Dental Traumatology

Dental Traumatology 2009; **25**: 532–534; doi: 10.1111/j.1600-9657.2008.00742.x

Space closure after extraction of two central upper incisors and re-shaping of laterals

CASE REPORT

Sigrid Justus Vassão[1], Denilson Antonio Cavina[2], Tatiana Banzatto Kreia[1], Bruno Bochnia Cerci[1], José Vinicius Bolognesi Maciel[3], Orlando Motohiro Tanaka[1]

[1]Orthodontics, Pontifical Catholic University of Paraná, PUCPR, Curitiba, Brazil; [2]University of Ponta Grossa, UEPG, Paraná, Brazil; [3]Orthodontics UFRJ, Rio de Janeiro, RJ, Brazil

Abstract – A 13-year-old boy had fractured both maxillary central incisors when he was 8 years old, resulting in pulpar damage. At the time of the accident, root canal therapy was performed. Although the teeth were retrieved, their roots were short and not fully developed. Cephalometric analysis suggested extraction of the four first premolars to achieve aesthetic and functional objectives. To attend to the patient's chief complaint, and with his parents' approval, both upper central incisors were extracted followed by periodontal and cosmetic procedures to improve the patient's smile as well as his self-esteem and satisfaction.

Correspondence to: Prof. Dr Orlando Tanaka, DDS, MSc, PhD, Graduate Dentistry Program – Orthodontics, R. Imaculada Conceição, 1155, Curitiba, Brazil
Tel.: +55 41 3271-1637
Fax: +55 41 3271-1405
e-mail: tanaka.o@pucpr.br

Accepted 22 August, 2008

Treatment of a malocclusion with anterior teeth missing, as in patients with missing maxillary lateral incisors due to agenesis or after severe dental trauma, can be accomplished by two alternatives; closing or maintaining the space (1). If anterior teeth are avulsed, the solution is immediate replantation (2). Follow-up alternatives are auto-transplantation of a developing premolar (3–6), maintenance of the space during childhood and adolescence, placing a bridge or implant during adulthood (7) or closing of the space by mesial movement of the laterals (7, 8). The choice of solution depends on the specific situation. The objective of this case presentation is to illustrate an alternative with space closure for two central incisors.

Case report

A 13-year-old boy, who due to an accident at the age of 8 years had damaged his central incisors, was referred for orthodontic treatment. The orthodontic diagnosis was Class I malocclusion with crowding of the anterior teeth in both jaws (Fig. 1a,b). Measurement on study models and total space analyses showed discrepancy of 8 mm in mandibular jaw (9). The cephalometric analysis indicated a skeletal Class II relationship (ANB 6°) with retrognatic mandibular (SNB 78°), a vertical growth tendency (FMA 30°; SN-GoGn 36°) and protrusive incisors. Furthermore, he had a long face tendency and was mouth breathing.

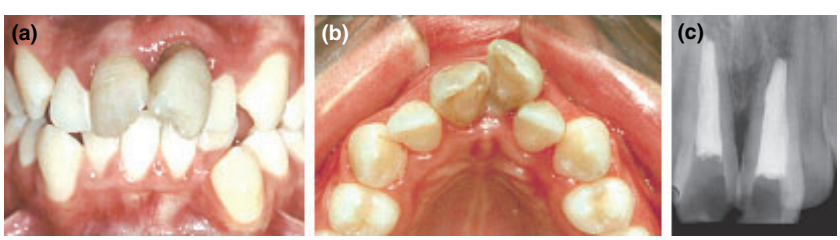

Fig. 1. Anterior maxillary and mandibular crowding. Endodontic treatment, altered color and fracture on incisal edges of maxillary central incisors.

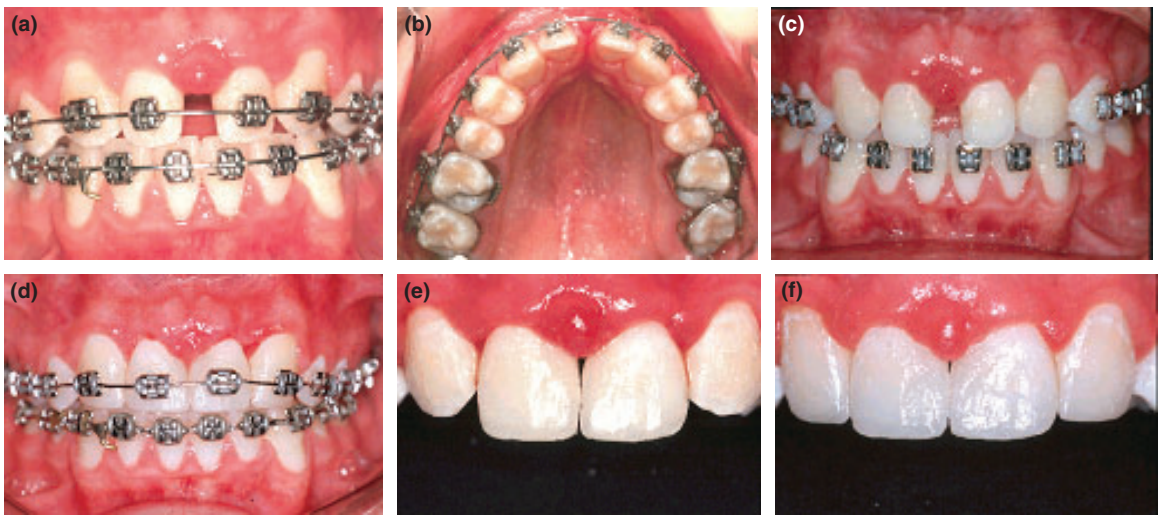

Fig. 2. Orthodontic treatment initiated with extraction of the maxillary central incisors and mandibular first premolars. Fixed complete edgewise appliance, slot 0.022″ × 0.028″. Diagrammatic drawing after Zachrisson (8). Lateral incisor replaced central incisor with root parallelism between the entire central incisor and the lateral incisor moved in the mesial direction.

Clinically the upper central central incisors were discoloured (Fig. 1a,c). Due to endodontic treatment at an early stage of root development, the long-term prognosis was poor. The following treatment plan was decided: Extraction of the central incisors, movement of the lateral incisors mesially, aligning of the teeth, coordination of the arch forms, correction of the midline, and extraction of the first mandibular premolars to establish Class I molar relationships. The decision was based on the type of occlusion, space conditions, the lateral incisors width and root length, and the shape and shade of the canines (8, 10). The risk of root resorption during tooth movement was also taken into consideration and explained to the parents. An edgewise appliance was used (Fig. 2a–f).

By the completion of orthodontic treatment at 14 years 11 months, a normal occlusion was achieved with clinical and radiographic results within the limitation and difficult of the malocclusion (Fig. 3a–e). A gingivectomy was performed in the maxillary first premolar areas to provide normal vertical tooth proportions (Fig. 3f,g). Harmonious smile was achieved with satisfaction to patient and parents (Fig. 4a–c). The occlusion was stable at follow-up after 5 years and 7 months with an acceptable aesthetic result (Fig. 5a–c).

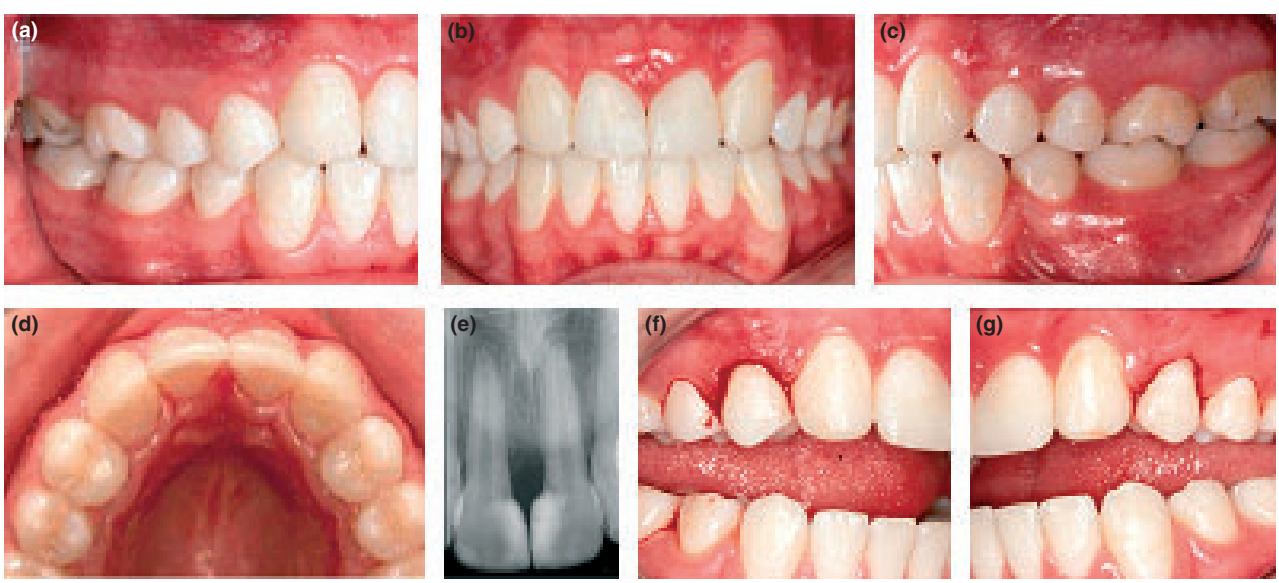

Fig. 3. Restorative dentistry procedures for transposing lateral incisors to replace central incisors, and for canines replacing lateral incisors. Clinical sequence: removal of brackets from the maxillary canines and lateral incisors. Shade selection. Canine reshaped into lateral incisors.

Fig. 4. Gingival reconstruction with restorative dentistry after gingivoplasty. Clinical and radiographic signs of normality.

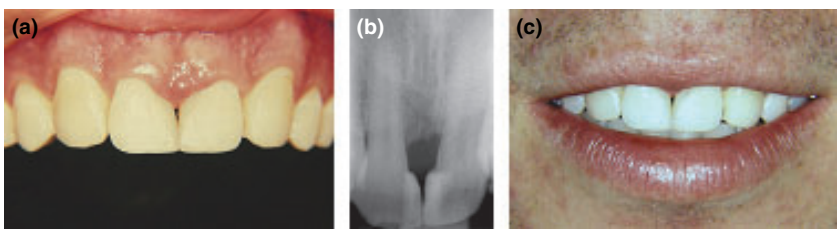

Fig. 5. Final facial photographs. Broad and harmonious smile. In order to obtain satisfactory esthetic results, a simple gingivoplasty was performed on the first maxillary premolars.

Discussion

The clinical aesthetic result for single implants replacing maxillary incisors is less desired. The difficulties in obtaining a natural gingival contour are partly due to the relationship between implants and the bone and gingiva surrounding them (6). The challenge in treating patients with missing maxillary incisors and any coexisting malocclusion is how to achieve the best aesthetic and functional results, particularly in the long term. In this regard, a comparison between properties of transplants and implants is relevant.

A patient with a missing maxillary incisor must have realistic expectations with regard to the treatment outcome, and must be informed about the benefits and drawbacks of relevant treatment alternatives, both in the short and long terms (11). In this case, transplantation of premolars was not chosen because of fully formed roots and closed apices. Implants, on the other hand, are not indicated in growing individuals (12). Space closure after loss of two central incisors is a challenge and it is necessary to compromise to create harmony.

An important characteristic that should be observed is the lack of inclination of the lateral incisors while closing the diastema, which provides an artificial aspect to the smile. A slight crown inclination in the mesial direction is more evident in the lateral than maxillary central incisors when using orthodontic tools.

In the present case, the conditions for space closure were optimal and the outcome must be considered as successful after the gingivectomy and restoration.

Conclusion

Orthodontic space closure with lateral incisors replacing missing central incisors may be a good option in cases with crowding and malocclusions.

References

1. Rosa M, Zachrisson BU. Integrating esthetic dentistry and space closure in patients with missing maxillary lateral incisors. J Clin Orthod 2001;35:221–33.
2. Ongkorahadjo A, Kusnoto B. The use of pre-implantation tooth lengths in the treatment of avulsed teeth. J Clin Pediatr Dent 2000;24:91–5.
3. Czochrowska EM, Stenvik A, Bjercke B, Zachrisson BU. Outcome of tooth transplantation: survival and success rates 17–41 years posttreatment. Am J Orthod Dentofacial Orthop 2002;121:110–9.
4. Czochrowska EM, Stenvik A, Zachrisson BU. The esthetic outcome of autotransplanted premolars replacing maxillary incisors. Dent Traumatol 2002;18:237–45.
5. Slagsvold O, Bjercke B. Applicability of autotransplantation in cases of missing upper anterior teeth. Am J Orthod 1978;74:410–21.
6. Zachrisson BU, Stenvik A, Haanae HR. Management of missing maxillary anterior teeth with emphasis on autotransplantation. Am J Orthod Dentofacial Orthop 2004;126:284–8.
7. Kokich VG, Crabill KE. Managing the patient with missing or malformed maxillary central incisors. Am J Orthod Dentofacial Orthop 2006;129:S55–63.
8. Zachrisson BU. Improving orthodontic results in cases with maxillary incisors missing. Am J Orthod 1978;73:274–89.
9. Merrifield LL. Differential diagnosis with total space analysis. J Charles Tweed Found 1978;6:10–5.
10. McNeill RW, Joondeph DR. Congenitally absent maxillary lateral incisors: Treatment planning considerations. Angle Orthod 1973;43:24–9.
11. Robertsson S, Mohlin B. The congenitally missing upper lateral incisor. A retrospective study of orthodontic space closure versus restorative treatment. Eur J Orthod 2000;22:697–710.
12. Chang M, Wennström JL, Odman P, Andersson B. Implant supported single-tooth replacements compared to contralateral natural teeth. Crown and soft tissue dimensions. Clin Oral Implants Res 1999;10:185–94.