



## EXPEDIENCY OF CONE BEAM COMPUTED TOMOGRAPHY (CBCT) IN 13 YEAR OLD BOY FOR DIAGNOSIS AND TREATMENT OF COMPOUND ODONTOMA IN THE MAXILLARY ARCH

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### Abstract

Background: Odontoma are benign tumours of odontogenic origin combining mesenchymal and epithelial dental elements that give rise to ameloblasts and odontoblasts. In recent years, cone beam computed tomography (CBCT) has been used in the diagnosis and treatment planning of this condition.

Case report: A compound odontoma in a 13 year old male, associated with an erupted permanent Canine is described, focusing on the diagnosis and treatment of this lesion. CBCT was performed and enabled the visualization of a radiopaque image compatible with an odontoma, the patient underwent surgical excision of the lesion and 12 month follow up was taken.

Conclusion: CBCT is a vital auxiliary tool, aiding in both accurate diagnosis and precise treatment planning. It is currently a technology accessible to most paediatric dentists and should be beneficial considering the diagnostic information provided as well as the cost-benefit ratio for the patient.

**Keywords:** CBCT, treatment planning, Pediatric dentistry, odontoma

### INTRODUCTION

Developmental dental anomalies are a vital category of dental symptomatology. Their occurrence and level of expression in various resident groups can provide significant information for phylogenic and genetic studies and assist the grasping of variations within and between the diverse populations<sup>1</sup>.

Odontomas, benign odontogenic tumours that develop in the jaw, seldom erupt into the oral cavity<sup>2</sup>. Paul Broca had introduced the 'Odontoma' term in 1867. It is considered as the developmental anomalies resulting from the growth of completely differentiated epithelium and mesenchymal cells that give rise to ameloblast and odontoblast<sup>3</sup>. These tumours are made up of enamel and dentin but they can also have inconsistent amount of pulp tissue<sup>4,5</sup>. One of the important features of this tumour is that they are hamartomas. This type of biological behaviour may be expansible and is locally resorptive of bone. Because of this type of behavior, it may cause impaction of tooth. Impaction of anterior deciduous tooth is rare and most commonly associated by two reasons. 1. Supernumerary tooth and 2. Odontoma<sup>6,7</sup>. The impaction of maxillary canine by odontoma is the most commonly seen more than mandibular and maxillary incisors.

The diagnosis of odontoma is made by radiographic examination, followed by surgical excision and histopathological assessment under microscope<sup>8</sup>. Treatment of odontoma usually consists of surgical enucleation because

it is easy to perform as this tumour is generally attached to bone by connective tissue only. The reoccurrence rates of these tumours are also unusual<sup>9</sup>.

### CASE REPORT:

A thirteen -year-old boy came to The Department of Pedodontics and Preventive Dentistry of Karnavati School of Dentistry with the chief complain of swelling in upper left anterior region. The medical and dental histories were unremarkable. Oral examination revealed a permanent dentition. The vestibular fornix in the area of the upper left canine had an asymptomatic expansion of the buccal plate Figure 1.



Figure 1 oval shaped hard swelling was present in the labial sulcus of left maxilla distal to canine. On radiographic examination, (intraoral Periapical and panoramic radiograph) indicated a radiopaque mass, located distally to the root of the upper permanent left canine Figure 2.

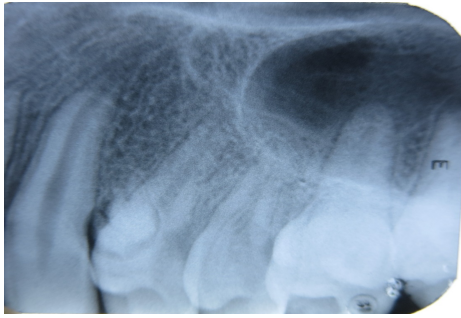


Figure 2 IOPA shows calcified mass in relation to upper left first premolar

It was not possible to determine from radiograph whether the odontoma was totally surrounded by connective tissue or fused to the root surface of the canine. So in this case one of the most advanced diagnostic methods was used, known as CBCT (cone beam computed tomography). It confirmed a bizarre view of the lesion in all three axes that revealed the presence of an odontoma-like lesion Distobuccally to the root of the upper left permanent canine region Figure 3a, 3b.

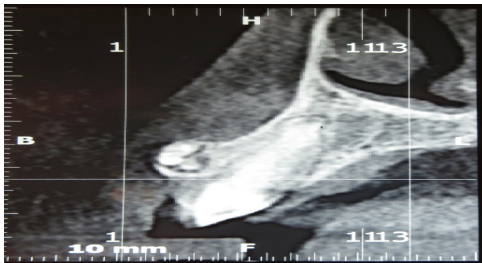


Figure 3a CBCT of axial cut showing presence of odontoma

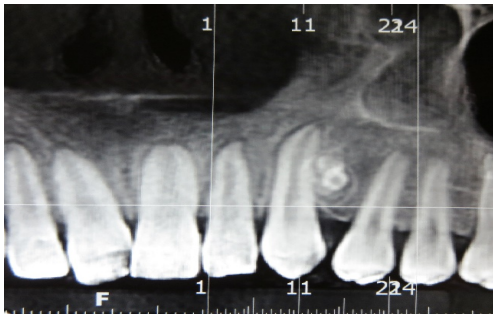


Figure 3b CBCT shows precise location and size of odontome

In that way a precise surgical planning was accomplished. Surgical removal of the odontoma was planned under local anaesthesia without any premedication. A mucoperiosteal flap on the buccal surface to the left canine was reflected and the layer of bone overlying the lesion



Figure 4 a Layer of bone overlying the lesion



Figure 4b. After removal of the overlying bone Figure 4a was removed Figure 4b and three calcified small structures looking like teeth were found in it Figure 5a, 5b which was anticipated from the CBCT.

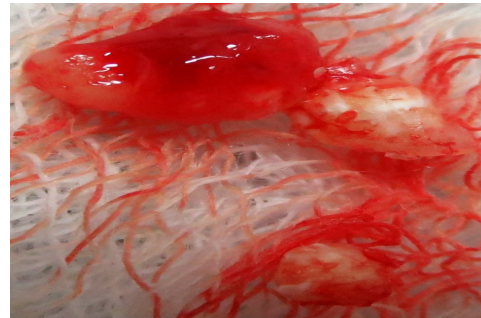


Figure 5a Calcified small structures



Figure 5b Complete removal of all the calcified structures

A bone graft was put in to the bone defect, flap was closed and sutures were taken Figure 6.





Figure 6 Flap closed and sutures were taken

The surgery was performed by a Pediatric Dentist and specimen was sent for histopathological investigation. The patient's behaviour during the procedure was classified as definitely positive, according to Frankl Behaviour Rating Scale. Postoperative oral and written instructions specifically related to the maintenance of an appropriate oral hygiene, ingestion of cold and soft meals, refraining from physical exercise during 48 hours, and management of pain were given to the patient's mother.

Microscopically, Hematoxyline and Eosin stained section shows a mass of dentin surrounding a soft tissue, resembling pulp, consisting of odontoblast in the periphery. Some areas show globules of dentinoid and cementoid like material and enamel matrix. Odontogenic epithelium with ameloblast like cells are also seen Figure 7a, 7b. This is compatible with compound-composite odontoma

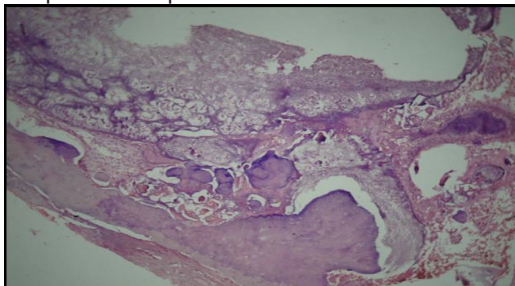


Figure 7a Hematoxyline and Eosin stained section 10X.

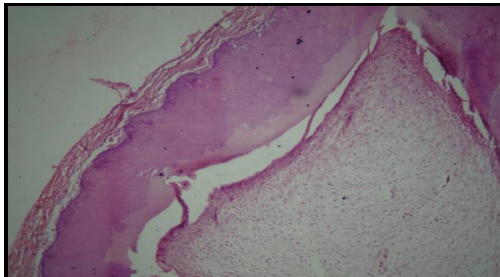


Figure 7b Hematoxyline and Eosin stained section 40X.

Follow up was taken at regular interval, 3 months, 6 months and One year after the surgery. It was confirmed that the operated site was showing normal bone pattern and that

there was no recurrence of the lesion Figure 8a, 8b.



Figure 8a Intra oral photograph at 6 months follow up



Figure 8b IOPA at 6 months follow up

#### DISCUSSION:

A special entity of the hamartomas known as odontomas, are the most common type of odontogenic tumours comprising 22% of the entire tumours in jaw<sup>10,11,12</sup>. According to the term they demonstrate dysmorphic proliferation of cells native to the organ from which they origin. They show expansile behaviour and are able to cause local bone resorption. The aetiology of odontoma is mysterious, but a certain pathological conditions like trauma, various infections, genetic abnormalities like gardeners syndrome, Hermanns syndrome are responsible factors. In addition it is attributed to odontoblastic activity and amendment in the genetic component accountable for controlling dental development<sup>13</sup>. They often lead to impaction or else deferred eruption of permanent tooth.

In 2005 WHO classified these tumours into two types, the compound odontoma and the complex odontoma. The former type shows the similar anatomic structures like tooth but the later shows lopsided dental tissue mass in disorderedly arranged pattern. The occurrence ratio between compound and complex odontomas is 2:1<sup>14</sup>.

The locations of these odontogenic tumours in the dental arches can be variable. The compound odontomas are most often located in the anterior region of maxilla whereas the complex varieties are located in the posterior region in particular in mandible<sup>15</sup>. Routine radiography may possibly diagnose the developing odontoma but it many times causes difficulties due to lack of calcification.

Radiographically complex odontoma shows unequal mass of calcified material enclosed by thin radiolucent region with smooth peripheral area. Whereas compound odontoma resembles calcified tooth like structure in the core of well definite radiolucent lesion. Periodontal/pericoronal space characteristic of unerupted teeth is seen around the region of each lesion <sup>16</sup>. In compound composite odontoma, the unerupted teeth are seen most commonly associated rather than in complex varieties. Also, large odontomas shows local disturbances like eruption delay, of succedaneous teeth and cystic lesion development such as dentigerous cyst <sup>17</sup>. Rarely may they cause soft tissue destructions in which they develop outer surface of alveolar bone and possibly will exfoliate or erupt <sup>14</sup>.

Treatment of any odontoma begins with the defined diagnosis. In recent years, there are lots of improvements in imaging diagnostic methods. With the advancing technologies, Cone Beam Computed Tomography (CBCT) is now available for use in dentistry. It is more precise and accurate diagnostic method compared with conventional radiography and it also provides complementary information <sup>18</sup>. CBCT overcomes the difficulties and limitations of conventional radiography because of the presentation of its 3D image. Although lots of advantages of this technology, CBCT is not routinely recommended in Pediatric dentistry due to high cost and much more radiation exposure than conventional radiography <sup>19,20,21</sup>.

The case described in this report were provisionally diagnosed as compound odontoma since the radiographic examination of the lesions showed a variable number of calcified interior structures resembled small teeth. Further this was diagnosed by cone beam computed topography which was later confirmed by histological examination of the lesions after their surgical removal.

In this case the important sign seen was swelling, distal to the mid root of maxillary canine with unaffected permanent dentition which was not associated with any impacted tooth. The additional diagnostic tool used in this case is CBCT scan. It gave the authentic position and size of the tumour which was not identified by the conventional radiograph. The treatment comprised of surgical removal of the associated odontoma followed by placement of a perio bone graft. This was requisite to aid in the necessary bone support which meant to overcome the lost cortical bone which otherwise was occupied by the odontoma.

Perio graft is the dental bone grafting material of choice for clinicians around the world because of its ability to predictably regenerate bone for patients and its ease of use to the clinicians including, periodontists and oral surgeons.

Periograft has been used for over a decade in almost all bone grafting surgeries that involve oral / dental / perioral osseous defects. The patient does not require any secondary orthodontic therapy as it is not impinging on the permanent dentition nor any impaction. The patient was kept on the follow up basis for evaluating the rejoinder of the bony tissues to the bone graft and also to verify for the recurrence which is otherwise not so common with cases of odontoma.

The patient showed success to the graft when studied by the radiographic basis and also lead to a beautiful social smile. He was kept on 3 , 6 , 12 months which enhanced the success therapy. The bone pattern was obtained to be completely normal which without a bone graft would have taken a long time to reach to normal haversian pattern due to slow body responsiveness.

In a nutshell removal of the odontoma is successful when it is completely free and not impinging on the associated tissues and its success is further followed by adequate bone support. Lastly the role of CBCT in specific diagnosis of odontoma cannot be ruled out.

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