

Orthodontic approach of a patient with dental fusion of lower incisors: Case report.

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Abstract:

Introduction: Union dental anomalies include dental fusion, which arises through the union of two normally separate dental germs. Some authors suggest a multidisciplinary treatment in patients with fused teeth, performing root canal treatment and veneers. Treatment options depend on several factors, such as the type of anomalies; root development; age and compliance of the patient; and the morphology of the pulp chamber and the canal.

Case report: This report is about a case of dental fusion in lower incisors, treated orthodontically with first premolar extractions. The objectives were to improve the profile orthodontically, keeping the fused teeth to achieve dental harmony. Orthodontic treatment is performed on an 11-year-old female patient, using MBT slot 0.018 appliances, with extractions, transpalatal and lingual arch to maintain anchorage. Following the MBT protocol.

Results: The results were satisfactory both facial and dental, achieving the previously established objectives, such as Class I molar and canine relationship, keeping the fused incisors in a good position.

Conclusion: To decide the treatment, its clinical characteristics as well as the aesthetic and periodontal involvement must be taken into account. These can be successfully treated with a multidisciplinary team and achieve aesthetic and functional results.

Keywords: dental fusion, orthodontics, premolar extraction.

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I. Introduction

Dental anomalies, like fusion, concrescence, and gemination, are considered congenital malformations caused by the lack or excess in the development of dental tissues; they're divided by their shape, number, size, and position; these can cause a delay in the replacement of the dentition and sometimes it can also cause a deficit in the development of the jaws^{1,2}

Dental gemination and fusion are often confused. Dental fusion is the union of two contiguous tooth germs in the developmental process, determined by the union of two pulp chambers. If fusion occurs in the primary dentition, there may be a congenital absence of one of the successor's teeth. Dental gemination is described as an attempt to divide the tooth bud. In most cases, the division is incomplete and leaves a single root with a root canal. The differential diagnosis can be made based on clinical inspection, by counting the teeth of the arch, presenting in fusion a reduced number, while in gemination the amount is considered normal.²

The prevalence of dental fusion is 0.5% to 2.5% in primary dentition, with a lower prevalence in permanent dentition (0.1% to 1%). There are no differences in the incidence between the sexes. It occurs frequently in the lower incisors, although it generally affects upper incisors, either as a fusion of the central and lateral incisors or as the union of a normal incisor and a supernumerary lateral incisor. A predilection for localization in the anterior areas of the jaws has been demonstrated, affecting more often incisors and canines; and less commonly the premolars and molars. There are also cases of bilateral fusions, being also more frequent in the primary dentition and the mandible.^{4,5}

Its presence in the interincisal region can cause esthetic problems, which are not easy to solve if the fusion extends radicularly. Problems related to loss of arch length and delayed or ectopic eruption of permanent teeth can also occur, as well as caries along the attachment line and periodontal abscesses. Therefore, the clinical management is interdisciplinary and the surgical procedure used to separate the two teeth is a good alternative for a conservative solution, given the presence of pulp chambers and independent root canals.^{5,6}

The treatment protocol for dental fusion has been classically carried out in a multidisciplinary approach comprising surgical sectioning of the teeth (hemisection), extraction of one of the sectioned segments, endodontic treatment of the remaining segment (with a reserved prognosis), orthodontic correction and implant or fixed partial prosthesis.^{7,8}

The present report is about a case of dental fusion in lower incisors, treated orthodontically with extractions of first premolars.

II. Case Report

An 11-year-old female patient came to the orthodontic clinic of the School of Dentistry at the Universidad Autónoma de Baja California, Tijuana campus, for consultation: "I want my teeth to be straight".

In the extraoral photographic analysis, it was found that the patient presented a normocephalic biotype, with apparent facial symmetry, symmetrical superciliary line, proportionate eyes, symmetrical pupillary line, medium nose, lips and mouth, lip incompetence present, and symmetrical commissural line; increased lower third regarding the middle and upper third, convex profile, nasolabial angle of 97°, lips opposite Ricketts esthetic line and upper dental midline deviated 2 mm to the right concerning the facial midline (Fig. 1).



Fig. 1 Initial extraoral photographs.

In the intraoral analysis, the patient presented mismatched midlines, the dental fusion of d.o. #31-32 and #41-42, bilateral C1 molar relationship and indeterminate canine relationship bilaterally (due to the position of o.d. #13 and 23), square upper arch with severe crowding and ovoid lower arch with moderate crowding, overjet of 5 mm and overbite of 40% (Fig. 2).



Fig. 2 Initial intraoral photographs.

In the radiographic study, the orthopantomography showed the 4 germs of the third molars, uniform bone density, and adequate crown-root relationship, and also confirmed the dental fusion of 31-32 and 41-42 (Fig. 3).

Cephalometry demonstrated a skeletal class II due to maxillary protrusion, vertical growth pattern, increased posterior facial height and proinclined upper and lower incisors (Fig. 4 and Table 1).



Fig. 3 Initial orthopantomography.



Fig. 4 Initial lateral skull radiograph.

	MEAN VALUE	PATIENT
SNA	82	85
SNB	80	80
ANB	2	5
SND	76	76

Go-Gn/SN	32	37
Occlusal plane/SN	14	19
Maxillary depth	90	93
1s/NA	22	25
1i/NB	25	36
1i/Go-Gn	90	103
Interincisal	131	113

Table 1 Initial cephalometric measurements.

-Treatment objectives:

The treatment objectives were to improve the profile, correct overbites, maintain the molar relation CI, obtain the canine relation CI, preserve the fused teeth, correct midlines, correct crowding in both arches, achieve harmonious arches with a functional occlusion and good periodontal health.

-Treatment plan:

For the management of this patient, the extractions of the upper and lower first premolars were indicated, as well as the placement of TPA to maintain anchorage and avoid molar rotation, and the placement of lingual arch to maintain anchorage. Use of upper and lower fixed appliances, MBT 0.018" slot technique from American Orthodontics[®], alignment and leveling, arch sequence, finishing and retention.

-Treatment progress:

Extractions of upper and lower first premolars were performed, together with the placement of the TPA and lingual arch, as well as the cementation of fixed appliances of the upper arch, 4 weeks later the lower appliances were cemented, carrying out the alignment and leveling phase in both arches with the sequence of arches indicated in the MBT technique. Once this stage was completed, the blocks were formed in the anterior sector and mass retraction was started by means of elastic chains; in this phase class II mechanical intermaxillary elastics were also used as support. Control orthopantomography was taken and the necessary brackets were repositioned to achieve root parallelism. Two months later, a tongue thrust appliance was placed as support to close the bite, continuing with the elastics until the desired settlement was achieved and when it was obtained, radiographs were taken for evaluation, and the fixed appliances were removed for the subsequent placement of retention in both arches (Fig. 5, 6).

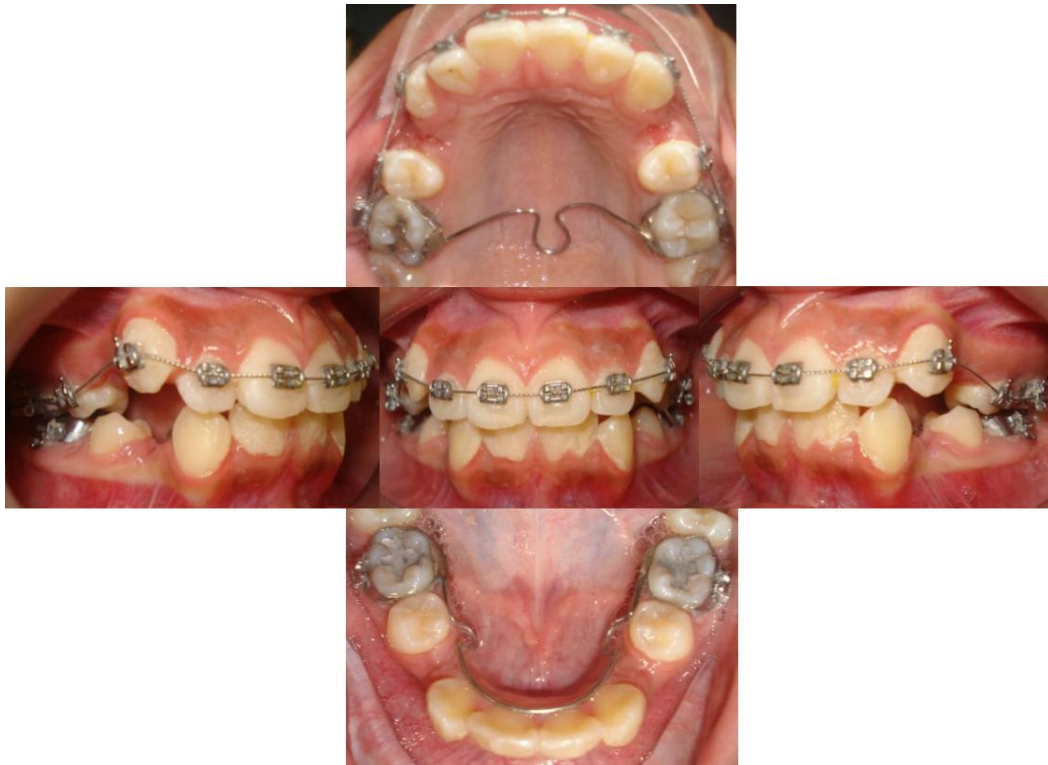


Fig. 5 TPA and lingual arch wires, upper fixed appliances MBT 0.018" slot.



Fig. 6 Complete fixed appliances, lower tongue thrust appliance.

III. Result

The results were satisfactory, both facial and dental, achieving the previously established objectives: profile correction, overbite and crowding, molar and canine class I, and keeping the fused teeth in a good position. Thus, reaching occlusal stability and facial harmony in the patient (Figs. 7, 8 and 9).



Fig. 7 Intraoral result, with canine guidance.



Fig. 8 Extraoral result.



Fig. 9 Radiographic result.

IV. Discussion

The etiology of dental fusion can be associated with:

- Physical forces or pressures that cause necrosis of epithelial tissue, causing the union of the enamel organ and dental papilla.
- Down syndrome and ectodermal dysplasia, focal dermal hypoplasia, and oro-facial-digital syndrome.
- Genetic predisposition
- Systemic diseases
- Vitamin deficiencies
- Lack of space in the arcade
- Trauma ¹

Deepak NallaswamyVeeraiyan and Aaron Fento suggest multidisciplinary treatment in patients with fused teeth, performing root canal treatment followed by veneers.⁷ However, in the present case, for economic reasons, esthetic restorations were not performed.

Treatment options depend on several factors, such as the type of anomalies, root development, pulp chamber and root canal morphology, age and compliance of the patient. The esthetic factor is the determining factor in the choice of treatment. If the pulp chambers and canals are separated, some suggest separation and extraction of the anomalous tooth with orthodontic closure of the space and remodeling of the teeth. Another option is surgical separation with the restoration of both teeth. There is also the alternative of selective wear of the fused teeth to reduce the width of the crown.⁹ In this case, we opted to keep the fused teeth, alleviating crowding with the help of extractions.

V. Conclusion

Dental anomalies can cause functional problems due to dental size discrepancies, decreasing the arch perimeter. For this reason, it is very important to perform an analysis of dental proportions to arrive at a diagnosis and an accurate treatment plan. To decide the treatment, the clinical characteristics should be taken into account, as well as the esthetic affectation and periodontal health; these can be successfully treated with a multidisciplinary team and achieve more esthetic and functional results.

VI. Recommendations

It is recommended to maintain good communication with the multidisciplinary team to be able to offer different treatments that provide similar aesthetic results within an economic range so that the patient can select the one that best suits their conditions.

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