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Effectiveness of Orthodontic Treatment in Managing Impacted Teeth From Bucally And Palatally Side in upper jaw case report

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Abstract
Background :. Third molars, maxillary canines, and incisors have been found to have the highest prevalence of teeth impaction, which has become a prevalent issue for orthodontic doctors. For the management of teeth that are impacted palatally and buccally, orthodontic treatment is quite beneficial.Typically, braces, aligners, or other orthodontic appliances are used during this period. Impaired teeth can be successfully treated to enhance dental function and appearance.
Case report : Because her primary teeth are still in place, the 30-year-old woman in this article has impacted canines and lateral incisors. The treatment plan for her is covered in detail.
Conclusion : orthodontic treatment successfully addresses many impacted teeth through careful monitoring and the use of necessary imaging ,especially three-dimensional X-ray, along with a thorough assessment of the case.
Keywords : orthodontics ,impacted teeth, canine impacted, cbct

Introduction:

One of the hardest cases for an orthodontist to treat is a patient with impacted palate. An interdisciplinary approach combining an oral surgeon and an orthodontist is necessary.In 2022, Mavani et al.The maxillary canines and mandibular third molars are the teeth that are impacted the most often. The mandibular canines, premolars, and maxillary central incisors are among the other teeth that are less commonly impacted (Kharsa2021).

Among patients with partial impaction, the primary causes of complete permanent teeth impaction are: early extraction of temporary teeth (41,28%); delayed extraction of temporary teeth in the dental arch (28,44%); disparity between the size of the teeth and the jaws (22,02%); anomalies in the formation of teeth (16,51%); and supernumerary teeth (15,6%).Pavlo I

Some negative consequences, such as nearby teeth migration, cyst formation, external root resorption in the affected tooth or in neighboring teeth, or in combination with both, may result from the presence of the impacted canine and lateral incisor.9. Treatment methods often aim to preserve the permanent maxillary canine rather than remove it because it is crucial for aesthetics and occlusion guidance (Chang-Chien et al. 2017a).

One of two general approaches can be used to treat an impaction case. The first involves extracting the impacted tooth, which is then followed by either auto-transplantation of another tooth, space closure and replacement of neighboring teeth, or space opening and restoration. Orthodontic traction of the affected tooth combined with surgical exposure may be the second therapeutic option. The position and state of an impacted tooth, the effects on nearby teeth and structures, the length and cost of the treatment, and the patient's desire all play a role in the decision (Dehis and Fayed 2018).

When it comes to patient considerations, it's important to assess the patient's capacity for cooperation and compliance during long-term treatment. According to Qian et al. (2024a), age plays a big role in how well impacted teeth traction works.

The goal of treating an impacted tooth is to move it into the proper position in the dental arch without affecting neighboring teeth. Some benefits come from manipulating a CBCT scan in three dimensions on a flat screen: you can pan, rotate, and zoom in on the image, as well as change the opacity of the various components. However, showing a CBCT scan in a genuine 3D environment could bring additional advantages, such as improved depth perception, enhanced visualization through a more immersive experience, and interactivity(Fudalej et al. 2024).

Compared to traditional imaging, CBCT offers improvements in picture integrity that can result in better visibility. According to Agrawal et al. (2013), CBCT is revolutionizing orthodontics in terms of clinically evaluating patients and is developing in terms of diagnosis, clinical procedures, and results.

Case Report

A 30-year-old woman's main complaint when she arrived at the outpatient clinic was a hard mass at her upper left region from the palate and buccal side, together with a delayed eruption of her permanent canine and lateral incisor teeth (Fig. 1)(A)(B). The patient had no medical history and no prior dental trauma.
The patient had a mesocephalic face with average vertical facial proportions, a straight profile, and uncompetent lips, according to an extraoral examination.

Genetics, endocrine shortages, palatal clefts, developmental issues, and radiation are among the common major reasons of impaction. According to Dehis and Fayed (2018), local secondary reasons such as dentoalveolar discrepancies, transverse maxillary deficiencies, prolonged retention, or early loss of deciduous canines are more common.

figure 1 A : Pre-treatment photos of a thirty-year-old woman with a retained upper deciduous tooth, a lateral incisor, and an impacted maxillary left canine (B).

Figure 1 B : pre treatment records (cast photoes)

Cone beam computed tomography (CBCT) offers a new platform for orthodontic diagnosis and treatment planning, making it one of the most significant advancements in dentistry in the last ten years. According to Agrawal et al. (2013),
CBCT is a fantastic tool for precise diagnosis, more predictable treatment planning, effective patient care and education, better treatment outcomes, and patient satisfaction.

To determine the precise location and position of the impacted teeth, CBCT is frequently utilized. When identifying canine and lateral position, CBCT proved to be morepractical.

In both straightforward and complicated situations, when a 3D assessment is essential to selecting the best course of treatment, CBCT can be considered a trustworthy diagnostic tool (de Grauwe et al. 2019).

To diagnose the linear and angular position of the impacted maxillary canine and lateral teeth, however, CBCT is still the preferred technique.
To ensure a reliable diagnosis of the canine location and its connection with surrounding structures (Figure.2) and to develop a suitable treatment strategy, CBCT must be used. For preliminary planning, orthopantomography offers enough information (Vaya Fernandez-Ladreda 2020).

Figure 2 : 3D image of impacted lateral and canine tooth view showing the relationship between impacted teeth & adjacent structure , so lateral tooth impacted labially and canine positioned palatally.

A firm swelling was discovered intraorally in the maxilla from the left side of the palatal region (the canine region). This was linked with retained maxillary left deciduous lateral (Ul B) with minor mobility, and absence of maxillary left lateral incisor (UL 2) and canine (UL 3) in the dental arch. The mandibular and maxillary arches were both ovoid, symmetric, and had a diastema. There was also slight crowding.

Examining the occlusal features showed that the left side of the molars were class I, while the right side was class II, with class I right canine and an undefinable right canine connection. The overjet and overbite were average, and the lower midline was normal.
Managing several impactions is extremely difficult and necessitates cautious diagnosis and care.
The only teeth that appeared to be preventing the upper canine and lateral teeth from erupting were the remaining deciduous teeth, which showed no evidence of resorption.

Aiming to resolve this case's problem list, the main goals of treatment were to:

1. Extract the retained Ul B and wait for a while for the impacted teeth to naturally erupt.
2. Both impacted teeth are surgically exposed, and they are aligned into the arch's line with orthodontics.
3. Achieve class I canine relation by bringing the maxillary midline into alignment.
4. To maintain room for attaraction of the impacted teeth, use the maximum amount of anchoring. (figure 3).

Figure 3 : orthodontic appliance for maximum anchorage

The patient was referred to an oral surgeon in order to have the retained UlB removed and to have the impacted teeth the canine from the palatally side and the lateral incisor from the labially surgically exposed.

Then, for all upper teeth save Ul 2 and 3, banding and bonding of the fixed pre-adjusted orthodontic appliance (0.022) Roth prescription was completed. 0.016" NiTi (Nickel-Titanium) upper archwire sequence, customized and coordinated 0.016" st.st (stainless steel), and finally 0.016" x 0.022" st.st were installed.
The retained Ul B was removed, and the upper right lateral incisor was observed to emerge shortly after. It was then followed until it approached the occlusal plane after being bonded and engaged to the 0.016" NiTi main archwire (figure 4).

Figure 4: surgical exposure ,Canine and lateral alignment sequence overlay wire, Residual space closure.

As therapy neared its conclusion, a radiographic evaluation was conducted to measure the teeth's inclination and root uprighting (Figure 5).

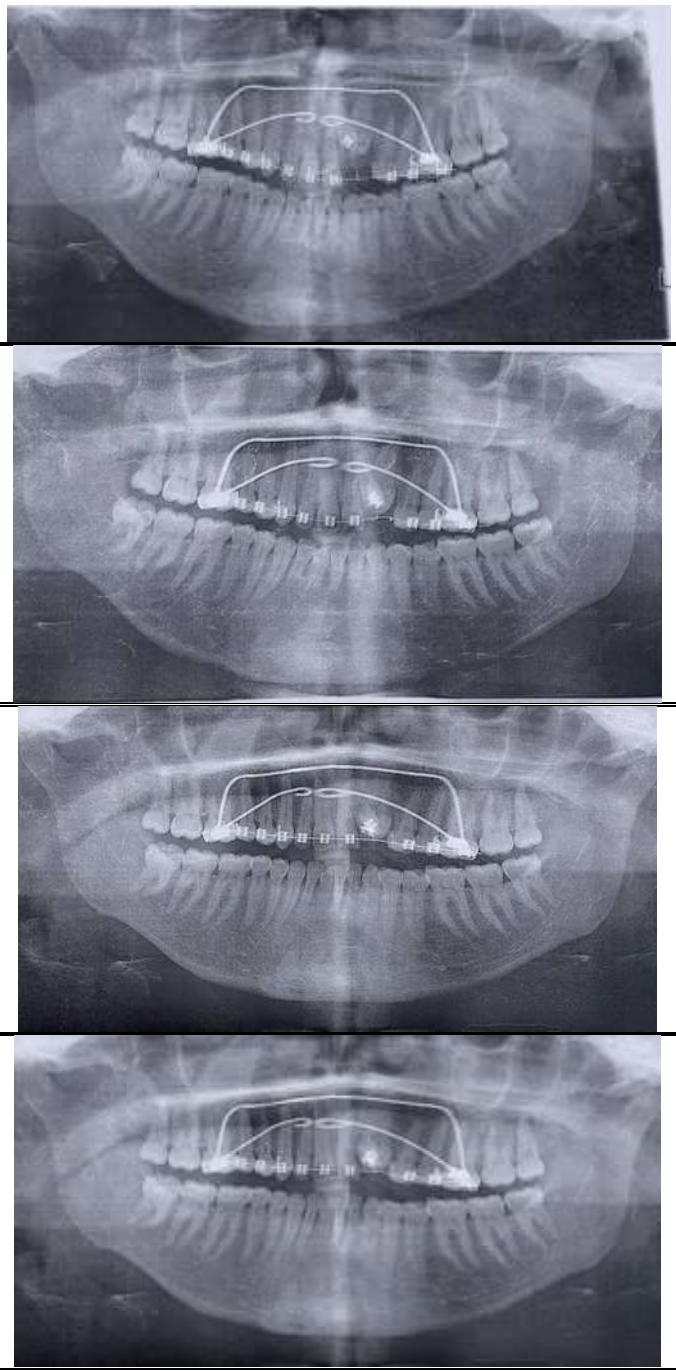

Figure 5: radiographic records taken during treatment.

The impacted left maxillary lateral incisor and canine were effectively aligned into their normal positions. The canine was oriented using elastic tension and crown exposure, while the lateral incisor erupted following surgical exposure. Achieved were the ideal overbite and overjet, midline coordination, and class I canine connection (Figure 6).

Figure 6:Pre and post-treatmet photos from frontal and left lateral side.

Disscussion

Traction of impacted teeth by orthodontics is a rather predictable process. Patient age has a major impact on the success rate (Qian et al., 2024b).
In humans, impacted and misplaced teeth are somewhat common. These are teeth that are impacted—that is, teeth that are unable to erupt normally or displaced tooth that are in an aberrant position. Depending on the population being studied, the prevalence of impaction and displacement might range from 1 to 7.5%(Fudalej et al. 2024).

(CBCT) is making it possible to identify root resorption more frequently. For instance, Walker et al. discovered root resorption in 67% of patients, with premolars accounting for 4% and central incisors for 11% of the cases. Similarly, Alqerban et al. discovered root resorption in 54% of lateral incisors and 15% of central incisors(Fudalej et al. 2024)
According to the guiding idea, the canine's eruption would be guided by the distal portion of the lateral incisor. That is, absence or malformation of lateral incisor would leave additional space in the apical region of itself and distort the eruption course of the canine. The genetic theory, on the other hand, held that the palatally impacted canines are caused by a confluence of several gene expressions that result in dental anomalies like congenital missing or peg-shaped lateral incisors because of a disruption in the dental lamina's development (Chang-Chien et al. 2017b).

The larger distance to the occlusion may make longer orthodontic treatment necessary for the disinclusion of impacted teeth. Our patient had orthodontic therapy for two years prior (Bianco et al., 2024).

In this instance, the lack of a permanent lateral incisor may have contributed to the impaction of the canine. The canine acts as a guide as it erupts along the root of the lateral incisor, according to the guidance theory. If the lateral incisor root is absent or malformed, the canine will not erupt (Syahdinda et al. 2022).

For a balanced smile, dental aesthetics, and functional occlusion, permanent canine teeth are necessary. Dogs also provide a great deal of support for the cheeks.A flattened upper lip results from the absence of canines (Chrystinasari, Bagus Narmada, and Triwardhani n.d.).
It is clear from this case report that the purpose of treatment—treating the malocclusion in the impacted canine has been attained. The patient was satisfied with the aesthetic outcome and stomatognathic function after the impacted canine could be attracted using power chain and orthodontic therapy into its natural position.

Conclusion :

Orthodontic treatment is effective in managing impacted teeth in conjunction with the use of 3D imaging, rather than resorting to the extraction of impacted teeth. Moving the teeth into place takes time and requires an assessment of the bone condition as well as the health of the surrounding teeth and gums.

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فعالية تقويم الأسنان في علاج الأسنان المطمورة من الداخل والخارج في الفك العلوي. حالة علاجية

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المستخلص

تقويم الأسنان فعال في علاج الأسنان المطمورة بالتزامن مع استخدام الأشعة ثلاثية الأبعاد عوضا عن خسران الأسنان المطمورة وخلعها جراحيا. شد الأسنان يحتاج إلى وقت بالإضافة إلى تقييم وضع العظم والحالة الصحية للأسنان واللثة والأنسجة المجاورة.

الكلمات المفتاحية: تقويم الأسنان، الأسنان المطمورة، الناب المطمور، الأشعة ثلاثية الأبعاد.