Surgical Removal of Compound Odontoma & Autotransplantation of the Associated Impacted Maxillary Canine: A case Report

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Abstract
Odontomas are the most common type of odontogenic tumors. They are asymptomatic and usually detected by routine radiography. Odontomas are frequently associated with unerupted teeth. This is a case report of 26 years old female attended Oral Surgery Department, Al-Karama Specialised Dental Centre with odontoma associated with impacted right maxillary canine. After surgical removal of odontoma, the impacted canine was transplanted successfully into the correct position of the jaw. The success of auto-transplantation depends on several factors: such as patient age, developmental stage of the transplanted tooth, type of tooth transplanted, surgical technique employed, and duration of time that the tooth being out of its socket.

Key words: Compound Odontoma, Impacted Canine, Auto-transplantation

Introduction
The term odontoma was introduced by Paul Broca in 1867. He defined it as “tumor formed by overgrowth of transitory or complete dental tissue” (Das et al. 2013) (Tejasvi & Babu 2011). Histologically, odontoma is a mixed odontogenic tumor consists of epithelial & mesenchymal cells that present as complete dental tissue differentiation (enamel, dentin, pulp and cementum) (Das et al. 2013). It is considered as the most common odontogenic tumors of the Jaws (Santosh et al. 2011), accounting for about 22% of odontogenic tumors of the jaw (Cuesta et al. 2003). Odontoma has been classified by WHO to two distinctive types: compound & complex (Hanemann et al. 2013). Compound odontoma composed of many tooth-like structures, whereas complex odontoma appear as irregular mass with no similarity even to rudimentary teeth (Prabhakar et al. 2012).

The etiology of odontoma is unknown, but local trauma, infection or mutant gene has been suggested as possible cause (Owens& Schuman 1997). It also might occur as part of a syndrome, like Gardner’s syndrome or Hermann’s syndrome. Remnants of lamina portions may play important factor in the etiology of compound odontoma (Vengal et al. 2007)

Odontoma is a symptomless lesion unless it erupts. It is usually detected by routine radiograph with frequent associating with unerupted teeth, mainly mandibular third molar followed by upper canine and upper central incisor. The prevalence of odontoma associated with impacted canine is 1.5 % (Malhotra et al. 2012).

Treatment options for cases of impacted teeth usually involve surgically aided orthodontic treatment, surgical uprighting, autotransplantation, and surgical removal. Surgically assisted orthodontic treatment involves surgical exposure of the impacted tooth, which can be performed either by closed technique or open technique. Closed technique involves attachment of the surgically exposed tooth with bonded bracket during the exposure time & then traction of tooth by gold chain. Whereas, open technique does not require attachment of bonded bracket at the time of surgical exposure (Miloro et al.2004). Auto-transplantation is another treatment option of impacted teeth. It means a traumatic surgical removal of the tooth from its impacted site to be re-implanted in its correct position (Patel et al. 2011). This case report presents the auto-transplantation of impacted maxillary associated with odontoma. The success of auto-transplantation process depends on several factors: like patient age, developmental stage of the transplanted tooth, type of transplanted tooth, surgical technique employed, and duration of time that the tooth being out of its socket (Kim et al. 2005).
Case Presentation

Twenty six years old female patient came to Conservative Department at Al-Karama Specialized center of dentistry complaining from caries in the upper posterior teeth. Intraoral examination showed a retained primary upper right canine. Radiographic examination revealed an impacted permanent canine with presence of irregular radiopaque mass preventing the eruption of impacted canine. Preoperative clinical picture showing retrusion of the primary canine in relation to lower canine.

Surgical access was obtained by reflection of a buccal mucoperiosteal flap from the upper right lateral incisor to the upper 1st premolar. After removal of bone by surgical hand piece and round coarse burs, the calcified masses were exposed. Small tooth like masses (5 pieces) were removed and sent for histopathological examination. The primary canine was extracted, the crown of the impacted canine was exposed and extracted by chisel and forceps, followed by curettage, debridement and irrigation with normal saline. The canine was re-implemented in the prepared socket of the primary canine with the absence of buccal bony...
support. The tooth was positioned out of occlusion. The wound was sutured by 3.0 silk suture. (Fig 2: G, H & I).

Fixation of tooth was performed by two stainless steel wires and composite. The labial wire extended from the left canine to the right 2nd premolar, while the palatal fixation wire extended from right lateral incisor to the right 1st premolar (Fig 2: J). The patient was discharged after giving the postoperative instruction with oral antibiotic (augumentin 1gm twice daily with flagyl 500mg 1x3 for five days). 3 weeks later the root canal treatment was performed after removal of palatal fixation wire (Fig4: C).

The buccal fixation wire was removed after 2 months. Followed by polishing and final restoration of the re-implanted canine with composite filling for the lingual side of the canine (Fig 3 A, B & C).

Follow up visits (3, 6, 12 months postoperatively) showed acceptable clinical healing with no signs of tooth mobility, ankylosis or gingival recession. There was no bleeding on probing with normal colour of tooth. Probing of the pocket showed 3 mm pocket depth (Fig4: A & B). There was no tenderness with tooth percussion. Periapical radiograph revealed new bone formation around the re-implanted canine (Fig 4 D). (On the 12th month visit the patient refused to take additional radiograph, because she was pregnant).

**Discussion**

Radiographic appearance of odontoma is almost always diagnostic (Prabhakar et al 2012), as in the presented case. The radiograph showed collection of small teeth. The possible differential diagnosis for compound odontome may include supernumerary tooth. On the contrary, complex odontoma, which appears as radiodense mass, may show wider range of differential diagnosis (Nelson & Thompson 2010).
Histopathological examination of the presented case showed fibrous connective tissues, irregular dentin and enamel formation with scattered odontogenic epithelium throughout the connective tissue stroma (Fig 3: D). According to Das et al & Cabov et al, treatment of choice for the odontoma is complete surgical removal with perfect curettage to the area in order to prevent complication like cystic changes. There’s no evidence of recurrence for that such lesion (Das et al 2013) (Cabov et al. 2005).

In the presented case, auto-transplantation was chosen as a treatment option for the impacted canine, because the patient was reluctant to wear orthodontic appliances. In addition, the presence of adequate space for transplantation within the arch, with reasonable chance of success for transplanted tooth and the possibility for atraumatic removal maintaining the viability of the periodontal ligaments(Kallu et al. 2005). Park et al believed that autotransplantation is a simplified and faster treatment option for patient with ectopically positioned teeth ( Park et al, 2010). The optimal treatment for ectopically positioned canines is surgical exposure and orthodontic treatment ( Bedoya & Park, 2009). However, there are cases of severe ectopic position of maxillary canines in which transplantation should be a considered treatment alternative (Arikan et al. 2008).

The procedure of transplantation in this case includes preparation of the recipient site with suitable primary closure of the gingiva around the donor tooth and placement of the transplanted tooth slightly below occlusal plane with fine adjustment and splinting the tooth with adjacent teeth by wire and composite adhesive for 2 months.

The literature shows 1-2 month range of fixation period for transplanted teeth (park et al 2010). Al-sarraj advised splinting the auto-transplanted canine to the adjacent teeth for 6 weeks (Al-sarraj 2009). Others recommend stabilization of the tooth for not more than 2 weeks (Patel et al 2010). Maximum duration of fixation was used with this case to insure maximum stabilization, as there was no bone support the transplanted tooth on the buccal area. This period of fixation requires cooperation from the patient, because the fixation wire may cause discomfort to the patient with the possibility of ulceration, food accumulation in addition to its effect on patient’s appearance.

The success of autotransplantation can be assessed using clinical and radiographical parameters during follow up time. The follow up period may range from 1 year (Al-Sarraj 2009) to 14.5 years (patel et al 2011). In the presented case there are 3 visits of follow up (3 months, 6 months and 12 months). The clinical examination during the follow up period showed reasonable outcome. This was manifested through healthy gingival and periodontal tissue and normal tooth appearance and mobility. In addition the patient was satisfied. The radiographic assessment after 6 months showed no sign of internal or external resorption, normal PDL space with new bone formation around the tooth. At the 12th month follow up visit the patient was in her 1st trimester of pregnancy. She refused to take radiograph.

Autotransplantation is not usually the first line of treatment for the patient with impacted canine. More preferable treatment options include orthodontics; extraction and implant placement or restorative bridges. Autotransplantation has the advantage over dental implant placement, as it induces bone formation, maintains proprioceptive function and a normal PDL and serve as shock absorber. In addition, the normal gingival contour is not problematic like implant & it less costly than dental implant. Fixed Restorative bridge has the disadvantage of being a destructive procedure because it needs preparation of abutment teeth (park et al 2010).

Accordingly, autotransplantation was a suitable option for treatment, especially with presence of odontoma and patient unwillingness to orthodontic treatment.

Conclusion
This case report presented with successful outcome for surgical management of compound odontoma with re-implantation of associated impacted upper canine. Impacted canine re-implantation is a suitable alternative treatment option for orthodontic treatment for patients refuse lengthy treatment procedures.

References
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