



Interdisciplinary Approach in a Clinical Case with Fusion of the Upper Central Incisors

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Abstract

Dental anomalies cause significant aesthetic and functional problems in the maxillary and mandibular arches. This clinical case describes an interdisciplinary treatment of a patient diagnosed with fusion in the right upper central incisor and macrodontia of the left (perhaps a fusion). A 7-year-old male patient the changes that occur during dental development induce variations in number, size, shape and position of teeth and can affect the deciduous dentition as well as the permanent dentition.

Introduction

Dental anomalies cause significant aesthetic and functional problems in the maxillary and mandibular arches. The changes that occur during dental development induce variations in number, size, shape and position of teeth and can affect the deciduous dentition as well as the permanent dentition. Despite the undefined etiology, lesions of the developing dental germs, environmental factors and genetic factors are pointed out as possible causes of these anomalies [1,2].

Fusion and twinning are dental alterations both in size and shape that occur frequently in the anterior region of the maxilla. They can cause problems such as crowding, rotation, diastema and ectopic eruption of the adjacent teeth [1].

Fusion is the union between one or more adjacent tooth germs during tooth development. It can be complete, when it involves crowns and roots, or incomplete, when it includes only the crowns. The tooth may have separate or fused root canals. Clinically, a fused tooth has a wide crown and two independent root canals [1,3].

Twinning occurs after the division of a tooth germ and results in the incomplete formation of two partially or completely separated crowns with one root and one root canal. It is clinically characterized by an incisive fissure and a wide crown. The twinned teeth are mostly unilateral [4].

Radiographically, a fused tooth has two pulp chambers and their own root canals, whereas a twinned tooth has a single pulp chamber and a single root canal. Clinically, the differential diagnosis may be difficult, therefore there's a need for complementary examinations such as panoramic and/or periapical radiographs [5].

The incidence of twinned teeth (0.19% to 0.22%) is approximately half when compared with fused teeth (0.42%), and there is no significant difference between men and women [3].

Several treatment approaches have been indicated in the last years according to different anomalies and teeth involved. Such procedures include aesthetic restorations in composite resin, prosthetic rehabilitations or extraction and consequent rehabilitation, for orthodontic or periodontal reasons. This means that the treatment of these teeth requires an interdisciplinary approach, including areas such as orthodontics, periodontology, oral surgery, implantology and prosthodontics [5,6].

This clinical case describes an interdisciplinary treatment of a patient diagnosed with fusion in the right upper central incisor and macrodontia of the left (perhaps a fusion).

Description of the Clinical Case

A 7-year-old male patient was referred to orthodontics because his parents were concerned about the anomaly of his upper central incisors (Figure 1, 2).

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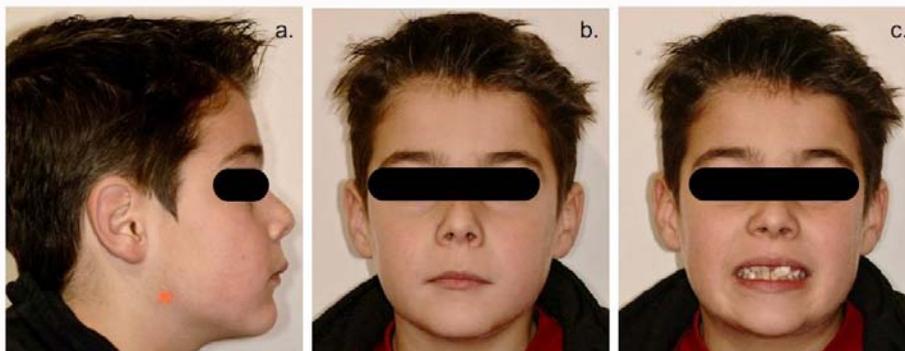


Figure 1: Initial records: Extraoral photographs.



Figure 2: Initial records: Intraoral photographs.

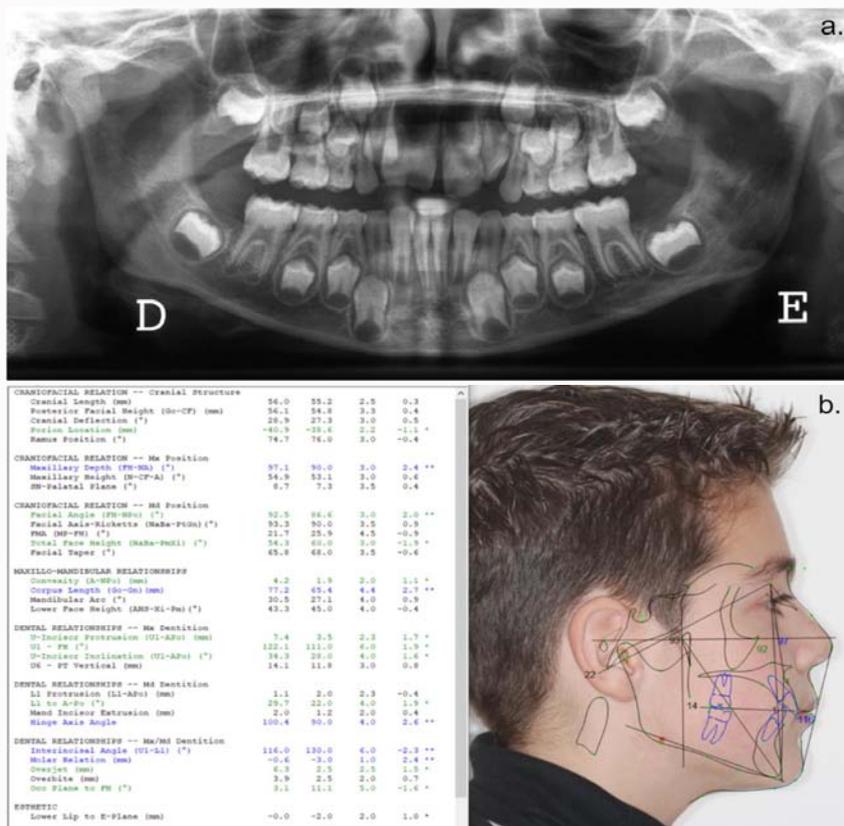


Figure 3: Panoramic radiograph (a) and cephalometric tracing (b).

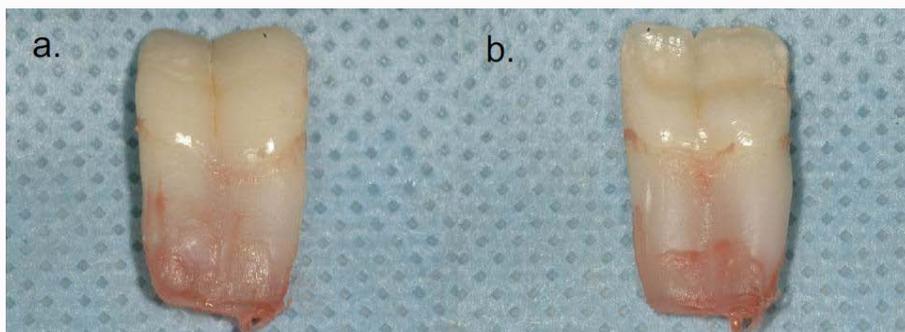


Figure 4: a) Lingual surface of the extracted tooth 11; b) Palatal surface of the extracted tooth 11.



Figure 5: Intraoral photographs at the early treatment.

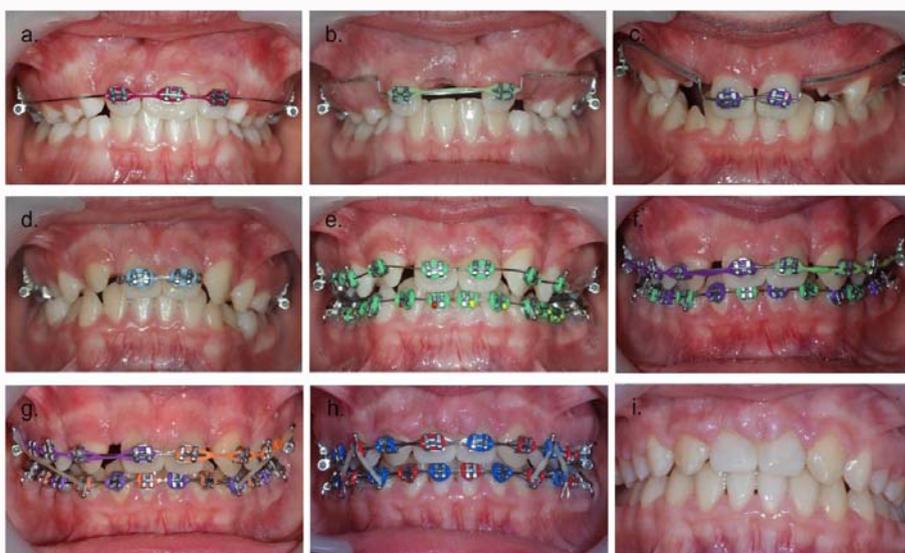


Figure 6: Frontal intraoral photographs of the evolution of the orthodontic treatment.

Diagnosis

The patient presented a Class I malocclusion with shape and size anomaly of the teeth 11 and 21. The diagnosis was fusion of teeth 11 and 21. In addition, there was evidence of mandibular incisor crowding (Figure 3).

Treatment plan

Any treatment goal would involve extraction of the anomalous incisor teeth and future rehabilitation of the anterosuperior dentition with interdisciplinary treatment.

Given the high technology available, we considered treatment without replacement of the incisor teeth with dental implants. To achieve this, we planned mesial movement of the upper dentition in a way that the advanced lateral incisors would later allow a prosthetic restoration, giving them shape and dimension of the missing central

incisors. The same would be done for the maxillary canines, which would occupy the space of the lateral incisors and simulate them with prosthetic restorations. Thus, the first premolars would become canines.

The final occlusion was predicted as therapeutic Class II.

Obviously, treatment would continue until the end of craniofacial growth, when periodontal treatment and definitive prosthetic rehabilitation would be more appropriate. Before rehabilitation with full crowns and ceramic veneers, tooth whitening was proposed.

Clinical approach

Due to the patient’s early age and his therapeutic needs, it was necessary to act clinically to cause the mesial eruption of the upper dentition without causing too much aesthetic disturbance. Therefore, we decided to extract fused tooth 11 (Figure 4) and close the space



Figure 7: a) Initial clinical situation; b) Final clinical situation.



Figure 8: a) Extraoral photograph of final smile; b) Intraoral photographs of the final result.



Figure 9: New data collection: Protocolar extraoral and intraoral photographs.

orthodontically, with mesial movement of the lateral incisors towards tooth 21. This would also allow a more mesial eruption of the definitive canines (future lateral incisors).

When the exchange between deciduous and permanent teeth of the maxillary support areas was processed, we extracted the macro tooth 21. From that moment on, with a segmented orthodontic technique (bioprogressive) in which we used a utility arch as anchorage, we promoted the mesial movement of the lateral incisors

(Figure 5) which we, afterwards, increased in their mesiodistal dimension with composite resin. Meanwhile, the canines erupted, as well as the remaining permanent dentition. From then on, the treatment was conducted with the therapeutic Class II goal in mind, and canine brackets were bonded on the first premolars and lateral incisor brackets on the canines [7].

Figure 6 shows the case at the end of the orthodontic treatment with gingival hyperplasia between incisors and canines caused



Figure 10: Dental preparation, color selection and rehabilitation with full crowns and ceramic veneers.



Figure 11: a) Presurgical situation; b) Connective tissue graft overlaid on the recipient bed; c) Immediate postsurgical situation.



Figure 12: a) Extraoral photograph of final smile; b) Intraoral photographs of the final result.

by tissue condensation and triggered by mesial movement. We then proceeded with retention with a 3rd generation Zachrisson bar [8], and a Hawley retainer. Afterwards we refer the case to the periodontologist.

In order to mimetize teeth 11 and 21 by camouflaging the lateral incisors, a clinical crown lengthening of these teeth was performed to define the position of the future gingival zeniths on the central incisors.

The procedure consisted of redefining the gingival margin, in keratinized gingiva, with gingivectomy, together with the corresponding apical repositioning of the bone contour with flapless osteotomy (Figure 7).

Illustrates the end of the first phase of the interdisciplinary

treatment, where orthodontic treatment was completed (Figure 8).

At 18 years of age, the patient had another data collection (Figure 9) in order to continue the initial treatment.

In this phase, after dental whitening, the aesthetic planning of the case was performed with an increase in the size of the new central incisors and re anatomization of the canines and premolars using ceramic veneers. We opted for prosthetic rehabilitation with full crowns on teeth 12 and 22 and ceramic veneers on teeth 14, 13, 23 and 24. Since the full crowns on teeth 12 and 22 would be made of a different material (zirconia), we decided to initially bond the veneers and place two polymethylmethacrylate crowns with the final shape on teeth 12 and 22. This allowed better control over the final color of the restorations. The veneers were bonded under absolute isolation using a resin cement (Variolink DC, Ivoclar Vivadent®). In a second stage

an impression was taken on teeth 12 and 22 for the fabrication of two zirconia crowns, which were cemented with a self-adhesive resin cement (MaxCem Ellite, Kerr) (Figure 10).

As far as the periodontal plastic approach, the aim was to level the gingival margins in the aesthetic zone, managing symmetry between the 1st and 2nd quadrants by treating the gingival recessions and increasing the volume of soft tissues in teeth 21 and 22.

Regarding this, we performed root coverage of the central and lateral incisors with a subepithelial connective tissue graft from the palate. The surgery was accomplished after teeth rehabilitation with ceramic veneers in order to take advantage of their optimal marginal adaptation to the root surface, with the finish line placed at a corresponding height to the cemento-enamel line, providing space for adequate stabilization of the graft and coronal migration tissue (Figure 11, 12).

Discussion

Sometimes general practitioners and orthodontists are faced with fractures, avulsions or even dental anomalies in the anterior region of the jaws. In these cases, a decision must be made about a possible restoration of the edentulous space. According to Kokich [9] there are several options to replace a missing maxillary central incisor. One of the solutions is to maintain the edentulous space during childhood and adolescence and place a bridge or an implant in adulthood. Another solution is to close the edentulous space and replace the central incisor with the lateral incisor. The appropriate solution for the absence of an upper central incisor will depend on the specific characteristics of each situation.

In this case, we chose to close the orthodontic space combined with aesthetic rehabilitation. This interdisciplinary treatment involved the specialties of orthodontics, periodontology and prosthodontics. The aesthetic and functional results were achieved and corroborate other authors, such as Marco Rosa [10].

Accordingly, there are premises to be considered for treatment success, of which we highlight individualized extrusion and intrusion during mesial movement of the canine and first premolar, respectively, to obtain an optimal level of the marginal gingival contours; correction

of the torque of the canine and premolar crowns; the increase in width and length of mesially relocated teeth, respecting each aesthetic contour with composite resin, inlays or ceramic veneers, in order to achieve ideal aesthetics and occlusion; dental bleaching to balance the color, as the canines are darker and more yellowish teeth; and minor surgical procedures to lengthen clinical crowns, when necessary.

Conclusion

The success of this unique clinical case is an unequivocal illustration of the importance of a beforehand concerted interdisciplinary treatment.

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