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Surgical and orthodontic treatment of impacted upper right lateral incisor

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ABSTRACT

This case report describes the successful interceptive treatment approach for young patients with complex odontoma and impacted permanent lateral incisors. The interceptive orthodontic treatment for impaction usually includes surgical excision of the odontoma, surgical exposing of lateral incisor and orthodontic traction of the tooth and space opening by summing of all nature spacing in the upper jaw with fixed appliance. If all kinds of interceptive treatments fail, the surgical intervention is an option by exposing the impacted tooth, then applying traction force to move the impacted tooth to the normal position. However, surgery is the only option in growing patients since, there is not still a chance for spontaneous eruption of the impacted tooth. In the present report, the patients presented to the orthodontic clinic with complaint of non-erupting right lateral incisor after the loss of deciduous teeth, with the eruption of lateral incisors on the contra lateral side. The treatment of this patient consisted of maxilla closing spaces to create space for permanent right lateral incisor.

علاج سن مطمورة بعد إزالة تشوهة عظمي وسحب السن

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الكلمات المفتاحية:

القواطع الجانبي المتأثر بالورم السني
قوة السحب
جهاز تقويم الاسنان

الملخص

يصف تقرير الحالة هذا نهج العلاج التقويمي التحفظي الناجح للمرضى صغار السن الذين يعانون من الأورام العضوية المعقدة والمتأثرين بالقواطع الجانبي الدائم. عادة ما يشمل العلاج التقويمي التحفظي الاستئصال الجراحي للورم السني، وللعرض الجراحي لسحب القاطع الجانبي والتقويمي للأسنان وخلق مساحة كافية عن طريق التباعد الطبيعي في الفك العلوي مع جهاز تقويمي ثابت. إذا فشلت جميع أنواع العلاجات التحفظية، فإن التدخل الجراحي هو الخيار الأمثل من خلال إبراز الأسنان المتأثرة، ثم تطبيق قوة السحب لدفع الأسنان المتأثرة إلى الوضع الطبيعي. ومع ذلك، الجراحة هي الخيار الوحيد لنمو المرضى حيث أنه، لا توجد أي فرصة للخروج التلقائي للسن المصاب. في هذا التقرير، قدم المرضى إلى عيادة تقويم الأسنان مع شكوى من عدم النمو الطبيعي في القاطع الجانبي الايمن بعد فقدان الأسنان اللبنية، مع خروج القاطع الجانبي على الجانب الأخر. هذا العلاج يتطلب تقليل مساحة الفك العلوي لخلق مساحة للقواطع الجانبي الايمن الدائم.

Introduction

Unerrupted teeth are often encountered in the orthodontic practice.

The nonappearance of maxillary lateral incisors even after eruption

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of adjacent maxillary canine is abnormal; an impacted lateral incisor is usually diagnosed accurately based on clinical and radiographic evaluation. Impaction of maxillary permanent incisors is not a frequent case in the dental practice, but its treatment is challenging because of these teeth's importance to facial esthetics. As a general rule, it is Pedodontics or general dental practitioners who, during a routine dental examination, discovers and records the existence of an over-retained deciduous tooth.[1-3] The prevalence of maxillary lateral incisor impaction ranges from 0.06% to 0.2%.[4] lateral incisor impaction may result from a number of local and systemic factors.[5] Over-retained deciduous teeth, supernumerary teeth, or ectopic eruption and crowding are the most common etiological factors for impacted lateral incisors. Careful planning and interdisciplinary approach are required in the management of impacted lateral incisor. Successful management of impacted lateral incisor is really a clinical challenge for orthodontist because there are chances of failure due to ankylosis, loss of attachment, external root resorption, and root exposure after orthodontic retraction. Improper surgical technique for flap design may lead to crown lengthening and loss of attachment which is functionally and esthetically unacceptable and needs to have periodontal surgery. Patients usually willing to save his/her impacted teeth even after orthodontists suggest several treatment plans. [6, 7]

Odontoma is a benign odontogenic tumor originating from a variation of differentiated mesenchymal and epithelial odontogenic cells; it has the capacity of developing enamel, dentin and cement.

They are classified into compound and complex Odontoma.

Treatment of choice for Odontoma is enucleation by remove all lesion and, endeavouring to preserve lateral incisor tooth.

This paper shows us a case with a deeply impacted tooth with odontoma.

Case history and diagnosis

A 12-year-old male child came to the Department of Orthodontics with a chief complaint of missing upper lateral incisor with the normal anterior general spacing: A clinical challenge to extraction the odontoma and creation the space before the traction of the impacted tooth. Multiple treatment options are available for patients who have impacted incisor. This paper shows a case in which orthodontic as well as surgical considerations in 12-year-old male child were presented in the management of impacted lateral incisor.

Treatment objectives:

1. Create the space for impacted lateral incisor
2. Orthodontic traction of impacted tooth
3. Establish an acceptable functional occlusion.

Treatment options:

The maxillary right incisor that was managed by combined orthodontic-surgical technique.

The following are three possible treatment options:

1. Creation of space for impacted tooth, surgical crown exposure and removal of odontoma, and orthodontic traction of the impacted lateral incisor
2. Extraction of the impacted lateral incisor and temporary restoration with removable prosthetic denture, followed by a permanent restoration with bridge or an implant when growth ceases
3. Extraction of the impacted lateral incisor and closure of the space, converting the canine into the lateral incisor with subsequent prosthetic restoration.

The orthodontic treatment plan included four steps

- 1- remove the odontoma
- 2- creation of space
- 3- exposure of crown
- 4- Forced eruption with the bottom on the exposed surface of the impacted tooth stating orthodontic traction by main wire in fixed orthodontic treatment by stainless steel legating wire no.02 ss. A unique and innovative technique for orthodontic traction was employed to move the maxillary incisor into arch, with minimum injury to neighboring soft tissue. After the successful management

of impacted teeth, it is very important to periodically review the periodontal condition and stability. The child was physically healthy and had no history of medical and dental disease. On extraoral examination, his face was symmetrical with convex lateral profile. The patient intraoral examination showed permanent dentition. Intraoral examination revealed Class I molar relationship, with an overbite of 4 mm and an over jet of 4 mm [Figure 1]. The arch length-tooth material discrepancy was 5 mm in the upper arch and 4 mm in the lower arch, as calculated from Moyers' prediction tables.

Radiographic.

The orthopantomogram and intraoral periapical radiographs showed an impacted maxillary right central incisor with odontoma (Figure2) . Dent scan evaluation confirmed the presence of the right impacted maxillary incisor surrounded by odontoma [Figure1, 2]. , Although it is generally considered that deeply impacted incisor has a poor prognosis, we decided to expose the tooth and bring it into the arch with special attention to the gingival recession.

Treatment progress

Treatment start to sum up the general spacing to create the good space for impacted tooth. The initial alignment was performed with a 0.016-inch Ni-Ti wire, followed by a 0.016-inch stainless steel wire. The patient was referred to the oral surgeon for exposure of the impacted incisor. The surgeon followed the closed eruption technique and raised a wide mucoperiosteal flap. The bone and the connective tissue covering the tooth were removed, and two odontoma were removed {Figure3} and sent for pathological examination. Crown was exposed for bonding the lingual button with a ligature wire tied to it. The flap was closed after bonding the lingual button, and the ligature wire was brought out and passively tied to the arch wire. After 2 weeks, orthodontic traction of the impacted incisor was started. A 0.017 × 0.025 TMA wire with palatal extension was ligated to maxillary arch for traction [Figure 5]. A force of approximately 50 g was applied by an elastic module. The button was removed, and a bracket was bonded when the incisor reached in the Figure 6:

(a) Radiographs showing odontoma impeding the eruption of upper right permanent lateral incisor Figure 1

(b) Pretreatment intraoral photographs of 12-year-old male patient Figure4.

0.014 cu Ni-Ti auxiliary wire was ligated to bring the tooth in the proper alignment. After the alignment of impacted incisor, torquing of this incisor was done with 0.019 × 0.025 stainless-steel wire. Results After 30 months of active treatment, impacted right lateral incisor was successfully bring in proper position and normal functional occlusion was established [Figure 7]. The repositioned incisor had slightly irregular gingival contour. Regarding esthetic factors, patient was satisfied with the results.

Discussion

The literature showed that perfect alignment of impacted incisor can be achieved by careful treatment planning.[2,8-10] The successful management of the impacted lateral incisor is often a difficult task and enquires the joint expertise. It is important that orthodontist and oral surgeon together Figure 3: After 5 month of space opening, odontoma was surgically removed and impacted lateral incisor exposed and buccal button bonded; 0.017 × 0.025 TMA wire with labial extension was made on cast and ligated in patient mouth. Orthodontic traction started with elastic module Figure 5:. In the present case, the findings of periapical and panoramic radiographic images in the maxillary anterior region revealed the presence of an impacted maxillary right lateral incisor with odontoma after the eruption of impacted lateral incisor, buccal button was replaced by bracket (Figure 6) and 0.014 cu Ni-Ti auxiliary wire was ligated to bring the tooth into the proper alignment Figure 7

Post-treatment intraoral photographs of patient (Figure 7,8) an accurate diagnosis and to design treatment strategies that would result nice esthetic appearance with conventional intraoral radiographs with regard to surgical treatment planning of impacted lateral incisor and odontoma. We requested a periapical and

Panoramic

X-ray to achieve a more detailed assessment of the shape and position of the impacted tooth and odontoma, the surgeon decided to go for labial crown exposure of the impacted incisor, so that all findings helped us to be more prepared for surgical exposure of the tooth. In this patient, the closed eruption technique was used for surgical exposure because this technique is recommended as best. A study conducted by Becker et al. showed that closed eruption surgical exposure gives good esthetic result when compared with the unaffected side.[11] Holland[12] has recommended that the movement axis of the impacted tooth must be within 90°. The extrusion force applied on impacted lateral incisor in present case was very light in the range of 50 gm. The forced eruption of impacted central incisor in high vestibular area can be prevented by applying force from palatal side so that tooth erupts as close to alveolar crest and through attached gingiva.[13,14] With respect to the flap design, in this case, we used the closed eruption surgical technique, but the tooth erupted through the nonattached gingiva because of the surgical difficulty in exposing the buccal surface of tooth (proximity to the nasal floor); the attachment was bonded on the mesial edge of the impacted incisor, so during traction, the tooth was rotated mesiopalatally by the traction force, leading to the loss of control and eruption of the distal edge through the nonattached gingiva. Once the tooth pierced the buccal mucosa, we use the 0.017 × 0.025 TMA wire with palatal extension to increase the palatal vector to prevent the complete eruption in the buccal vestibule. The periodontal examination showed slightly increase crown length and irregular gingival contour of exposed teeth. We advised the parents for flap surgery to improve the periodontal condition of exposed teeth, but parents refuse for this. They were satisfied with treatment results. The post-treatment The orthopantomogram show the good aligning of the lateral impacted incisor(Figure 9)

Conclusion

The successful management of impacted lateral incisor is a clinical challenge. There is also a risk of periodontal problem after alignment. Hence, the periodontal care is very critical. To minimize relapsing a bonded fixed retainer may need to be considered for retention.

Figures



Fig1-per-orthopantomogram X ray show impacted lateral incisor and odontoma.



Fig 2- periapical radiograph



Fig 3- surgical producers show remove odontoma and exposed impacted lateral incisor



Fig4- One week later



Fig5-insert orthodontic bracket



Fig5- lateral incisor exposed into oral cavity and apply dental bracket on it.

Fig 6- tooth is almost in the right position



Fig 7- after complete orthodontic treatment



Fig 8-palatal view after remove dental bracket



Fig 9- OPG radiograph after complete treatment.

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- [6]- Lundberg M, Wennström JL. Development of gingiva following surgical Figure 7: Figure 8: Superimposition of the patient Posttreatment radiographs of patient Khera, et al.: Orthodontic management of impacted teeth 50 *Journal of Indian Orthodontic Society* | Vol 51 | Issue 1 | January-March 2017 exposure of a facially positioned Unerupted incisor. *J Periodontol* 1988; 59:652-5.
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