

## Macrodonia of an impacted upper second premolar: a case report of a previously unreported anomaly

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### Abstract:

**Introduction:** Isolated macrodonia of a second premolar is a very rare dental anomaly that has been described in the literature only in nine patients, but never in the upper jaw.

**Case presentation:** This case report presents for the first time the clinical, radiographic, and macroscopic findings of isolated macrodonia of the impacted maxillary permanent second premolar in a 12-year-old female of Caucasian ethnicity. The X-ray and CBCT examination revealed the presence of an impacted macrodonic second premolar and its distinct morphology characterized by large multitubercular molariform crown and two short conical roots. Orthodontic treatment was proposed; the second deciduous molar as well as macrodonic second premolar were surgically removed and space was orthodontically closed. The treatment was performed without any unexpected complications.

**Conclusion:** Premolars affected by macrodonia often exhibit the failure of eruption and cause disturbance of the developing occlusion. The tooth extraction is the only possible solution and it is recommended to extract macrodonic premolar before the development is completed. This case report demonstrates that isolated macrodonia of the second premolar is not limited to the mandible but may also occur in the maxilla.

**Keywords:** macrodonia, dental morphology, tooth development, tooth anomaly, radiography

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### I. Introduction

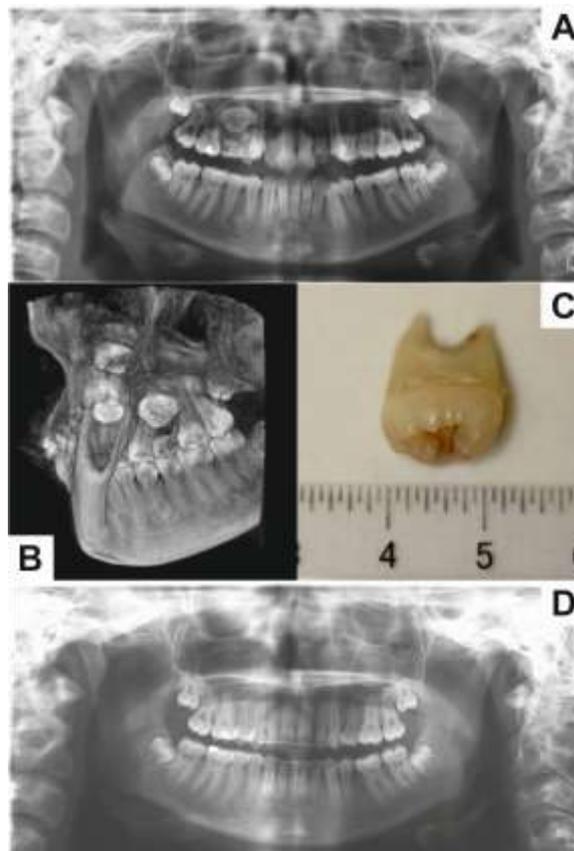
Macrodonia (also called megalodontism, megadontia or macrodontism) is a rare shape anomaly described as gigantism in teeth. It is often associated with systemic disorders or syndromes such as type I diabetes [1], otodental syndrome, facial hemihyperplasia, KBG syndrome, Ekman-Westborg-Julin syndrome [2] and 47 XYY syndrome. Isolated macrodonia occur only very rarely [3, 4, 5, 6]. The prevalence of permanent teeth with macrodonia is 0.03 to 1.9% [7, 8, 9], more frequently in men [8, 9]. Macrodonia can be divided into “true generalized”, “relatively generalized” and “isolated” form. In the true generalized form, all teeth in the dentition are larger than normal teeth and this condition is usually associated with pituitary gigantism [10].

Relatively generalized form of macrodonia is the state of normally sized or slightly larger teeth in small jaws [2]. The isolated form of macrodonia affects individual teeth and is very rare. It is described as a simple enlargement of dental mass [11, 12] and it may occasionally be associated with morphological abnormalities [5, 13]. This type of macrodonia is found more frequently in incisors and canines [14] and has only rarely been described in molars. It is extremely rare in premolars. The exact pathogenetic mechanism of isolated macrodonia still remains unknown [15]. Until now, scientific literature describes only nine cases of isolated macrodonia of second premolar. This case study presents a macrodonic maxillary permanent right second premolar (tooth #15) in the first time in the scientific literature.

### II. Case presentation

The 12-year-old female of Caucasian ethnicity was sent to the Division of Paediatric Dentistry because of the persistence of maxillary deciduous right second molar (tooth #55) and the retention of the right second premolar (tooth #15). Personal as well as family medical history was not significant. The patient's permanent dentition was almost completely erupted, only tooth #55 persisted and tooth #15 was unerupted. All erupted teeth were of normal size. A panoramic radiograph (Fig. 1) revealed abnormal size and shape of the tooth #15 characterized by gigantic multitubercular molariform crown. The CBCT was made to determine the exact position of the tooth, scans accurately displayed multitubercular enlarged crown of tooth 15, its significant palatal dislocation and two short conical roots (Fig. 1). The orthodontic treatment with fixed appliance in both jaws was proposed and extractions of teeth 55, 15, 24, 35 were planned. According to the recommendation of orthodontist the patient was referred for surgical removal of teeth #55 and #15 and subsequent orthodontic treatment, including space closure. CBCT helped to facilitate its surgical removal with minimal damage to adjacent teeth and anatomical structures. The tooth #15 was extracted surgically in one piece in local anaesthesia, without any unexpected complications (Fig. 1). The crown of the extracted tooth, measured with a digital

calliper, revealed mesiodistal dimension corresponding to 10.64 mm, vestibulooral dimension to be 13.11 mm and 15.42 mm in occlusoapical direction. The wound was sutured with resorbable material and standard postoperative care was undertaken. The articulation in Angle Class I was planned. The levelling of both dental arches was performed by using nickel titanium wires with increasing diameter (.012–.018). A space closure, aligning and a movement of teeth was performed by using more rigid .017x.025 steel wires. Planned anchorage was mild on the right side and middle on the left side. Orthodontic treatment was carried out from January 2012 to July 2014.



**Fig. 1:** Treatment of impacted upper second premolar with macrodontia. A - Panoramic radiograph before treatment showing impacted upper second premolar with macrodontia. B - CBCT scan shows the palatal dislocation of megalodontic tooth and its close anatomical relationship to surrounding structures. C - Extracted megalodontic tooth 15 – a molariform shape and multituberculism. D – Panoramic radiograph after the treatment

### III. Discussion

Isolated macrodontia of a second premolar is an extremely rare anomaly. To our knowledge, until now, only macrodontia of the mandibular not maxillary second premolar was described, either unilaterally [5, 6, 10] or bilaterally [3, 12, 15]. In all but one cases, this anomaly was observed in a patient between the age of 8 and 14 years, which corresponded to the time of eruption of second premolars. Premolars affected by macrodontia often exhibit the failure of eruption and cause disturbance of the developing occlusion [15, 3]. Multituberculism (Fig. 1) has been previously described in conjunction with macrodontia and other shaped anomalies affecting the whole dentition [15]. In accordance with this case report and previous publications, multituberculism has also been present in isolated macrodontia of premolars [3, 5, 6, 15]. The enlargement of the pulp cavity is present in this report as well as in most cases in literature describing teeth with macrodontia [15]. Due to the very similar morphology of macrodontic second premolar to molar, Dugmore even suggested using the term "macrodontic molariform premolars" [3]. The experience from previous similar cases shows that tooth extraction is the only possible solution and it is recommended to extract macrodontic premolar before the development of dental structures is completed [3, 5, 6].

#### **IV. Conclusion**

This case report demonstrates that isolated macrodonia of the second premolar is not limited to the mandible [3], but may also occur in the maxilla and the extraction of affected tooth seems to be the only solution.

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