A CLASSICAL CASE REPORT OF OEHLERS' TYPE IIIA DENS INVAGINATUS

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ABSTRACT

Dens invaginatus is a developmental anomaly that arises from invagination of enamel organ into dental papilla during bell stage. The invagination begins at the crown and extends into root before its mineralization. Most common tooth affected by dens invaginatus is maxillary lateral incisors followed by maxillary central incisor, maxillary canine, mandibular lateral incisors, mandibular canine and mandibular central incisor. A classical case of Oehlers' type IIIA dens invanigatus is presented here.

Keywords: *Dental anomalies, Dens invaginatus, Dens in dente, dilated composite odontome.*

INTRODUCTION

Dens invaginatus is a developmental anomaly that arises from invagination of enamel organ into dental papilla during bell stage[1]. The invagination begins at the crown and extends into root before its mineralization[2]**.** Dens invaginatus have several synonyms like dens in dente, dentinoid in dente or telescopic tooth, pregnant woman anomaly[3], deep foramen caecum, tooth inclusion and tooth within tooth[2]. Hallett introduced the term dens invaginatus in 1953[4]**.** Hunter coined the term 'dilated composite odontome' to describe this anomaly due to abnormal dilatation of the dental papilla[5] however Colby called it gestant anomaly[5]. This type of tooth anomaly was first reported by Ploquet in 1794 who discovered this malformation in a whale's tooth. In a human tooth it was first described by a dentist named Socrates in 1856[6]**.** Exact etiology of dens invaginatus is still in dillema and over the last decades several theories have been proposed. A Alani, K Bishop concluded that dens invaginatus is due to a focal group of cells or proliferation and in growth of cells of the enamel organ into the dental papilla during development and exertion of an external forces on the tooth germ or forces from adjacent tooth germs, infection processes and trauma[5]**.** Some evidence suggests that familial and hereditary components are important for its occurance[7]. Recent hypothesis suggested that it occurs due to degeneration of dental lamina which leads to fusion, gemination or agenesis[8].The incidence of dens invaginatus varies from 0.04% to 10.00%.[9] The deciduous teeth are rarely affected but frequently seen permanent dentition[10,11]. The dens invaginatus most commonly affects maxillary lateral incisors followed by maxillary central incisor, maxillary canine, mandibular lateral incisors, mandibular canine and mandibular central incisor[12]. Conklin reported a case of dens in dente in mandibular incisors[13]. Radiographically it appears as a radiopaque invagination equal in density to enamel extending from the cingulum into the root canal. Oehlers' classification's system is most popular and valuable from a clinical perspective. He categorized invaginations into three classes depending upon how far they extend radiographically into the crown and the root[14].Type I: The invagination is minimal and enamel-lined and confined within the crown and does not extend beyond the level of the external cementoenamel junction. Type II: The invagination is enamel-lined and extends into the pulp chamber but remains within the root canal without any communication with the periodontal ligament. Type III: the invagination extends throughout the root upto the apical foramen and communicates with the periodontal ligament. Usually there is no communication with the pulp.

CASE REPORT

A 26 year old male patient complaining of pain and swelling in right upper anterior region of palate since 2 month. The patient has noticed a small soft swelling of .5x.5 cm 2 months back involving palate in right maxillary central incisor and lateral incisor region. The swelling was progressively increasing in size up to present size. There was occasional pain associated with swelling and there was occasional pus discharge from periodontal pocket of right maxillary lateral incisor. The patient complaint of bad taste and halitosis after the pus discharge. There was no significant medical and dental history. None of his family member is affected with this condition. There was no associated syndrome features noted. On extra-oral examination no significant finding noted. On intra-oral examination (fig.1) a swelling of 1x1cm noted involving palate in right maxillary central incisor and lateral incisor region. The shape of lateral incisor was abnormal so called 'peg lateral'. The right maxillary canine was ectopically erupted and rest of dentition

was normal. The overlying mucosa over swelling was normal. On palpation swelling was found to be soft, tender and slightly fluctuant. There was no localized increase in temperature however swelling was painful. There was no associated bleeding but sometimes pus discharge noted. There was no cortical expansion and associated dysfunction. The electrical Vitality test for right maxillary central incisor and lateral incisor was positive. There was no significant lymphadenopathy noted. On the basis of clinical findings a provisional diagnosis of chronic periapical abscess has been made. The patient is further advised for radiographic investigations including IOPA, maxillary anterior occlusal radiograph and panoramic radiography. The IOPA shows (fig.2) a well-defined round radiolucency of 1x1 cm having irregular margin in relation to right maxillay lateral incisor with Oehlers' type IIIA dens invaginatus. The pulp canal with an adjacent invagination is opening into periodontal ligament space causing a periapical radiolucency. The maxillary anterior occlusal view (fig.3) showing right maxillary lateral incisor with Oehlers Type IIIA dens invaginatus causing a periapical radiolucency. The panoramic radiograph (fig.4) showing well defined radiolucency with oehlers' Type IIIA dens invaginatus involving right maxillary lateral incisor superimposing on roots of right maxillary central incisor and right maxillary canine. The differential diagnosis includes periapical granuloma, infected periapical cyst, dens evaginatus, dentoid in dente. The radiographic features and clinical findings was highly suggestive of a final diagnosis of Oehlers' Type IIIA dens invaginatus. Since the patient is advised for root canal treatment he is referred to endodontic department for further management. But patient has denied the treatment and opted for extraction of right maxillary lateral incisor. The routine blood investigation is advised and found to be within normal limits finally right maxillary lateral incisor is extracted under local anesthesia (Fig.5).

Fig. 1: Intraoral photograph of patient showing peg shaped right maxillary lateral incisor tooth with swelling involving anterior palatal region.

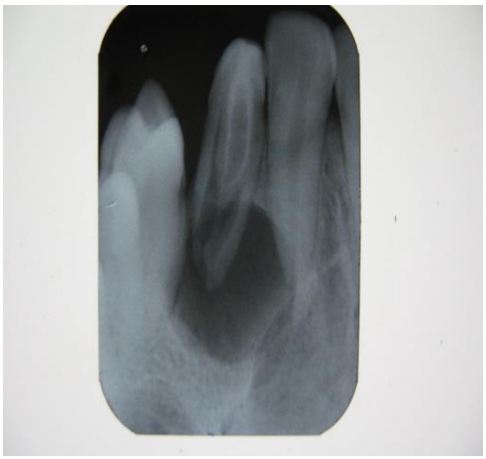

Fig. 2: Intraoral periapical radiograph of right maxillary lateral incisor with oehlers' Type IIIA. The pulp canal with an adjacent invagination is opening into periodontal ligament space causing a periapical radiolucency.

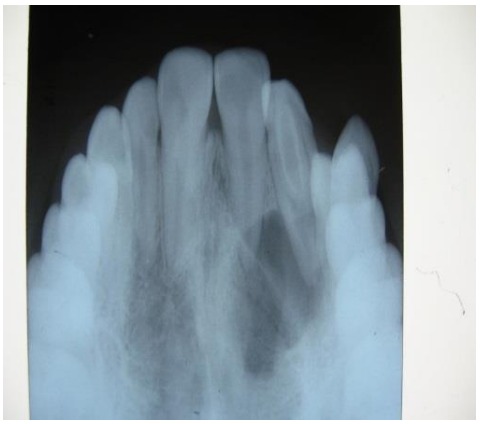

Fig. 3: Maxillary Anterior Occlusal Radiograph showing right maxillary lateral incisor with oehlers' Type IIIA causing a periapical radiolucency.

Fig. 4: Panoramic Radigraph showing right maxillary lateral incisor with oehlers' Type IIIA causing a periapical radiolucency superimposing on roots of right maxillary central incisor and right maxillary canine.

Fig. 5: Extracted peg shaped right maxillary lateral incisor

DISCUSSION

Dens invaginatus is a developmental anomaly that arises from invagination of enamel organ into dental papilla during bell stage[1]. The invagination begins at the crown and extends into root before its mineralization[2]. Recent hypothesis suggested that it occurs due to degeneration of dental lamina which leads to fusion, gemination or agenesis[8]. The incidence of dens invaginatus varies from 0.04% to 10.00%.[9] Kronfeld hypothesized that when these teeth erupt the invagination will contain remnants of the dental papilla or periodontal connective tissue. These tissues become necrotic and provide a nutrient-rich environment for oral bacterias. In mild forms, the invagination may be tear-shaped surrounded by mineralized dental tissue while severe cases are characterized by presence of a fissure that makes communication with the periodontal ligament[5]. Bhaskar classified dens invaginatus in two types – Coronal type and Radicular type[12].Worth has described two types of dens in dente: first is root dilation resembling an open umbrella and second is fleur-de-lys which resembles the French emblem[15]. According to Kramer defective structure of enamel layer were restricted to the invagination with the intact dentine but dentine is exposed and due to absence of enamel in these areas bacterial contamination of the dentine tubules provide a direct portal for pulpal infection[16].

Dens invaginatous is not a common clinical finding thus is easily overlooked until any significant sign and symptom develops. Maxillary lateral incisors are most susceptible to coronal invaginations. The maxillary lateral incisors with a deep pit at the foramen coecum should be investigated thoroughly clinically and radiographically[6]. The first clinical sign may be deep palatal groove associated with dens invaginatous[1]. Genetic and syndromic association of dens invaginatous has always been debated due to absence of clinical evidence[8]. Mann et al found that dens invaginatus was variant of Ekmann Westborg-Julin syndrome with other associated symptoms like macrodontia, multituberculism, central cusp and pulpal invagination. The patient with craniofacial abnormalities and developmental delay presented with numerous clinically and radiologically dental anomalies including dens invaginatous[10]. Dens invaginatus is diagnosed as an incidental radiographic finding and radiographic examination is a valuable way of diagnosis along with clinical examination[17]. Today dens invaginatus malformation has been a subject of interest due to greater understanding of the problem and an increased number of screenings. Several treatment techniques have been described in literature. Some authors have recommended nonsurgical treatments however some described surgical approach like the periodontal surgery case reports[18] intentional reimplantation[19] and removal of the invaginated portion[20]. Ingle suggested dens invaginatous teeth can be successfully treated endodontically including retro-filling but because of aberrant anatomy endodontic treatment may be quite difficult[21]. However early clinical or radiographic diagnosis of invagination without signs of pulp pathology, fissure sealing and restorations are very effective[22]. Generally Type I and Type II of dens invaginatus do not pose any problem during treatment because invagination does not reach up to the apical region of canal and restricts to the interior of the canal[23] however in type III dens invaginatus nonsurgical endodontic treatment is difficult because invagination may reach the root apex of the tooth. Surgical removal of teeth in type III dens invaginatus is highly recommended[24].

CONCLUSION

Whenever there is developmental tooth malformation in maxillary and mandibular anterior teeth they should be investigated thoroughly clinically and radiographically to rule out dens invaginatus particularly when they are associated with a deep pit at the foramen coecum.

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