

Use of Tip-Edge Brackets in Patients with Repaired Alveolar Clefts

[ROBBIE LAWSON, BDS \(Hons\), FDS RCS, MSD, MOrth RCS](#)

[PETER DURNING, BDS, MDS, FDS RCS, DOrth RCS](#)

Patients with repaired alveolar clefts can be difficult to treat orthodontically. Autogenous alveolar bone grafting of the residual cleft defect generally provides the best conditions for successful orthodontic treatment,¹ and excellent results have been shown in many patients who have undergone such procedures.^{2,3} However, complete alveolar integrity is not always obtained, particularly in older patients.^{4,5} If the initial grafting procedure is unsuccessful, regrafting may not be feasible.

Occasionally, therefore, it is necessary to achieve orthodontic goals in the absence of ideal alveolar bone support. This may not only limit the scope of orthodontic treatment, but also increase the risk of external root resorption if the roots of teeth adjacent to the cleft site are inadvertently moved out of cancellous bone.⁶

Preadjusted appliances have improved the efficiency of orthodontic care for the majority of malocclusions, but are not versatile enough to treat many cases that deviate significantly from normal.⁷ In cleft lip and palate cases with inadequate grafting, the average 2nd- and 3rd-order bracket prescriptions may be particularly inappropriate.

Differential Straight-Arch Technique

The Tip-Edge appliance has several advantages in these situations:⁸

- Selective 2nd-order tipping is possible, and further control can be gained by "power-tipping" with auxiliary springs.
- Although a range of tipping movements are possible, extreme tipping is prevented by the "self-limiting" bracket prescription.
- The bracket torque prescription can be circumvented by the use of round wires, or applied progressively using rectangular wires and auxiliary springs.⁹

The following two cases illustrate how Tip-Edge brackets can be valuable in treating patients with repaired alveolar clefts.

Case 1

A 15-year-old male presented with a bilateral complete cleft of lip, alveolus, and palate (Fig. 1). Bilateral autogenous alveolar bone grafting had been carried out at age 10, together with a tongue flap to repair the residual oronasal fistula. At age 15, there was contact between the maxillary right canine and central incisor, a significant midline discrepancy, and a large edentulous area from the left central incisor to the canine that would be difficult to deal with prosthodontically. In addition, the alveolar bone grafting to the left cleft had not been entirely successful, producing only a small bony bridge (Fig. 2). The radiograph confirmed the clinical impression of marked tipping of the central incisors to the right.

After consulting with restorative and maxillofacial surgeons, we chose a treatment plan involving:

- Extraction of the lower first premolars.

- Correction of the midline by distal tipping of the maxillary left central incisor and mesial tipping of the maxillary right central incisor.
- Equal distribution of the residual space in the maxillary lateral incisor areas, so that restorations with adhesive bridges could replace both lateral incisors.

Both maxillary central incisors were bonded with Tip-Edge maxillary left central incisor brackets to produce the desired tipping movements. The midline correction was rapidly achieved with coil springs between the maxillary right central incisor and canine (Fig. 3).

Radiographs taken after these tooth movements confirmed adequate alveolar support (Fig. 4). The Tip-Edge brackets were then replaced with preadjusted edgewise brackets, and gentle torquing of the maxillary central incisors was achieved with a thermally activated nickel titanium archwire (Fig. 5).

Case 2

An 18-year-old male presented with a repaired complete cleft of lip and palate on the left side (Fig. 6). An autogenous alveolar bone graft had been placed at age 11, and the canine had been exposed at age 17 after failing to erupt spontaneously.

The treatment plan involved:

- Extraction of the microdont maxillary left lateral incisor, which showed compromised periodontal support.
- Maxillary expansion with a quad-helix appliance.
- Correction of the Class III incisal and molar relationship using a preadjusted appliance and Class III intermaxillary elastics.
- Restorative modification of the maxillary left canine to simulate a lateral incisor. Radiographs taken prior to the finishing stage of treatment revealed marked mesial tipping of the maxillary left canine, with limited alveolar bone mesial to the canine root (Fig. 7). We therefore decided to replace the left canine edgewise bracket with a Tip-Edge bracket. Controlled mesial root uprighting was carried out with a Side-Winder uprighting spring over a round base archwire, thus avoiding undesirable torque expression. This minimized the risk of moving the root out of the limited area of alveolar bone, which could have led to root resorption (Fig. 8).

The patient declined a gingival graft to improve the esthetics in this area (Fig. 9).

Conclusion

These cases show that selective integration of Tip-Edge brackets into a preadjusted appliance system can take advantage of the benefits of both systems and simplify orthodontic treatment of patients with repaired alveolar clefts. □

FIGURES



Fig. 1 Case 1. 15-year-old male with repaired bilateral complete cleft of lip, alveolus, and palate.

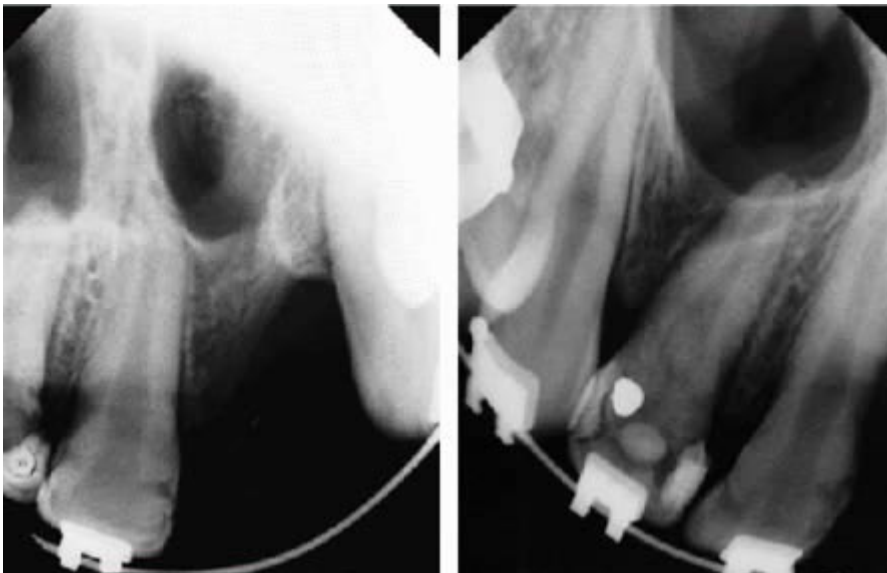


Fig. 2 Case 1. Incomplete alveolar bone grafting on left side.



Fig. 3 Case 1. Push-coil mechanics, with Tip-Edge maxillary left central incisor brackets used on both maxillary central incisors.

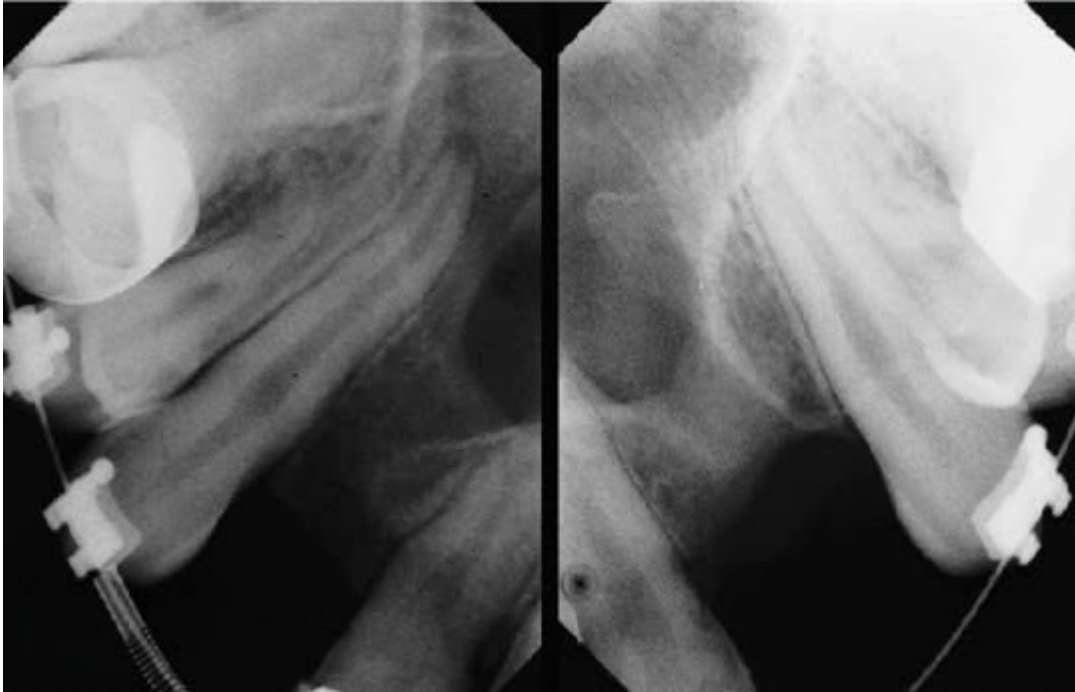


Fig. 4 Case 1. Adequate alveolar support after midline correction.



Fig. 5 Case 1. Patient after treatment and restorations.



Fig. 6 Case 2. 18-year-old male with repaired complete cleft of lip and palate on left side.



Fig. 7 Case 2. Mesial tipping of maxillary left canine, with limited alveolar bone mesial to canine root.



Fig. 8 Case 2. After controlled mesial root uprighting with Tip-Edge bracket and Side-Winder spring.



Fig. 9 Case 2. Patient after treatment.

REFERENCES

- 1 Boyne, P.J. and Sands, N.J.: Secondary bone grafting of residual alveolar and palatal clefts, *J. Oral Surg.* 30:87-92, 1972.
- 2 Bergland, O.; Semb, G.; and Abyholm, F.E.: Elimination of the residual alveolar cleft by secondary bone grafting and subsequent orthodontic treatment, *Cleft Palate J.* 23:175-205, 1986.
- 3 Enemark, H.; Sindet-Pedersen, S.; and Bundgaard, M.: Long-term results after secondary bone grafting of alveolar clefts, *J. Oral Maxillofac. Surg.* 45:913-918, 1987.
- 4 Sindet-Pedersen, S. and Enemark, H.: Comparative study of secondary and late secondary bone grafting in patients with residual cleft defects: Short term evaluation, *Int. J. Oral Surg.* 14:389-398, 1985.
- 5 Helms, J.A.; Speidel, T.M.; and Dennis, K.L.: Effect of timing on long-term clinical success of alveolar cleft bone grafts, *Am. J. Orthod.* 92:232-240, 1987.
- 6 Rune, B. and Jacobsson, S.: Dental replacement resorption after bone grafting to the alveolar cleft, *Plast. Reconstr. Surg.* 83:614-621, 1989.
- 7 Dellinger, E.L.: A scientific assessment of the Straight-Wire Appliance, *Am. J. Orthod.* 73:290-299, 1978.
- 8 Kesling, P.C.: Expanding the horizons of the edgewise slot, *Am. J. Orthod.* 94:26-37, 1988.
- 9 Parkhouse, R.C.: Out torquing conventional edgewise mechanics, *Tip-Edge Today*, Spring 1993.

FOOTNOTES

- 1 Registered trademarks of TP Orthodontics, Inc., 100 Center Plaza, LaPorte, IN 46350.