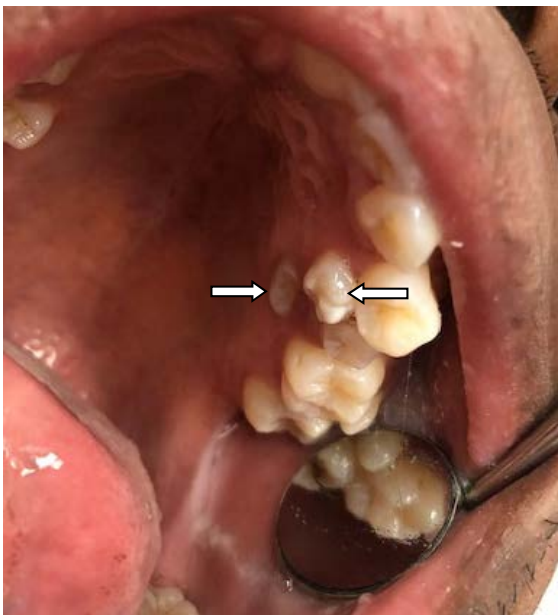


Fig. 3: Upper left maxilla: Note two supplemental premolar in the palate opposite #24. (arrows)

Note the supplemental premolars in front of the lower first molars. Also, the extra fully formed horizontal supplemental impacted premolar #35 on the lower left mandible. The lower third molars (teeth #38 and #48) are impacted. There is a molar tooth #18 and supplemental molar tooth #19 and as well an supplemental pre-molar #14 and supplemental pre-molar #15; there is a molar tooth #28 and a

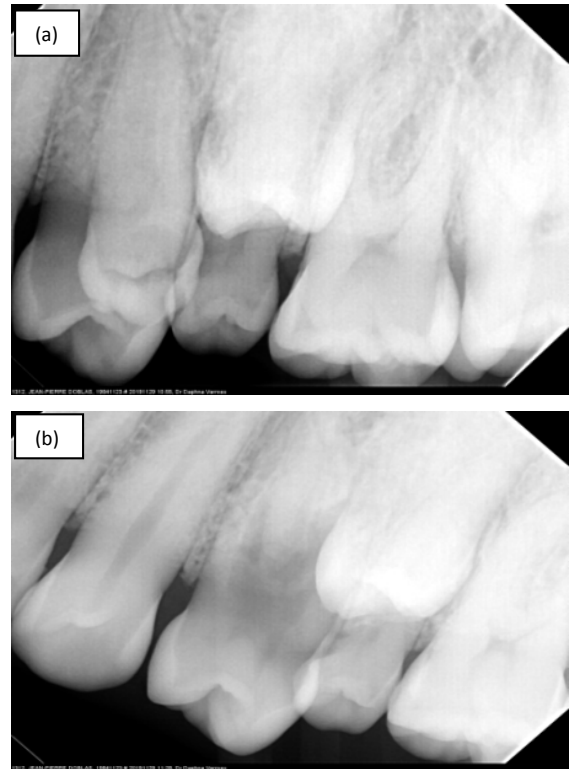


Fig. 4(a-b): Intra-oral radiographs, (a) Fully formed supplemental premolars and (b) Second supplemental premolar is not clear but discernible over the root of #24

supplemental molar #29 as well as 2 supplemental pre-molar teeth (an extra #24 and an extra #25). In total there were eight supplemental teeth.

DISCUSSION

The case described manifests typical features of polydactylism. The patient history illustrated that he had no other external malformation manifestations, other than extra eight supplemental teeth. A syndrome called "multiple embedded or impacted teeth (no syndrome)" has been described⁶. This has been ascribed to an autosomal dominant trait, (the transmission of non-syndromal multiple supernumerary teeth¹³⁻¹⁶. Therapy usually indicated removal of impacted teeth because of danger of jaw fractures (especially the mandible) odontogenic infections, development of follicular cysts and rarely odontogenic neoplasia⁶, with stable jaw function, excellent oral hygiene and no noticeable symptoms, regular clinical and radiographic monitoring for growth or radiographic changes is advised.



Fig. 5: A panorapase radiograph of the jaws

Lizards, many fish; sharks and dinosaurs are monomorphodont, that is they have same shape of all teeth. Also, sharks are polyphyodont, as they have succedaneous generations of tooth replacement when teeth are lost or shed as they age. Some pundits aver that humans have three sets of teeth: besides [1] Deciduous and [2] Permanent set, consideration needs to be focused on [3] Iatrogenic implant-prosthesis set.

In this case study, all the supplementary teeth were well developed, with identifiable crowns and roots and none showed any concrescence or germination. Every natural human tooth has a unique anatomy which allowed for identification of type and location where it was placed in the jaws. This feature is used extensively in paleodontology and archeology to interpret and classify evolution of mankind. This case had numerous supplemental teeth, no conical supernumeraries, but did show multiple impactions. Multiple supernumerary teeth are associated with cleidocranial dysplasia and Gardner syndrome. It is a rarity to encounter supernumeraries in people without some related pathology or other ectodermal disorder⁶. Among the most prevalent dental abnormalities (with increase or decrease in number of teeth) are people with genetic diseases affecting ectodermal structures like cleidocranial dysostosis (CCD), hypohidrotic ectodermal dysplasia, focal dermal hypoplasia, craniofacial dysostosis and Aperts syndrome. Most commonly supplemental impacted teeth are found in those suffering from cleidocranial dysostosis (CCD). This CCD is an autosomal dominant trait, characterized by uni or bilateral clavicle

hypoplasia, skull abnormalities (from delayed closure of fontanelles), enlarged cranium with frontal bossing, a broad flat nose, exophthalmos, compromised hearing and delayed eruption or multiple impactions of supplemental teeth^{6,7}.

CONCLUSION

Case report presented, clarifies what a supernumerary tooth is and differentiates between germination, concrescence and what a supplemental tooth is. Whenever an extra tooth is found on examination, many oral health care workers do not comprehend how to classify it; this understanding impacts on treatment. Therapy in this case was to resort to exodontias of the impacted molars and removal of the premolar-teeth outside the natural flow of the curves of the dental arches. This allows the residual erupted teeth within the arches to serve successfully as masticators. The lower left horizontally impacted premolar was not removed, will be monitored for any pathological changes and only be removed if symptomatic.

SIGNIFICANCE STATEMENT

The presented case report will assist researchers and oral health care workers to recognize and differentiate between supplemental teeth, supernumerary and impacted teeth. In the absence of other ectodermal or developmental anomalies, the final diagnosis was "Polydent: Multiple supplemental and impacted teeth (no syndrome)".

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