

Managing Congenitally Missing Lateral Incisors: A Case Report

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Received: July 26, 2022

Published: August 23, 2022

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Abstract

Congenitally missing maxillary lateral incisors affects patient self-esteem in a big way since it concerns an esthetic zone. This case report describes a multidisciplinary approach combining orthodontic and surgical treatment replacing the two laterals by implant-supported prostheses.

Keywords: Agenesis; Laterals; Orthodontic; Implant

Introduction

Upper lateral incisors agenesis affects approximately 2% of the population. Bilateral cases are more common than unilateral ones, and women have a slightly higher prevalence than men [1,2]. It is a condition involving the anterior dental arch region, thus raising concern in patients and their families as dental asymmetries significantly compromise facial esthetics, particularly the smile [3,4].

Whether missing lateral incisor spaces should be orthodontically opened or closed using permanent canines to replace the missing teeth is a controversial issue [5].

The present article reports a multidisciplinary approach to treat agenesis of maxillary lateral incisors with implant-supported dentures.

Clinical and radiographic examination

An 18-year-old female patient, with no relevant medical history, presented to dentofacial orthopedic department at the dental clinic of Monastir (Tunisia) with the chief complaint of spacing between maxillary canines and central incisors.

Extraoral examination (Figure 1)

- In frontal view, a symmetric face and parallelism of the horizontal lines of reference with right sagittal median plane were noted. The lower third of the face was raised with a flat nose.
- The profile view revealed an orthofrontal profile, an open nasolabial angle, and a slightly marked labiomental furrow.
- Smile examination showed an unsightly dental smile.



Figure 1: Pre-treatment extraoral photos.

A: Frontal view; b: Smile view; c: Lateral view.

Intraoral examination (Figure 2)

- The maxillary and mandibular arches had an oval shape with a thick periodontal biotype
- Maxilla:
- A hypertrophied labial frenum with low insertion (Plasek Class IV) associated with a diastema of 1.5 mm between the two central incisors was noted.
- The absence of the 12 and the 22 was clinically evident with a residual space of 3mm and 2 mm, respectively.
- The mandible showed a slight crowding in the anterior region.
- In occlusion, a variable overjet of 0 to 1 mm and an overbite of 3 to 4 mm were noted.
- The lateral views revealed Angle class I relationship in both sides with incisal midlines coincidence.

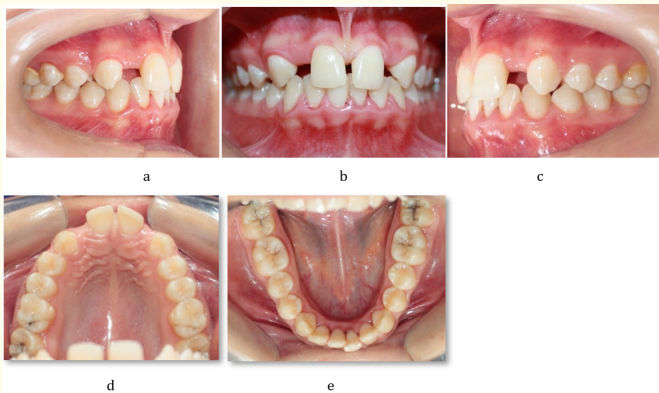


Figure 2: Pre-treatment Intraoral photos.

a: Right lateral view; b: Frontal view; c: Left lateral view; d: Upper occlusal view; e: Lower occlusal view.

Functional examination revealed a swallowing disorder with tongue interposition, nasal breathing, and normal phonation.

Radiographic examination

Panoramic radiograph confirmed an agenesis of the maxillary lateral incisors (12 and 22). No infection and no temporomandibular joint abnormalities were found (Figure 3).

Lateral radiograph revealed a wide respiratory airway (Figure 5). Retroalveolar radiographs of the agenesis sites revealed normal osseous trabeculation with no bone defect (Figure 4).



Figure 3: Panoramic radiograph.

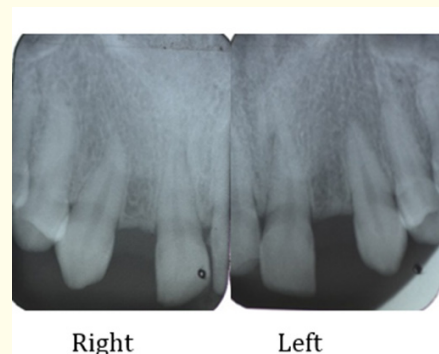


Figure 4: Retroalveolar radiographs.



Figure 5: Pretreatment Lateral cephalometric radiograph.

Cephalometric values	Treatment onset	Mean values
SNA	86°	82° ± 2
SNB	84°	80° ± 2
ANB	2°	-2° - +2
AoBo	1 mm	0-4mm
FMIA	61°	68°
IMPA	90°	87°
FMA	29°	22°-28°
I/i	137°	135°
I/F	108°	107°+/- 5

Table 1: Cephalometric values.

According to Tweed, the patient had a class I skeletal pattern with some protrusive mandibular incisors and a moderately increased lower facial third.

The therapeutic decision involved an active rehabilitation phase followed by labial frenectomy (Figure 6). Orthodontic treatment using Roth technique with no bicuspid extraction and involving an implant-supported prosthetic restoration of the maxillary lateral incisors was later performed.



Figure 6: Labial frenectomy.

Metal-preprogrammed brackets (0.022"slot) were placed to start with aligning the teeth and to create the necessary space for the two lateral incisors. A sequence of 0.014, 0.016, and 0.018 NITI arch wires were used and prosthetic lateral incisors were used for better esthetic integration.

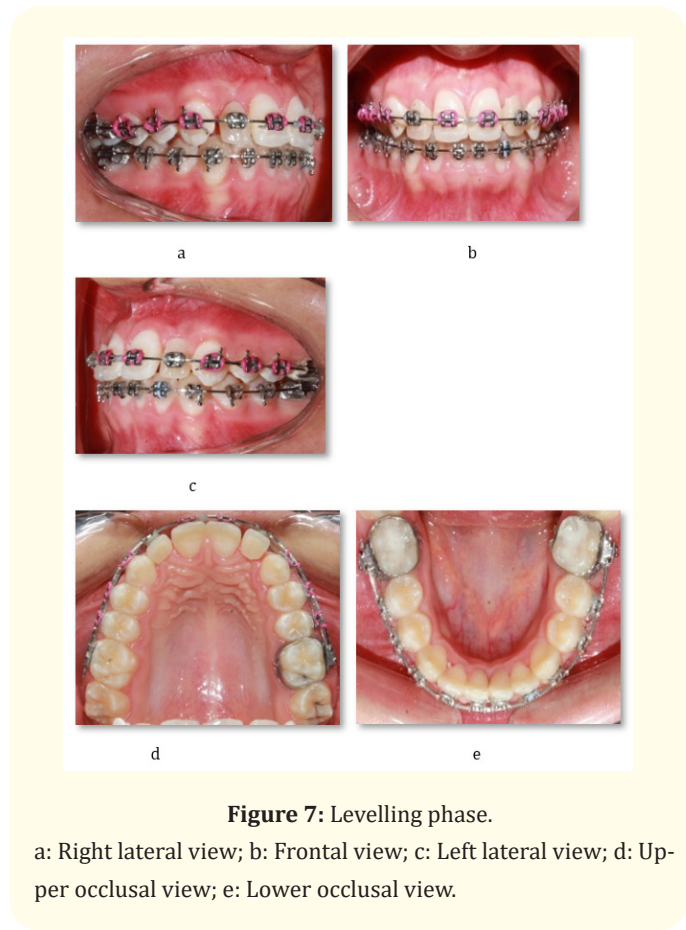


Figure 7: Levelling phase.

a: Right lateral view; b: Frontal view; c: Left lateral view; d: Upper occlusal view; e: Lower occlusal view.

Then, 0.017x0.025 and 0.018x0.025 stainless steel arch wires were placed to manage the implant sites (Figure 8) and to achieve coordination. Finishing was performed using SS 0.019*0.025.

Particular attention was paid to finishing the teeth axes adjacent to the implant sites since the space opening biomechanics may lead to root convergence.

At this stage, a three-dimensional radiographic assessment was conducted in order to refine the implantation surgery. A cone beam was performed and the patient was referred to the oral surgery department.

An implant with a 4 mm diameter and a 10 mm length was selected. These measurements represent the optimal ones recommended in the literature for implant durability.

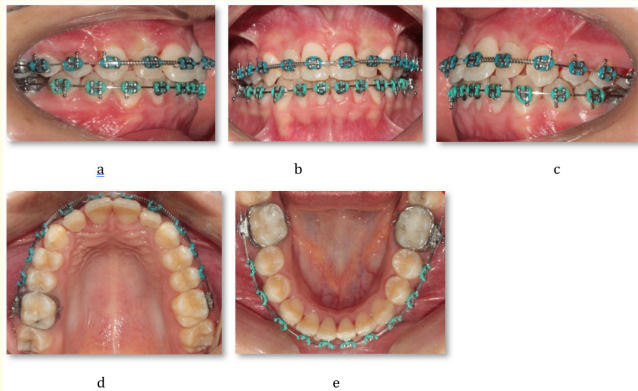


Figure 8: Managing implant sites.

a: Right lateral view; b: Frontal view; c: Left lateral view; d: Upper occlusal view; e: Lower occlusal view.

The patient had a 7 mm mesio-distal width crest; however, the vestibule-lingual width was insufficient. So, we opted for guided bone regeneration with xenograft (GBR): a PTFE membrane (polytetrafluoroethylene).

The outline of the treatment plan is presented in figure 9, drilling, verification of the implant axes, implant placement, and GBR. Finally, a retro alveolar radiographic check-up was carried out.

At the end of the orthodontic treatment, two Essix retainers were prescribed to maintain the result and to reinforce the healing phase. For an esthetic purpose, resin was added to the retainer at the level of the maxillary lateral incisors.

After using a standard healing abutment, provisional restorations were performed to recreate the emergence profile and the papilla. Final crowns were mounted after one month (zirconia core + lithium disilicate).

At the end of the treatment, right and left Class I canine and molar were obtained with good interdigitation in the bicuspid area.

During follow-ups and when analyzing the lower third of the face, a significant improvement was noted. The patient was able to close her lips gently in concordance with a nice and pleasant profile and a passive lip sealing. Maxillary expansion reduced the corridors for a wider smile.

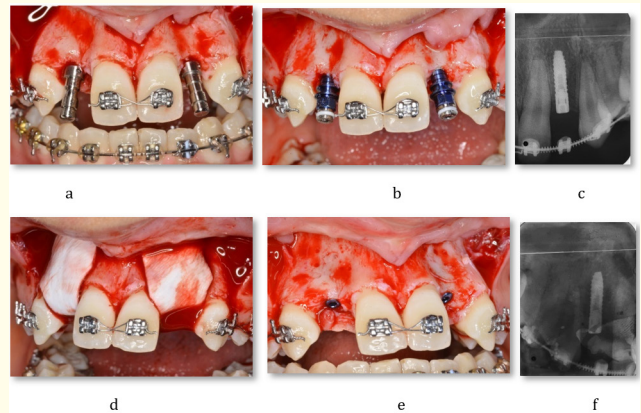


Figure 9: Implants placement.

a and b: Drilling; c and f: Retroalveolar radiographic check-up; d: GBR; e: Implant placement.

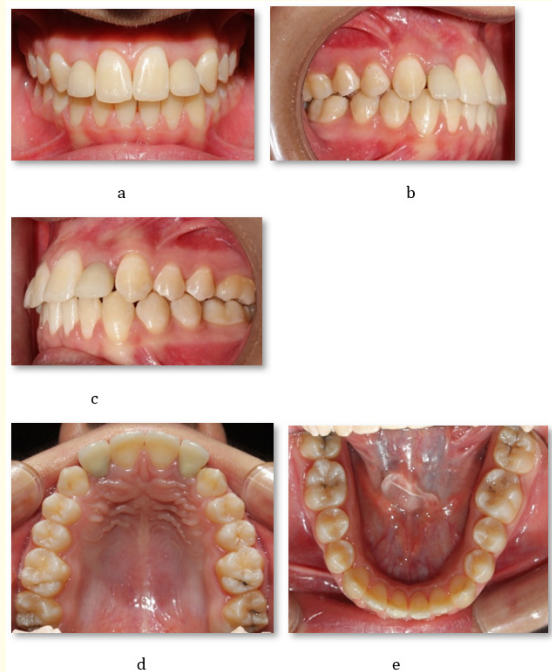


Figure 9: Post-treatment Intraoral photos.

a: Right lateral view; b: Frontal view; c: Left lateral view; d: Upper occlusal view; e: lower occlusal view.

Comparison of the pre and post-treatment dental photographs revealed that the treatment objectives were achieved.



Figure 11: Extraoral photos before and after treatment. a: smile view; b: lateral view.

Discussion

The agenesis of maxillary lateral incisors is a common developmental anomaly. It represents a clinical problem impairing dental esthetics and function from a very young age. Several dental specialties are involved in the management of this clinical problem because only a multidisciplinary approach can respond to the complete dental needs of patients with dental agenesis.

There are three treatment options for replacing missing lateral incisors, including canine substitution, tooth-supported restoration, or single-tooth implant.

The evolution of dentistry over the years seems to have an influence on the therapeutic choice as practitioners have long preferred the closure of spaces since the opening usually ends with mutilating teeth preparations and bonded bridge with poor fixation prognosis [6].

In this case, decision to open the space for two implants replacing the lateral incisors was taken. Spaces were created by incisor proclination and residual diastemas.

Regardless of the type of prosthetic replacement, this procedure consists in opening or at least maintaining the space for the missing teeth. The canine is placed or kept in an Angle Class I relationship.

The option of space opening gives the surgeon a neo-formed well vascularized bone which strengthens the prognosis of the implant phase. Moreover, at the cutaneous level, space opening for lateral incisors helps to close the nasolabial angle for a more esthetic appearance.

Since the patient was 18 years old at the beginning of the treatment, we opted to directly proceed with the implant phase at the end of the orthodontic treatment without waiting for periodontal immaturity that can lead to implant failure.

On the other hand, implant restorations in the anterior maxilla represent a challenge in terms of proper esthetic results, particularly in the gingival contour aspect [8,9,12]. Even when a good immediate result is achieved [13,14], misalignment, both gingival and on the incisal edge, is expected over the years between the implant crown and the adjacent teeth due to the passive eruption of natural teeth [8,9,15]. Thilander, *et al.* [7] reported an infra-position of the implant varying from 0.6 to 1.6 mm after 3 to 10 years.

The longer the time elapsed between the end of orthodontic treatment and the placement of the implant, the greater the risk of atrophy of the alveolar ridge [11] and the roots adjacent to the space, moving once again closer together [10].

Furthermore, with age, the cutaneous profile and anterior teeth become more and more up righted, possibly causing virtual protrusion of the implant crown [12,15].

However, the therapeutic option of space closure can be performed even before the end of dental development to take advantage of the flexibility and metabolism of the young growing bones [9,16]. Finishing orthodontic treatment during adolescence also has a positive impact on patients' motivation and their self-esteem

as well as social acceptance without the need to use temporary prostheses [17].

Conclusion

Choosing the best possible treatment for congenital absence of maxillary lateral incisors depends on a multidisciplinary diagnosis of the facial, occlusal, functional, and periodontal features.

Regardless of the therapeutic choice, treatment must not only provide an esthetic result but also a long-term stability.

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Volume 6 Issue 9 September 2022

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