

## Patient with class II skeletal malocclusion and agenesis of central lower incisor

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### Abstract

**Background:** Barbero (2015) defined tooth agenesis as the congenital absence of one or more teeth. Dental agenesis is also known as hypodontia. This condition may be caused by genetic factors, local trauma, infections, or drug exposure during the dental development. The aim of this article is to show a case report of an adult patient with class II skeletal malocclusion and dental agenesis. **Case report:** A 20-year-old male patient with dental crowding, absence of a lower central incisor and class II skeletal malocclusion. The treatment plan was a McNamara expander and fixed 0.022'alexander appliances. The result was a satisfactory treatment outcome.

**Conclusions:** A multidisciplinary approach when treating a patient with dental agenesis is the key to provide the best functional and esthetic results.

**Key word:** agenesis, hypodontia, permanent dentition, orthodontics.

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### I. Introduction

Barbero (2015) defined tooth agenesis as the absence of one or more teeth. Another name for this condition is hypodontia. Dental agenesis can be found as an isolated problem or as part of a group of abnormalities such as: dental transposition, impacted tooth, eruption problems, size and shape discrepancy, dental crowding, cleft palate and lip and craniofacial growth modifications. (1)(2)

Tooth agenesis can be caused by multiple factors such as alveolar process injuries, exposure to certain drugs or treatments, such as chemotherapy. Although, this condition can be caused also by genetic factors, it has been identified that some gens (MSX1, PAX9 and MSX24) are responsible for the absence of teeth, either on an isolated form or as part of a syndrome. (3)(4)(5)

Dental agenesis can cause an impact on the patient's oral health. The amount of impact will depend on the numbers and positions of the missing teeth. There are multiple problems that a patient can develop as a result of the agenesis: occlusal dysfunctions, speech disorders, and decrease of the alveolar bone. The treatment, for this condition must be handled with a multidisciplinary point of view and include a long-term treatment. (8)(9)

The McNamara is a bonded maxillary expander that has an acrylic splint that covers the posterior teeth, the occlusal coverage helps to control of the vertical dimension. (13)

The aim of this article is to show a case report of an adult patient with class II skeletal malocclusion and dental agenesis.

### II. Case Report

A 20 year old male patient attended the orthodontic department of the Autonomous University of Baja California, campus Tijuana in Mexico, and when asked for the reason for his consultation said, "I want to fix my teeth, I want them straight."



Fig. 1 Initial diagnostic photographs

The extra-oral examination revealed that he was a dolichofacial patient with symmetric face features, a convex profile and labial incompetence. The intra-oral examination revealed the agenesis of a lower central incisor, midline discrepancy, maxillary transverse discrepancy, class I canine relationship on the right side and class III on the left side, class I molar relationship on the right and class III on the left side, 5 mm overbite and 2 mm overjet (figure 1).

The panoramic radiography confirmed the absence of the permanent lower incisor. Besides that, no other abnormalities were found. The cephalometric analysis revealed a skeletal class II due to a maxillary protrusion lower and upper incisor proclination and a vertical growth pattern (figure 2).



Fig. 2 Radiographic studies and cephalometric analysis.

## TREATMENT

The treatment consisted of two phases. Phase I was the correction of the transversal discrepancy. It was carried out with a McNamara appliance. The selection of the appliance was based on the need to maintain vertical control due to the patient's growth pattern. The screw was active 0.25mm per week, during 17 weeks (figure 3).



Fig 3. Phase 1 treatment. a) McNamara appliance bonding; b) Expansion after 3 months

Phase II consisted of a fixed appliance Alexander slot 0.018", first in the upper arch and a few appointments later in the inferior arch as well. The use of open coil was needed in the lower arch between the central incisor and both canines to make enough space so that later on, lateral incisors can be aligned. When there was enough space for the lower lateral incisors, both were approached to the arch using metal ligature. Then, the treatment proceeded with the archwired sequence. During the treatment an interproximal reduction was made in the upper arch on the interproximal surface of the four incisors (figure 4).



**Fig 4.** Alignment process

Three months before the finalization of the treatment, a dual arch technique was employed in the mandibula; an 0.016" X 0.022" SS arch with a bend over the right canine, to leave the canine out of the arch, and a 0.016 Nikeltitanium arc was placed over the lower right canine, the lateral incisor and the first premolar, to improve the canine position. The treatment finished with a 0.017" X 0.025" SS arc (figure 5).



**Fig 5.** Dual arch technique

Once the fixed appliance were removed, a fixed retainer was placed between the inferior canines and a Hawley retainer on the upper arch.

### III. Results

The post treatment cephalometric analysis showed a 6-degree change in the mandibular incisor inclination, an overjet and overbite of 3 mm each (figure 6). The molar and canine class I relationship was accomplished with a right posterior settlement of the occlusion. It was impossible to obtain a coordination of the dental midlines due to the dental agenesis (figure 7).



**Fig 6.** Final cephalometric evaluation.



**Fig 7.** Finished treatment.

#### IV. Discussion

In patients with dental discrepancies, as the congenital absence of a tooth, the orthodontist must keep in mind that this problem would difficult the case development and may jeopardize the result of the treatment.

The case mentioned in this article had some obstacles because of the skeletal discrepancy and class II malocclusion present in the patient. Those two factors, plus the absence of the lower incisor, represent a problem to obtain a better overjet.

A good diagnosis and a meticulous treatment planning are the key to determine what obstacles will occur along the treatment and with that, which treatment goals can be reached. Barron et al. (2010) mentioned in a previous work, the orthodontic setup as a helpful tool that gives the orthodontist valuable information regarding treatment decisions and also helps to predict the treatment outcomes. (10)

There is not an ultimate path to follow when treating a patient with a missing tooth. Every patient has specific features which will lead to the selection of a certain treatment plan. Zhang et al. (2014) discuss about the opinion of the patient in the plan treatment, they say that some approaches may not be accepted by the patient, extractions or restorations for example, due to personal beliefs or cultural context. The problem is that in these particular cases the orthodontist has to find different and creatives ways to solve the patient's problems. In their article, specialists introduced a patient with dental agenesis where the treatment of choice was a forsus appliance. With this particular device they achieved an improvement of the overbite and overjet. (11)

In the particular case of the patient mentioned in this article, the improvement of the overjet and overbite was achieved by the proclination of the mandibular incisors, as well as the interproximal reduction in the upper arch, and with these actions, we accomplished the correction of the malocclusion at a dental level.

The retention is one of the most important parts of the treatment. One of the main goals of an orthodontic treatment is to maintain, as long as possible, the final results. There are some factors that can jeopardize the post-treatment stability, such as variation on the inclination of the incisors, changes in the intercanine distance and dental rotations. This is why in the particular case of this patient, the retention of choice was a fixed retainer, which will help on the maintenance of the position of the lower incisors as long as possible. (12)

#### V. Conclusion

When treating a patient with tooth agenesis, a good diagnosis and meticulous treatment are essential to provide this patient with a functional occlusion, as well as an esthetic smile. The orthodontist must have in mind that the final result could be compromised in patients with this dental discrepancy. The orthodontic setup is an important resource that can help to predict the treatment results and to achieve the treatment's best outcome.

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