

Multidisciplinary Management of Angle Class II Associated to Peg Shaped Lateral Incisor: A Case Report

Case Report

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Author Details

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Abstract

Angle class II malocclusion is closely related to congenital tooth anomalies such as peg shaped lateral incisor. The asymmetrical intra-arch relationship in Class II subdivision malocclusion with lateral incisor anomaly poses challenges in the treatment planning. Incisor anomalies had also a negative effect on the patient's self-esteem consequent to an unsightly smile caused by the reduced size of the teeth and anterior diastemas. Many options are described in the literature for managing microdontia of lateral incisors such as space closure by orthodontic treatment, placement of a resin-bonded prosthesis or both. Orthodontic treatment allows a favorable alignment of the dentition, occlusal stability, and a favorable anterior dental relationship preparing to the prosthetic treatment with good esthetic outcome. The development of the adhesive dentistry allowed ceramic veneers to be the best treatment option to reestablish the teeth size, shape, and anatomic characteristics with a perfect mimicry of natural esthetic and function. The aim of this case report is to describe a conservative multidisciplinary approach to harmonize the smile of a female patient with a class II malocclusion associated to incisor shape abnormalities.

Introduction

Angle class II subdivision malocclusion is a dentofacial deformity, estimated to reach 50% of Class II malocclusions [1]. It is characterized by an asymmetry between the right and the left sides of the dentition. Eftimia and all. confirmed that class II malocclusion is closely related to congenital tooth anomalies such as peg shaped lateral incisor [2] which is one of the most common forms of localized microdontia that affects the shape of permanent maxillary lateral incisors [3,4].

The asymmetrical intra-arch relationship in such malocclusion with lateral incisor deformity poses challenges in the treatment planning and mechanotherapy.

Only a multidisciplinary approach can respond to both orthodontic and prosthetic concerns. However, orthodontist will play two key roles in treating anteroposterior dental shifting and preparing for prosthetic restoration. Several orthodontic treatment protocols were reported in the literature to treat Angle class II relationship such as two or four premolars extraction, maxillary molars distalization, fixed functional appliances, and intermaxillary elastics [5-8]. Meanwhile, managing lateral incisors microdontia can be achieved by orthodontically space closure, placement of a resin-bonded restorations or both [10].

The present article reports a clinical case of class II malocclusion subdivision associated to peg-shaped maxillary lateral incisor completely rehabilitated with multidisciplinary approaches including orthodontic, periodontal and prosthodontic restorative treatment using lithium veneers.

Clinical and Radiographic Examination

An 18-year-old female patient, with no relevant medical history, presented to the dento-facial orthopedic department at the dental clinic of Monastir (Tunisia) with the chief complaint of shape anomaly of the 11 and 21, and spacing between maxillary central incisors.

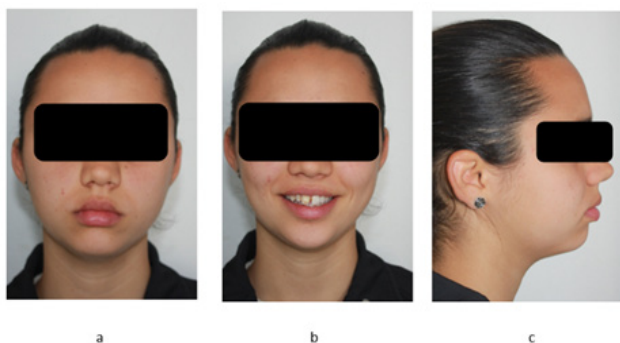
Extraoral Examination (Figure 1)

In frontal view, a symmetric face and parallelism of the horizontal lines of reference with right sagittal median plane were noted with a right sagittal median plane. The lateral view revealed an orthofrontal profile, an open nasolabial angle, and a moderate lip protrusion. Smile examination shows an unsightly dental smile (Figure 1).

Intraoral Examination (Figure 2)

The maxillary and mandibular arches had an oval shape with a thin periodontal biotype. At the maxilla, 12 was peg shaped, 22 was size

reduced, 11 presented a localized hypoplasia in the incisal third and a 1 mm diastema was present between central incisors. The mandible showed a slight spacing in the anterior region. In occlusion, we note a deep bite with incisal midlines deviation with upper midline shifted towards the left and the lateral views showed Angle class II malocclusion, left subdivision (Figure 2). Functional examination revealed a swallowing disorder with tongue interposition, nasal breathing and normal phonation.



a: frontal view; b: smile view; c: lateral view

Figure 1: Pre-treatment extraoral photographs.



a: right lateral view; b: frontal view; c: left lateral view; d: Upper occlusal view; e: lower occlusal view

Figure 2: Pre-treatment intraoral photos.

Radiographic Examination:

Panoramic radiograph showed full dentition, a lack of bone defects. No infection and no temporomandibular joint abnormalities were found. Third molars were erupting (Figure 3). Lateral radiograph revealed a wide nasopharyngeal airway (Figure 4) (Table 1). According to Tweed analysis, the patient had a class II skeletal pattern due to mandibular retrusion, and a normal vertical growth with incisor biprotrusion.



Figure 3: Pre-treatment panoramic radiograph.

On the basis of clinical examination and diagnostic records, a treatment plan to correct the malocclusion through non extraction fixed appliance mechanotherapy was selected. The rationale was to, orthodontically, achieve better position of lateral incisor and redistribute the interproximal diastemas to facilitate their indirect restorations with

bonded ceramic veneers. Full fixed 0.022 inch ROTH brackets were bonded on both arches. Then, we start initial levelling and alignment with 0.014, 0.016, and 0.018 nickel-titanium arch wires (Figure 5).



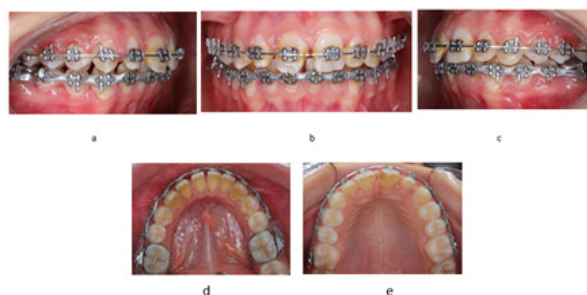
Figure 4: Pre-treatment lateral cephalometric radiograph.



a: right lateral view; b: frontal view; c: left lateral view; d: Upper occlusal view; e: lower occlusal view

Figure 5: Levelling phase.

Space analysis of the anterior maxillary dentition showed that minor tooth rearrangement was needed. An optimal space distribution for restorations was attained by coil spring mechanotherapy and controlled with regular prosthodontic checks. Closing mandibular diastemas was achieved using elastomeric chain (Figure 6). Then, both arches were stabilized with 0.017x0.025 and 0.018x0.025 SS arch wires and finishing was performed using 0.019*0.025 SS.



a: right lateral view; b: frontal view; c: left lateral view; d: Upper occlusal view; e: lower occlusal view

Figure 6: Spaces closing.

A panoramic radiograph was performed to evaluate root axis and prepare for debonding. The patient was referred to the oral surgery department for wisdom teeth extraction (Figure 7). The orthodontic treatment allowed the alignment of the teeth and a favorable anterior dental relationship to prepare the periodontal and prosthetic treatment to enhance the esthetic result (Figure 8). Gingival contour remodeling was indicated to correct teeth proportionality and gingival shape (Figure 9 & 10).

The orthodontic treatment plays a very important role by achieving a correct position of peg-shaped lateral incisor and redistributing the interproximal diastemas to better reproduce natural form of maxillary incisors. Then, the management of peg-shaped maxillary lateral incis-

ors must be achieved with a minimally invasive adhesive approach to improve esthetic and functional treatment goals. In our case, we opted for four lithium disilicate veneers to correct the central and lateral incisors abnormal shape. The goal of tooth preparation was to arrange space into which the technician can sculpt ceramic without over-contouring the tooth and then respect the gingiva.



Figure 7: Post-treatment panoramic radiograph.



Figure 8: Space distribution.



Figure 9: Gingival contour remodeling.



Figure 10: Gingival contour remodeling after healing.

Preparation should be maintained in enamel area whenever possible to guarantee an optimal bonding. All angles were rounded to reduce stresses in the margins of the veneers. Incisal reduction of 1,5 mm was done with incisal overlap to improve translucency (Figure 11).



Figure 11: Conservative tooth preparations for ceramic veneer.

Table 1: Pre-treatment cephalometric values.

Cephalometric Values	Treatment Onset	Mean Values
SNA	79°	82° ± 2
SNB	74°	80° ± 2
ANB	5°	-2° ± 2
AoBo	1 mm	0-4mm
FMIA	54°	68°
IMPA	104°	87°
FMA	22°	20°-30°
I/i	111°	135°
I/F	121°	107° ± 5

Once the preparation was validated, an impression using polydimethylsiloxane material was taken and sent to the laboratory where the master cast was prepared to elaborate the veneers with hot pressed ceramic fabrication technique. The chosen ceramic system was the IPS e.max Press (Figure 12). After reception of ceramic veneers from the lab (Figure 12) the try in and cementation protocol were performed. The removal of the excess of resin cement was critical to guarantee a healthy gingival contour and harmony between white and pink (Figure 13).



Figure 12: Lithium disilicate veneers on the cast.



Figure 13: Intraoral view of veneers after cementation.

The lithium disilicate veneers were able to enhance the patient's smile, recovering the teeth size, shape, and anatomic characteristics. At the end of treatment, right and left class I canine and molar were obtained with good interdigitation in the bicuspid area (Figure 14) Post-treatment records demonstrated satisfactory final results responding to all objectives. Intraoral examination revealed the achievement of all planned objectives, namely Angle class I relationship in both sides, restored lateral and central incisors and mandibular spacing correction. Extraoral photos showed a harmonious profile, correct incisor exposure during smile and the absence of buccal corridors (Figure 15).



a: right lateral view; b: frontal view; c: left lateral view; d: Upper occlusal view; e: lower occlusal view

Figure 14: Post-treatment intraoral photos.



a



b

a: smile view; b: lateral view

Figure 15: Extraoral photos before and after treatment.

Discussion

As there were no major skeletal discrepancies, a combined orthodontic/surgical approach was ruled out. Fixed multibracket treatment with extraction of four premolars was considered, but also excluded due to potential worsening of the profile. The patient was therefore offered a treatment plan involving unilateral distalization by fixed multibracket appliances using class II elastics.

In accordance with findings from Janson et al. [8] and due to the age of the patient, the movements brought about by the use of intermaxillary elastics were predominantly dentoalveolar in nature and led to a slight reduction in the SNA angle, a slight increase in the IMPA, and retroclination of the upper incisal sector. After class II correction has been achieved, elastic wear was instructed for night-time for retention.

The management of peg-shaped maxillary lateral incisors need necessarily a multidisciplinary approach. Being the most conservative one, inter-proximal diastemas were orthodontically achieved avoiding

excessive tooth preparation. Orthodontic mechanics play a key role in determining the ideal final position of the tooth in vestibulo-palatal, vertical and mesio-distal senses to provide a sufficient space for a future adhesive restoration. Chronic inflammatory gingival overgrowth during orthodontic treatment is very common and can compromise prosthetic rehabilitation. However, oral hygiene instruction, scaling, and prophylaxis are not always effective. Therefore, we are frequently invited to coordinate with periodontist for managing gingival contour.

The development of the adhesive dentistry allowed ceramic veneers to become an esthetic and functional best treatment option to restore the smile harmony that can be affected by incisor anomalies. As we should focus on the importance of cervical adaptation, mechanical properties as well as esthetic outcomes, layered veneers using lost wax technique was selected as the most adapted to the clinical case combining the artistic sense of the lab technician and his experience in lost wax method with metal alloys.

Conclusion

Choosing the perfect treatment option for Angle class II associated to peg shaped lateral incisor and anterior diastemas depends on a meticulous diagnosis of the facial, occlusal, and functional factors. An ortho-prosthetic approach is basic in order to create a personalized treatment plan.

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