Early Eruption of third Molars

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ABSTRACT:

Early eruption of fully developed all four third molars is a rare incident. Tooth eruption is a complex and tightly regulated process that involves cells of the tooth organ and the surrounding alveolus. Any aberration in tooth eruption is of clinical significance and may be a consequence of an underlying local or systemic condition. Disturbances in tooth eruption (i.e., timing or sequence of eruption) may contribute to a chain of complications such as malocclusion, impaired oral hygiene, periodontal disease, and associated dental and orthodontic treatment needs. When the eruption process is disturbed, the clinician is presented with a situation that is challenging to diagnose and treat.

Key words: Tooth eruption, Early eruption, Third molar

INTRODUCTION

Dental eruption is the gradual movement of a tooth from its formative position in the osseous crypt through alveolar bone and into functional occlusion in the oral cavity. Although many theories have been presented, specific mechanisms that are responsible for tooth eruption remain largely unknown. Tooth eruption is a complex and tightly regulated process that involves cells of the tooth organ and the surrounding alveolus. Mononuclear cells (osteoclast precursors) must be recruited into the dental follicle prior to the onset of eruption. These cells, in turn, fuse to form osteoclasts that resorb alveolar bone, forming an eruption pathway for the tooth to exit its bony crypt. Several factors ranging from molecular signaling to osteoclastic activity, root development, nutrition, and hormonal influences have been implicated.

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disease, and associated dental and orthodontic treatment needs. The report is a rare case of early eruption of fully developed all four third molars in an Indian child.

Case report

A 15 years and 6 months old girl child reported to the Department of Pedodontics and Preventive Dentistry Maratha Mandal’s NGH Institute of Dental Sciences & Research Centre, Belgaum, with the chief complaint of sensitivity in the lower left back teeth since one month. On intra oral examination it was found that the girl had all the permanent teeth with third molars also erupted and reached the occlusal plane. All the teeth were hypoplastic. There were cusp fractures of 13, 15, 23, 26, 36, 44, 46. [Fig. 1, 2 & 3]

The girl was 5ft 1inch in height and weighed 42 kgs. Adequate history of early eruption in the family could not be obtained as the girl was abandoned by her parents and she was brought up in a remand home. Date of birth was confirmed from the documents and was found to be true. Series of investigations were done which included radiographs (Panoramic radiograph, Hand wrist radiograph and Cephalograph) and Blood investigations.

- Panoramic radiograph [Figure 4] was advised to evaluate status of third molars which showed nearly completed roots of all four erupted third molars indicating a dental age of approximately 21 years.
- Hand wrist radiograph and Cephalograph [Fig. 5 & 6] were advised to assess the skeletal maturation status and both the radiographs showed completed skeletal maturity.
- Blood Investigations- Details are shown in [Table 1]

<table>
<thead>
<tr>
<th>TABLE I: BLOOD INVESTIGATIONS</th>
<th>Patient values</th>
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</thead>
<tbody>
<tr>
<td>Tri-iodothyronine (T3)*</td>
<td>160.08 ng/ml</td>
</tr>
<tr>
<td>Thyroxine (T4)*</td>
<td>6.53 μg/dl</td>
</tr>
<tr>
<td>Thyroid stimulating hormone (TSH)*</td>
<td>2.90 μIu/ml</td>
</tr>
<tr>
<td>Prolactin (PRL)*</td>
<td>13.4 ng/ml</td>
</tr>
<tr>
<td>Testosterone**</td>
<td>0.696 ng/ml</td>
</tr>
</tbody>
</table>

* Tests performed on Alpha Lite Fully automated chemiluminescence immunoassay system.
** Method: ELISA, Kit used: EQUIPARsrl, Italy 74010A

Discussion: Both genetic and environmental factors acting during odontogenesis influence the tooth eruption process. The chronology of the eruption of the primary teeth is thought to be more extensively genetically determined than that of the permanent dentition. On the other hand, the environment, pre-natal and maternal factors, diseases (hyperpituitarism affecting somatotrophic hormone, hyperthyroidism and hypergonadism), nutrition, socio-economic status, climate, etc. may influence the timing of permanent tooth eruption.

An association between birth weight and advanced tooth eruption has been suggested, in that heavier children at birth have significantly earlier permanent tooth eruption. Children who receive a higher vitamin D dose in the neonatal period have a more mature permanent dentition. It has also been suggested that climate may affect dental maturation, as populations living in tropical climates are found to be dentally more advanced. Engstrom conducted a study to analyse development of lower third molar and whether it could be correlated to skeletal maturity. A strong correlation was found between 3rd molar development and skeletal maturity.

Several factors influencing the timing of third molar eruption have been identified. These include racial factors, nature of diet, extent of generalized tooth attrition, degree of use of the masticatory apparatus, and genetic inheritance. Times of eruption of third molars were studied in rural
Nigerian adolescents-125 males and 133 females. Results of this study showed that the average age for the initial eruption of third molars was 15 years in male subjects and 13 years for female subjects. The incidence of eruption showed a steep rise after the age of 16 years for male subjects and 14 years for female subjects. By the age of 19 years, all third molars had erupted into the oral cavity. The eruption of lower third molars was generally ahead of the upper third molars for all age groups. The results of this study suggest that (1) the timing of third molar eruption is strongly influenced by the availability of mandibular trigone space, (2) the attrition and shrinkage of the dental arch, probably as the result of non-refined highly fibrous diets, produce larger mandibular trigone spaces, and (3) early eruption of third molars observed may be due to the nature of the diet used and the vigorous employment of the masticatory apparatus (from infancy) by the subjects examined.9 It has also been postulated that third molars tend to erupt early if space for them is available and obstruction is minimal. For example, in male and female adolescent high school and college students with complete dentition, examined in Boston, the median age at which the maxillary third molar pierced the gingiva was 20.5 years. When at least one extraction had previously been performed, the median age of eruption became 19.2 years for both sexes. In the mandible, a still greater effect of extraction was observed.10

Blood investigations done for the estimation of relevant hormonal levels [table 1] were within the normal limits ruling out the endocrinal cause for early eruption. The cause of early eruption of third molars in this case could be availability of space for eruption, relatively course diet consumption since birth, and possible familial influence.

Tooth eruption appears to be a programmed, localized event whereby a given tooth erupts at its appointed time. The molecules that initiate eruption, their localization, and their regulation of the cellular events of eruption—all must fit within the context that each tooth erupts independently. In other words, tooth eruption is a localized event rather than a systemic one. When the eruption process is disturbed, the clinician is presented with a situation that is challenging to diagnose and treat. The prospect of better control over the eruptive process and improving the overall health of dentition is an obvious reason to advance in this area of oral biology.11

REFERENCES

Figure 1: Facial Profile of the patient.

Figure 2: Mirror view of maxilla showing erupted 18 and 28.

Figure 3: Mirror view of maxilla showing erupted 38 and 48.

Figure 4: Panoramic radiograph showing third molars with nearly completed roots of all four erupted third molars.

Figure 5: Hand wrist radiograph showing completed skeletal maturity.

Figure 6: Cephalograph showing third molars erupted and reached the occlusal plane and completed skeletal maturity.