An impacted central incisor due to supernumerary teeth: a multidisciplinary approach

ABSTRACT

Background Hyperdontia is a disorder of odontogenesis characterised by excess teeth. Many complications can be associated with supernumerary teeth, such as crowding, tooth displacement, diastema, deep caries, retention or impaction, delayed eruption or ectopic eruption of adjacent teeth, aesthetic problems, neuralgic manifestations, root resorption of adjacent teeth, and dentigerous cyst formation with significant bone destruction. Treatment of hyperdontia depends on the area and number of supernumerary teeth, and also on the presence of pathologic processes that can affect them and/or the teeth of the normal series that could be erupted, retained or impacted.

Case report The present case report describes the clinical management of two impacted supernumerary teeth, which impeded the eruption of the maxillary right central incisor in a paediatric patient. A multidisciplinary treatment approach was planned, including the surgical removal of the supernumerary teeth and the orthodontic correction of the unerupted permanent maxillary right central incisor. Combined surgical and orthodontic treatment resulted in an aesthetically pleasant and balanced occlusion. Thus, early multidisciplinary treatment is required for greater hard and soft tissue preservation.

Keywords Hyperdontia; Impacted teeth; Orthodontic treatment. Retained teeth; Surgery; Supernumerary teeth.

Introduction

Hyperdontia is a disorder of odontogenesis characterised by the formation of excess teeth [Capozzi et al., 1987]. Supernumerary teeth can be defined as “supplementary” if they closely resemble the teeth of the group to which they belong (molars, premolars or anterior teeth) and as “rudimentary” if they are teeth of abnormal shape and smaller size (conical, tuberculate and molariform teeth) [Batra et al., 2005; Garvey et al., 1999]. The scientific literature also classifies supernumerary teeth according to their intraoral position (mesiodens, paramolar, distomolar and parapremolar) [Mason and Rule, 1995].

The reported prevalence of supernumerary teeth ranges from 0.3% to 0.8% in the primary dentition, and from 0.1% to 3.8% in the permanent dentition, with a male to female ratio of 2:1 [Srivatsan and Aravindha Babu, 2007; Parolia et al., 2011].

The presence of supernumerary teeth in the primary dentition is generally overlooked by parents. In fact, supernumerary teeth in the deciduous dentition are often of normal shape (supplemental type), erupt normally, and appear to have a proper alignment. Approximately 80% to 90% of all supernumerary teeth are found in the maxilla; half of these are located in the anterior region [Russell and Folwarczna, 2003]. The most common supernumerary tooth is a mesiodens, which occurs between the maxillary central incisors. Mesiodens can occur individually or as multiples, and may appear unilaterally or bilaterally [Hyun et al., 2009]. Supernumerary teeth are often impacted (88.7%) and are often found in the palatal area. More rarely, they can be located in the superior distomolar, inferior premolar, superior premolar, inferior distomolar, superior canine, and inferior incisor zones [Grimanis et al., 1991; Hurlen and Humerfelt, 1992].

Although several theories have been postulated to explain their development (including atavism, tooth germ dichotomy, hyperactivity of the dental lamina, and genetic and environmental factors), the aetiology of supernumerary teeth is still uncertain [Liu, 1995; Primosch, 1981; Rajab and Hamdan, 2002; Saarenmaa, 1951; Wang and Fan, 2011]. Supernumerary teeth have been associated with a number of developmental disorders and syndromes, such as cleidocranial dysplasia, Gardner’s syndrome and lip and palatal fissures [Rajab and Hamdan, 2002; Stahl et al., 2006]. Multiple supernumerary teeth unrelated to any syndrome or systemic illness are very uncommon; in such cases, they are normally found in the inferior premolar area [Moore et al., 2002].

Many complications are associated with supernumeraries, such as crowding, tooth displacement, diastema, deep caries, retention or impaction, delayed eruption or ectopic eruption of adjacent teeth, aesthetic problems, neuralgic manifestations, root resorption of adjacent teeth and dentigerous cyst formation with significant bone destruction [Mittal and Sultan, 2010]. In particular, the presence of supernumerary teeth in the anterior area of
the maxilla may cause the delayed eruption or impaction of the central incisors [Mathias et al., 2011]. When any of the above complications occur, surgical removal of the supernumerary tooth is indicated.

The specific clinical findings that may indicate the presence of supernumerary teeth include: absence of permanent teeth in the maxillary arch with the persistence of the deciduous teeth, malposition of erupted permanent teeth, and presence of a wide interincisive diastema and swelling in the buccal or palatal/lingual area [Garvey et al., 1999; Inchingolo et al., 2010]. Treatment of hyperdontia depends on the area and on the number of excess teeth, and also on the presence of pathologic processes that affect the supernumerary teeth and/or the teeth of the normal series, which could be erupted, retained or impacted. A pre-operative evaluation is necessary. Any contiguity between the supernumerary tooth and important anatomic structures should be investigated, and the surgical procedure should be planned to preserve the surrounding hard and soft structures [Inchingolo et al., 2010].

The present case report describes the clinical management of two impacted supernumerary teeth, which impeded the eruption of the maxillary right central incisor.

Case report

An 8-year-old boy was referred to the Department of Paediatric Dentistry “Federico II” of the University of Naples, Italy, with the chief complaint of a missing maxillary right central incisor. According to the medical history, the child was physically healthy and had no history of dental trauma. Neither systemic disorders nor hereditary patterns of hyperdontia were reported in his family.

The intraoral examination showed absence of the permanent maxillary right central incisor, with no evidence of eruption (Fig. 1). Radiological investigations, including an orthopantomogram and a 3D computed tomography of the skull, were performed. The panoramic radiograph revealed the presence of an impacted maxillary right central incisor and two supernumerary teeth, which caused the inclusion of the tooth 11 (Fig. 2). The 3D computed tomography analysis revealed the positions of the impacted right upper central incisor and of the two supernumerary teeth (Fig. 3, 4). The eruption status of the other permanent teeth was normal.

The diagnosis of non-syndromic supernumerary teeth was made.

A multidisciplinary treatment approach was planned, including the surgical removal of the supernumerary teeth and the orthodontic correction of the unerupted permanent maxillary right central incisor. Prior to the surgical phase, the patient underwent expansion of the maxilla to promote the eruption of the impacted tooth and to treat the right side cross bite (Fig. 5). The transversal correction was performed by means of the
Quad Helix appliance, for the coincidental expansion and molar derotation. The advantages of the Quad Helix are the possibility to modify the arch shape and size with a low load/deflection ratio, thus avoiding application of a strong force that could potentially damage the periodontium and cause root resorption.

Regular follow-ups were scheduled to monitor the eruption of the permanent central incisor and the associated supernumerary teeth. One month later, the appearance of a supernumerary tooth cusp was detected, and the surgical treatment was planned (Fig. 5).

**Surgical extraction of the supernumerary teeth**

Under local anaesthesia, a muco-periosteal flap was raised on the palatal side. After careful elevation of the flap (Fig. 6), the supernumerary teeth were surgically removed with the preservation of the roots of adjacent teeth (Fig. 7). The extraction sockets were inspected for any pathological tissue (Fig. 8). The flap was repositioned and closed with 3-0 silk suture, which was removed after 1 week (Fig. 9). The impacted central incisor was left to erupt on its own.

**Surgical exposure of the permanent right central incisor**

The impacted permanent maxillary right central incisor was kept under observation to wait for its natural eruption; however, after 10 months, it was not clinically evident: a maxillary occlusal radiograph revealed that it was slightly impacted toward the left central incisor, and the amount of available space was reduced (Fig. 11). Therefore, orthodontic correction of the impaction was implemented.

Two-thirds of the crown of the permanent maxillary right central incisor were surgically exposed with a closed eruption technique. The raised flap, which included the attached gingiva, was fully repositioned in its former position and then a bracket was bonded to the labial surface of the impacted incisor (Fig. 12).

After surgical exposure of the permanent maxillary right central incisor, a Beta-Titanium .016x.022 cantilever was applied and activated with extrusive force on 1.1 (Fig. 13). The cantilever was inserted in 1.6-bonded tube and ligated to tooth N. 1.1.

On tooth N. 1.2, was placed a 180° rotated bracket to...
provide a buccal root torque to this tooth. Usually, the upper lateral incisor bracket provides 14° palatal root torque, and in this case, we inverted the bracket, providing -14° of root torque.

Once the correct intercuspation, a satisfactory overjet and overbite, and alignment of the upper anterior teeth were completed, the appliance was removed, and a lower canine-canine retainer was bonded. The upper arch retention was managed with a Hawley removable appliance, to be worn at night for 6 months (Fig. 14).

Conclusion

The presence of supernumerary teeth has the potential to disrupt the development of normal occlusion, and early diagnosis is crucial to minimise complications such as the development of dentigerous cysts, root resorption of adjacent teeth, and bone loss [Primosch, 1981; Kessler and Kraut, 1989]. Therefore, a timely intervention that aims to remove the supernumerary teeth is recommended, followed by an observation period until the eruption of the impacted permanent incisor in the oral cavity. If the impacted permanent incisor does not erupt spontaneously, orthodontic intervention is required to align the impacted tooth in the occlusal plane.

The treatment adopted consisted of surgical exposure of the crown, followed by orthodontic positioning of the tooth, instead of a restorative approach, which would entail extraction of the impacted upper central right incisor and restoration with a bridge or an implant at a later time. In the present case, the immediate removal of supernumerary teeth was not suitable, therefore we opted for the preliminary expansion of the maxilla to promote the eruption of the impacted teeth in the oral cavity. Several factors can have a significant impact on the failure of spontaneous eruption of impacted teeth, including a tuberculate form of the supernumerary tooth, early stages of root formation of this tooth, and space loss. Thus, under unfavourable conditions, an interdisciplinary approach with both surgical removal of the supernumerary teeth and orthodontic and surgical alignment of the impacted tooth may be the best choice. In the case reported, the combined surgical and orthodontic treatment resulted in aesthetically pleasant and balanced occlusion. Thus, early multidisciplinary treatment is required for greater hard and soft tissue preservation [Kalaskar and Kalaskar 2011].

References