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Obtaining Dental Aesthetics for Lower Incisor Agenesis

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Authors' contributions

This work was carried out in collaboration between all authors. Authors NBFS and OVV designed the study. Authors NBFS, DTBL and AJR managed the literature searches and wrote the first draft of the manuscript. Authors NBFS, DTBL and OVV managed the clinical case and revised the manuscript for intellectual content. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Tooth agenesis is a congenital disorder, which is extremely rare in lateral mandibular incisors. This article presents the case of a female patient with the absence of right lower lateral incisor and significant Bolton discrepancy. She was treated with the aid of a fixed orthodontic appliance and transpalatal bar to avoid the loss of anchorage of the posterior superior dental segment. To correct the Bolton discrepancy, stripping of 4.07 mm on the proximal faces of the anterior superior teeth was also performed. These procedures solved the occlusal disorders presented by the patient, conferring appropriate function, aesthetics and quality of life.

Keywords: Hypodontia; incisor/diagnostic imaging; orthodontics, corrective/methods; Bolton discrepancy.

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1. INTRODUCTION

Tooth agenesis is a congenital absence of one or more primary or permanent teeth that can be classified as hypodontia if the agenesis is of one to six teeth, excluding third molars. Hypodontia as one of the most common human dental developmental anomalies [1,2].

Dental agenesis can be of genetic origin or can occur due to environmental factors, such as dental blade development or general factors, such as trauma, infection, surgical procedures, use of medications (e.g. thalidomide), radiation and chemotherapy [3-5]. This disorder most commonly affects the last series of teeth: lateral incisors, second premolars and third molars [6,7]. It shows highest prevalence in lateral maxillary incisors, with Caucasian women being most affected [8].

Diagnosis can be made through clinical examination radiography, analysis of dental arch models and intraoral photographs. In this case, the absence of the lower mandibular incisor was diagnosed by periapical radiography requested prior to beginning of orthodontic treatment, as well as panoramic and cephalometric radiography.

Three treatment modes can be selected for this condition: no treatment when the patient is satisfied with its appearance; Interceptive or interdisciplinary treatments [7,9].

Interceptive treatment includes early diagnosis during deciduous and early mixed dentition, preservation with radiographic shots, space maintenance with removable appliances and extraction of deciduous canines [10].

Interdisciplinary treatment involves several specialties, such as dentistry, periodontics, pediatric dentistry and orthodontics [7]. However, Silveira et al. [9] reported that for better aesthetic finalization, space closure is the recommended option. After the end of the active treatment, the orthodontic containment must be present to prevent relapses.

Space closure in young and adult patients provides a better gingival contour, in addition to the maintenance of natural teeth. It allows for mutually protective occlusion, and there is no evidence of TMD [11,12]. Also, only orthodontic treatment without restorative treatment may be sufficient.

However, not all patients are eligible for this type of intervention and must have at least one of the following characteristics: class I malocclusion (Angle), anterior crowding, posterior crowding, absence of only one incisor, class III malocclusion (Angle) or Bolton discrepancy related to the anterior teeth [10,11,13].

2. CASE REPORT

2.1 Case Summary

A 9-year-old female patient sought care at the Orthodontics Clinic of the Fluminense Federal University (UFF), presenting with a major complaint of aesthetic impairment by crowded teeth.

The facial examination showed a mesocephalic pattern with no asymmetries, convex profile, lip protrusion, shortened lower-third of the face and decreased nasolabial angle. Intraoral examination revealed excellent oral hygiene, absence of lower incisor (only one missing tooth). The model discrepancy was −3.5 mm, with the upper and lower middle lines diverted to the right.

Cephalometric analysis showed a good skeletal pattern. The dental pattern presented molars and canines in normal occlusion, with a slight projection of the lower incisors (IMPA = 93º), 4-mm overbite, 5-mm overjet and elongated arch form. The absence of right lower lateral incisor was clinically and radiographically diagnosed through periapical and panoramic radiographs (Figs. 1 and 2).

Bolton's analysis defines the discrepancy of dental size between the upper and lower arches. In this clinical case, a Bolton discrepancy of 3.5 mm with inferior excess in the twelve teeth (from first molar to first molar) and anterior superior excess of 4.5 mm (from canine to canine) was observed. This analysis revealed a higher mesiodistal tooth width than expected to the second lower premolars, which should be corrected with slices (stripping) on the mesial and distal surfaces of both models. This way we will correct Bolton discrepancies. To solve the excess of superior material in the sixth anterior teeth due to the absence of the lower lateral incisor, stripping was planned on the proximal faces of all anterior superior teeth.

2.2 Treatment

During orthodontic planning, it was necessary to consider the presence of other peculiarities of the

case (deviated median lines, interdental arch and occlusal discrepancy, exaggerated overbite, everted lower lip, deep submental fold, convex profile). All these characteristics increased the degree of complexity of this case.

To maintain the correct occlusion of the posterior teeth, it was installated a transpalatal bar for anchorage, this was proposed as an initial procedure of the orthodontic treatment plan. Due to the overbite it was bonded resin occlusal stops on the lower molars allowing bracket fixation on the lower teeth.

Fixed orthodontic appliances were placed in both arches. Alignment and leveling was performed with a steel wire and thermo-activated wire, To correct the overbite, it was made the step down bend was performed on the lower anterior arch segment and step up bend on the lower second molars. In upper jaw it was used Spee curved arch. Both the procedures were followed by considerable stripping of the anterior teeth.

Stripping was performed as follows in the upper arch: canine, lateral incisor and central incisor received a wear of 0.26 mm, 0.48 mm and 0.88 mm on the right side and 0.44 mm, 0.55 mm and 0.46 mm on the left side, respectively. The second premolars (upper or lower, right or left) received a total wear of 1 mm. The total amount of stripping procedures was 4.07 mm. These values were defined by measuring the teeth in the model after treatment of the upper dental arch.

3. DISCUSSION

The etiology of agenesis may be due to nutritional, traumatic, infectious and hereditary factors, anomaly in the development of the mandibular symphysis affecting the dental tissue of the lower incisors or reduction of the dentition as an evolutionary trend [4,5]. However, in the discourse of the anamnesis, no similar problem was detected in the patient's parents or relatives. Therefore, it was deduced that the etiology of this case was not hereditary. This case has unknown etiology or is assume that is due to problems in early nutrition of the patient.

The difficulty of achieving adequate functional occlusion in patients with congenital absence of a mandibular incisor is well known, particularly when the patient has exaggerated overbite and overjet with Bolton discrepancy in the anterior mandibular teeth [4].

Fig. 1. Pretreatment extraoral, intraoral photographs and periapical radiography

The occlusion obtained with orthodontic treatment in cases with absence of mandibular incisors does not cause disturbances in the temporomandibular joint because it generates functional excursion guides in the stomatognathic system [10,14].

The clinical case was concluded with an excellent result, both in relation to occlusion and aesthetics, conferring quality of life for the patient by solving her major complaints (Figs. 3, 4 and 5).

Fig. 2. Panoramic radiography (pretreatment)

Fig. 3. Posttreatment extraoral, intraoral photographs and periapical radiography

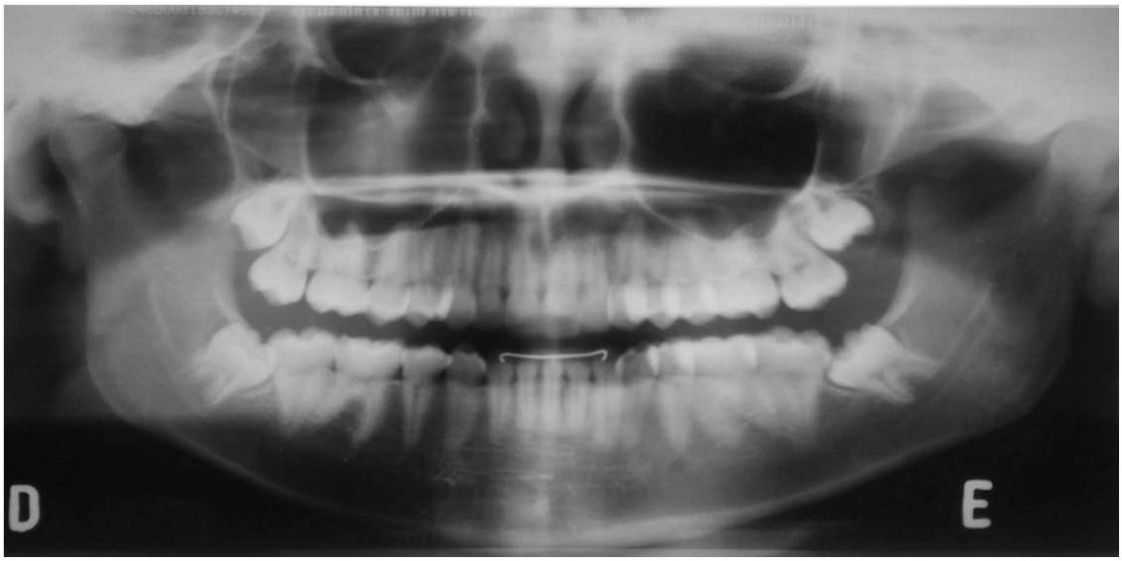

Fig. 4. Panoramic radiography (posttreatment)

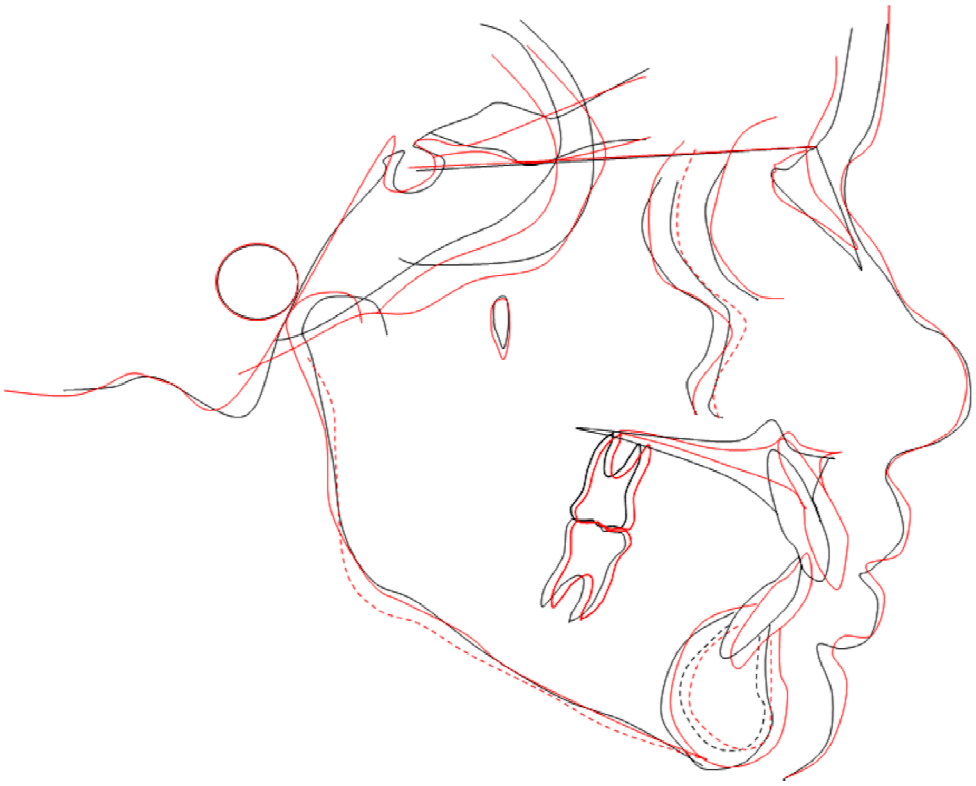

Fig. 5. Superimposition of the pre- and post-treatment

4. CONCLUSION

When there is an absence of a mandibular incisor combined with significant Bolton discrepancy, the anterior guidance is negatively affected, making orthodontic planning more challenging.

The present orthodontic planning was directed towards the correction of an exaggerated

overbite and Bolton discrepancy, thereby obtaining excellent results and stability and conferring quality of life to the patient.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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