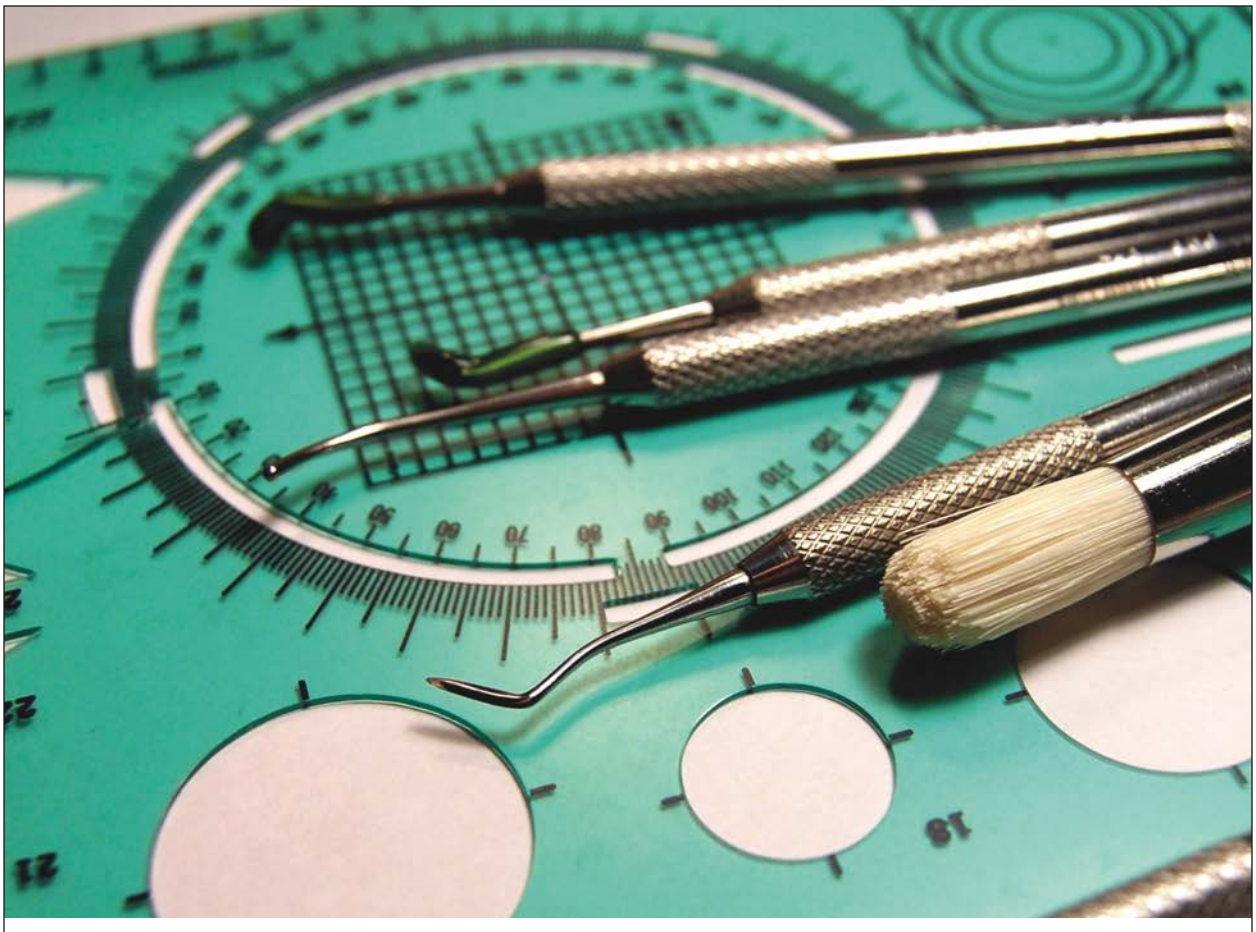

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Full Retarded Eruption of Permanent Dentition: Report of a Rare Case (8 Years Follow-up)

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ABSTRACT

Permanent tooth eruption occasionally fails due to local, systemic or idiopathic reasons. Full retardation of eruption is a very rare clinical finding and is challenging in terms of aetiology. This case report describes the clinical condition of a 13-year-old boy, where primary teeth were still present in the oral cavity. Surgical exposure was performed and the patient was followed up for 8 years, showing partial eruption of some teeth at a slow rate. The working diagnosis based on clinical and radiographical criteria is "idiopathic loss of eruption potential". Treatment plan is also discussed in this report.

Key words: Retarded eruption, full retardation, primary teeth maintenance, idiopathic failure of eruption

INTRODUCTION

Permanent tooth eruption is connected with the exfoliation of the deciduous predecessors and is defined as the movement of the tooth from the area of development within the alveolar process to its functional position in the oral cavity (Steedle and Proffit, 1984). A tooth can be characterized as impacted when it has not erupted one year after normal eruption time and is impossible to erupt according to clinical and radiological criteria (Thilander and Jacobsson, 1968) due to systemic or local findings. Idiopathic failure of eruption owes to lack of eruptive force or defects in the eruption mechanism, leading to primary or secondary retardation and is challenging in terms of etiology (Sivakumar *et al*., 2007). This case refers to a unique clinical situation where primary teeth in all quadrants were still present in the mouth of a 13-year old boy, failing to exfoliate despite the presence of their successors, which were located radiographically. Overall aim was to study this unique case and treat the patient appropriately according to his needs.

MATERIALS AND METHODS

Patient was examined. Skeletal development is characterized normal, medical history is clean and no systemic or genetic anomalies were detected after genetic evaluation (karyotyping). The patient grew normally, both physically and mentally, throughout childhood and adolescence and was a product of full-term pregnancy and uncomplicated delivery. No complication can be attributed to breast feeding practices (Matthew *et al*., 2009), as it took place only for a few days. No allergies, hospitalizations or severe illnesses and infections were noted while evaluation of

thyroid function, calcium, phosphorus, alkaline phosphatase (Asma *et al.*, 2008) and vitamin D levels revealed no endocrine or metabolic contribution to craniofacial growth. Check for cleidocranial dysplasia, which is connected to eruption failure, as well as hereditary oro-facial digital syndrome (Xavier *et al.*, 2011), or Crouzon syndrome (Pournima *et al.*, 2011), were negative. His three sibhings had no similar problem but it was mentioned that a distant relative of the patient had "small teeth", probably referring to preserved deciduous teeth that had not exfoliated, but, this could not be confirmed. It was also mentioned that primary teeth eruption was delayed.

Teeth 71 and 81 had been extracted before the first visit in our clinic, when the patient was 11 years old, but after almost 2 years there was no sign of permanent teeth eruption. Teeth 31 and 41 were surgically exposed in the oral cavity during the first visit in our clinic, under local anesthesia. The basic goal was to promote tooth eruption by removing the physical barrier of soft tissues and bone but at the same time maintaining the vertical dimensions of occlusion by teeth contacts. The bone removal was not aggressive in an attempt to preserve mandibular bone. After the surgical operation it was evident that these teeth were placed labially compared to their predecessors' position. Orthodontic-assisted eruption was not possible due to lack of teeth for anchorage, as only primary teeth were present. Moreover anchorage could not be supported by mini-implants as there was no ideal location for placement, because of possibility of hurting permanent tooth buds during insertion and due to lack of sufficient bone.

RESULTS

After 2 months teeth 31 and 41 had partially erupted into the oral cavity and teeth 16 and 26 erupted at the age of 14 years old, as seen at the cast (Fig. 1a). An image of slow or no eruption of

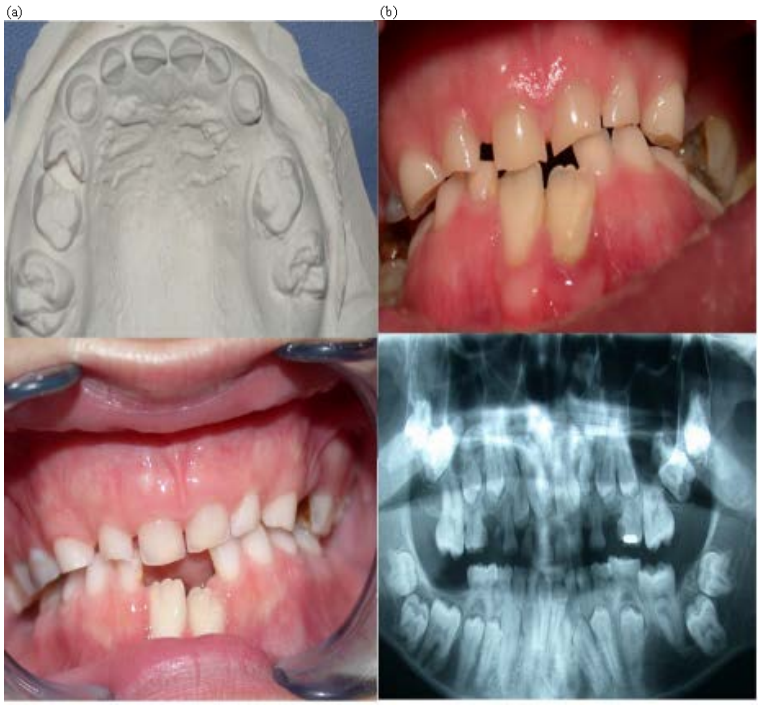

Fig. 1(a-b): Short clinical presentation of the case, (a) Eruption of teeth 16, 26 and 31, 41 as seen in casts and clinical photo respectively and (b) Clinical and radiographical examination after 8 years

any other teeth was noted still, after 4 years from the first visit. After 8 years few teeth were extracted or had deep carious lesions and tooth 36 had partially erupted. Teeth 31 and 41 had still not reached the occlusal plane (Fig. 1b). Teeth apices were fully formed and rest of the teeth remain impacted, as seen at the radiograph. At the area of tooth 54 an image of bone loss was noted, but there is still a bony bridge approximately 3 mm between 54 and his successor. The inclined position of 38 and 48 seems to act as an additional mechanical obstacle in the eruption process of teeth 37 and 47, respectively (Fig. 1b).

DISCUSSION

Very few similar cases are presented in the literature. Nodine (1935) and Quinn (1956) were the first authors to present such cases, but still no full retardation was noted until 1999 when O'Connell and Torske (1999) described a full retarded eruption of both deciduous and permanent dentitions.

When generation of eruptive force and pathway clearance fail to couple, teeth movement cannot keep pace with bone resorption indicating an idiopathic problem in the eruption mechanism (Steedle and Proffit, 1984; Ahmad *et al.*, 2006). Since each tooth has a "window of opportunity" for successful eruption, disregulations of the mechanisms during that period, could result in defective tooth eruption. In our case, this critical period does not seem to have passed, since permanent teeth have erupted after surgical intervention, at a slow rate. The working diagnosis, based on clinical and radiographical criteria is "idiopathic loss of eruption potential" which led to extreme retardation and eventually failure of eruption, demonstrating different rates of eruption between maxilla and mandible. A definitive diagnosis of primary failure of eruption could only be made retrospectively, following the possible failure of orthodontic movement (Frazier-Bowers *et al.*, 2010), which was impossible to our case as mentioned above. Molars also acted secondarily as mechanical obstacles. No real tendency for generalized ankylosis is noted, as concluded from the radiographic image, the spontaneous eruption of upper first molars and the eruption of teeth 31 and 41 after the surgical exposure. It is also remarkable that failure of eruption was not only present in the areas where primary dentition was succeeded by permanent teeth, but also in the areas of permanent molars, even though the phenomenon had subclinical appearance, as some of the molars were semi-erupted. Cases with no obvious etiology for retarded eruption, could be supported by research on the genetic level (Wise *et al.*, 2002). Specifically, mutations in parathyroid hormone receptor 1 (PTH1R) genes, which regulate calcium metabolism during early bone growth, explain several familial non syndromic cases of primary failure of eruption (Frazier-Bowers *et al.*, 2010).

After the experience of the successful surgical intervention in the area of teeth 31 and 41, a reasonable treatment plan is the removal of all deciduous teeth and the underlying bone in order to expose the retained permanent dentition. There lies however the question of the appropriate sequence of the extractions, the choice of one time operation or of separate extractions in a longer period and patient cooperation, as it was difficult to keep up with re-examinations. Until now, the patient is not complaining for functional or aesthetic disturbances. He is using his primary teeth as permanent to masticate and showed no signs of weight loss or other problems relevant to this handicap. He refuses to continue treatment despite the fact that he was informed about the consequences of long-standing impaction due to no therapy.

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