C-Space Regainer for Molar Distalization

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Various methods for distal movement of the buccal teeth have been suggested. These include headgears, lip bumpers, space-gaining appliances, sliding jigs with Class II elastics, nickel titanium open-coil springs, superelastic nickel titanium wires, and repelling magnets.[1-9] The most significant drawback of such techniques is that an equal and opposite mesial force tends to flare the incisors labially. Anchorage loss of this type, manifested as an increase in overjet, can be a severe problem in dolichofacial facial types, especially those with tongue-thrust habits.

We use a removable appliance, called the "C-space regainer", to achieve bodily molar movement without significant incisor flaring. This appliance can be used to intrude teeth as well as to move them distally or sagittally. Its indications include:

- Mesial drift of the first molar following premature loss of the deciduous molar in the mixed dentition
- Mild arch-length discrepancy treated by extraction of second or third molars (with straight or flat facial profile)
- Open bite
- Class II malocclusion
- Class III malocclusion

Fabrication

The C-space regainer consists of a labial framework, formed from .036" stainless steel wire, and an acrylic splint (Fig. 1). A closed

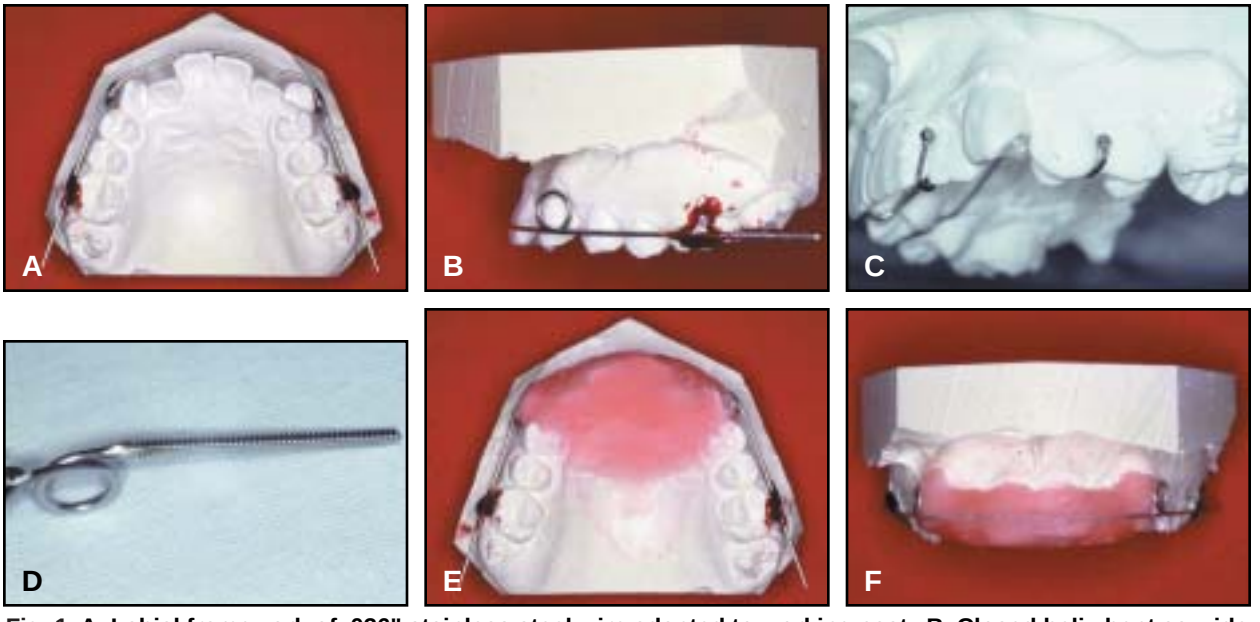

Fig. 1 A. Labial framework of .036" stainless steel wire adapted to working cast. B. Closed helix bent as wide as possible in canine region. C. Ball clasps for retention of appliance. D. Open-coil spring soldered immediately distal to helix. E. Palatal acrylic coverage on cast. F. Acrylic extended labially according to anchorage requirement.

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helix, as wide in diameter as comfort will allow, is bent into the framework in each canine region. The labial framework is extended distally to lie as close to the buccal molar tubes as possible, allowing easy insertion into the headgear tubes and improving the precision of the distal-driving force. The distal ends of the framework should be polished down for a loose fit in the molar tubes. An .010" × .040" open-coil spring is soldered immediately distal to the helix, and .028" ball clasps are used to retain the appliance.

The working cast is placed on a large glass slab for construction of the acrylic splint. After the labial frame and ball clasps have been stabilized, a separating medium is painted on. The acrylic is normally applied to cover the crowns of all the anterior teeth. The cast is immediately inverted on the glass slab, and the acrylic is extended labially according to the amount of anchorage needed. After the acrylic has cured, the plate is scalloped around the cervical margins, leaving it thick enough to contact the mandibular incisors.

If anterior protrusion is to be avoided, .028" ball clasps are added facially, between the lateral incisors and canines, to serve as hooks for Class II elastics or J-hook headgear traction. If maxillary expansion is needed, a midpalatal screw can be incorporated in the midline of the acrylic and activated one-quarter turn every three days.

Appliance Placement

The open-coil spring should be 130% of the length between the solder point and the mesial edge of the headgear tube. When compressed, it will exert 200g of force and move the molars distally about 1-1.5mm per month.[2,9] Vertical control is maintained by adjusting the wire framework occlusally or gingivally (Fig. 2).

The patient should be checked every three weeks for the constant application of coil-spring pressure. When reactivation is needed, the helix is squeezed with a heavy-wire or three-prong plier, moving the labial wire extension and the coil spring distally. When the labial wire is reinserted in the headgear tube, the initial compressive force will be regained (Fig. 3).

A molar overcorrection of at least 2mm dis-

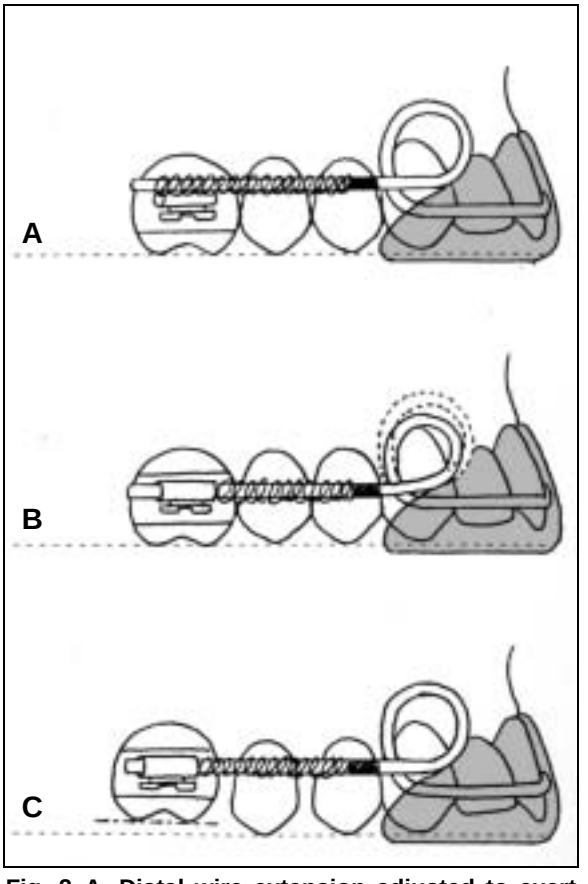

Fig. 2 A. Distal wire extension adjusted to exert intrusive and distalizing force. B. Distal extension inserted into molar tube. C. First molar moves distally and palatally, above occlusal plane; second bicuspid then drifts distally.

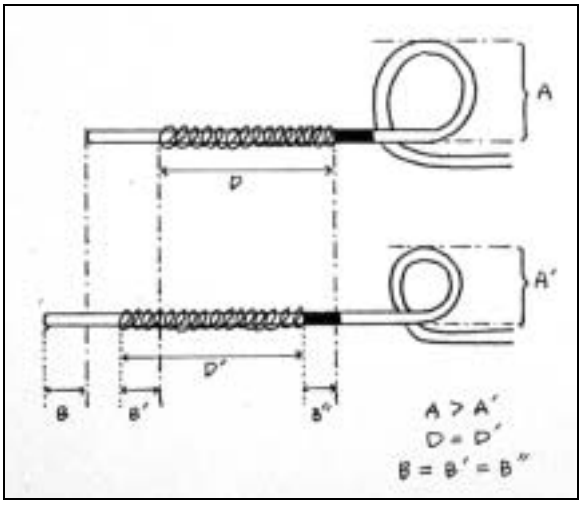

Fig. 3 Compression of closed helix for reactivation of C-space regainer. Labial framework and coil spring are moved distally to close helix and regain initial compressive force.

tal to the normal Class I position will be needed because of the inevitable mesial relapse. A Nance button should be placed immediately after removal of the C-space regainer to hold the molars in position and allow the maxillary buccal segments to drift distally while the transseptal fibers reorient. The entire maxillary arch is bonded or banded, and a continuous archwire with omega stops mesial to the terminal molar tubes is placed. Thus, the entire arch is used for anchorage while the buccal segments are moved distally and the first molars are prevented from moving mesially along the wire. A headgear should then be worn for a few months; although this requires some patient compliance, it is for a shorter period than headgear is traditionally used.

Case 1

A 12-year-old female presented with a unilateral high canine and mild lower crowding (Fig. 4). She had a flat profile and a slight lingual inclination of the maxillary incisors. No extractions were performed. After three years of retention, the treatment result was maintained.

Case 2

A 9-year-old female showed a moderate arch-length discrepancy in the maxillary arch (Fig. 5). The maxillary first molars had drifted and tipped mesially due to early loss of the deciduous molars. The four maxillary incisors were used as an anchorage unit for distalizing the first molars.

Case 3

The patient was a 15-year-old female with a Class III malocclusion and a maxillary arch-length discrepancy (Fig. 6). She had a flat profile, an open-bite tendency, and normally angulated incisors, making premolar extractions undesirable. Therefore, the maxillary second molars were removed. Anchorage was reinforced by the maxillary anterior teeth, the palate, and the mandibular arch. The anterior open bite was reduced by intrusion of the maxillary first molars.

Case 4

A 15-year-old male presented with a Class III malocclusion and an anterior open bite (Fig. 7). The mandibular second molars were extracted. The entire maxillary arch was incorporated into the anchor unit by means of Class III elastics. As the mandibular first molars were intruded and distalized, the anterior open bite was reduced.

Conclusion

The molar distalization demonstrated in this article was almost all bodily movement, with only minor distal tipping and rotation. Some slight labial movement of the anterior teeth was observed as a counteraction to the distal movement of the molars, but the acrylic splint kept this flaring to a minimum.

In appropriately selected cases, it appears that the C-space regainer is a viable method of molar distalization. A more comprehensive study

Fig. 4 Case 1. A. 12-year-old female with unilateral high canine and mild mandibular crowding. B. Placement of C-space regainer. C. Distal movement of posterior segments in eight months. D. Twenty months later, after removal of fixed appliances. E. Three years after retention.

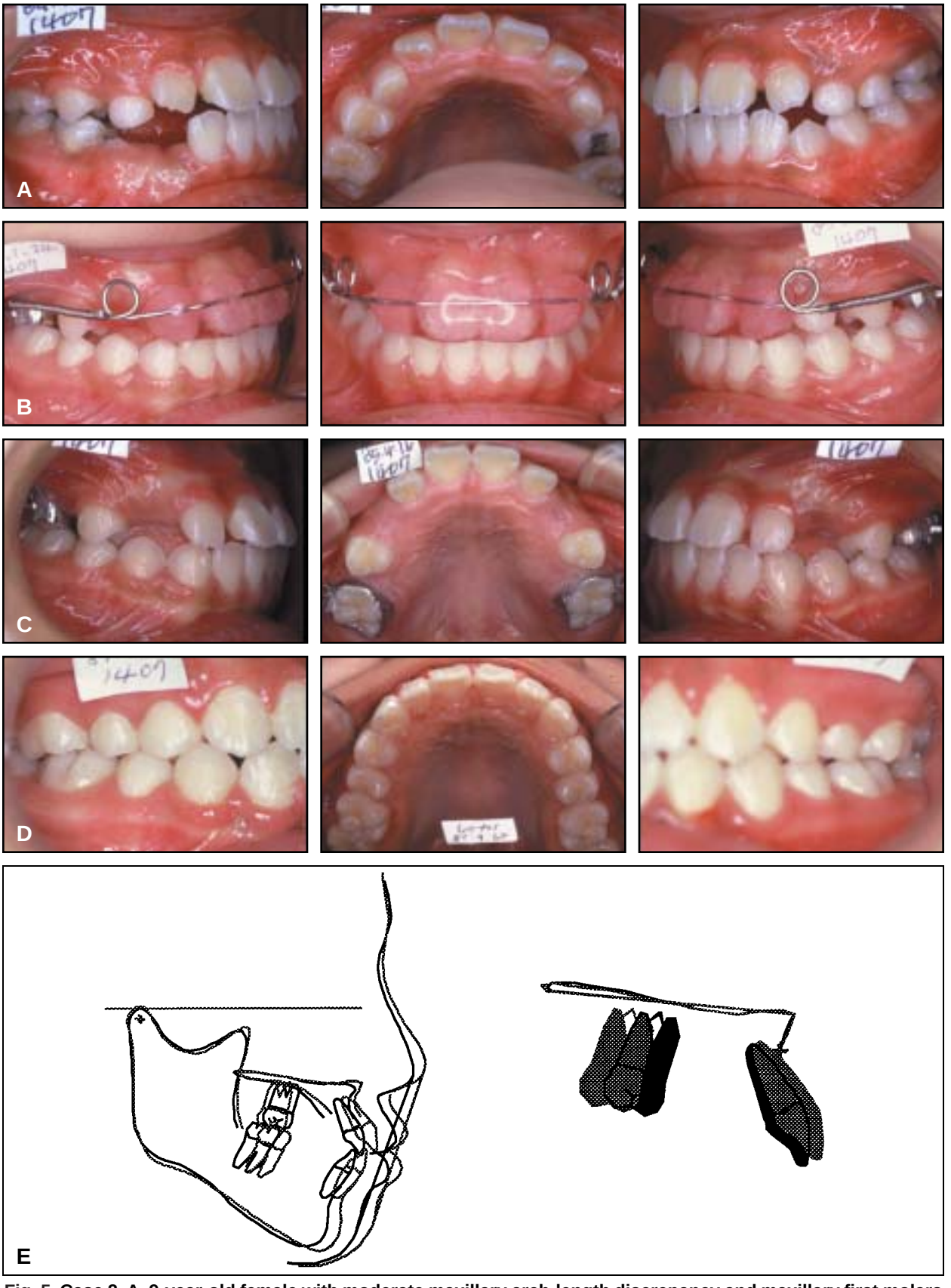

Fig. 5 Case 2. A. 9-year-old female with moderate maxillary arch-length discrepancy and maxillary first molars tipped distally due to early loss of deciduous molars. B. C-space regainer using maxillary incisors as anchorage unit. C. After three months of distal molar movement. D. After completion of treatment, 26 months later. E. Superimpositions of cephalometric tracings before and after molar distalization show only slight flaring of maxillary incisors.

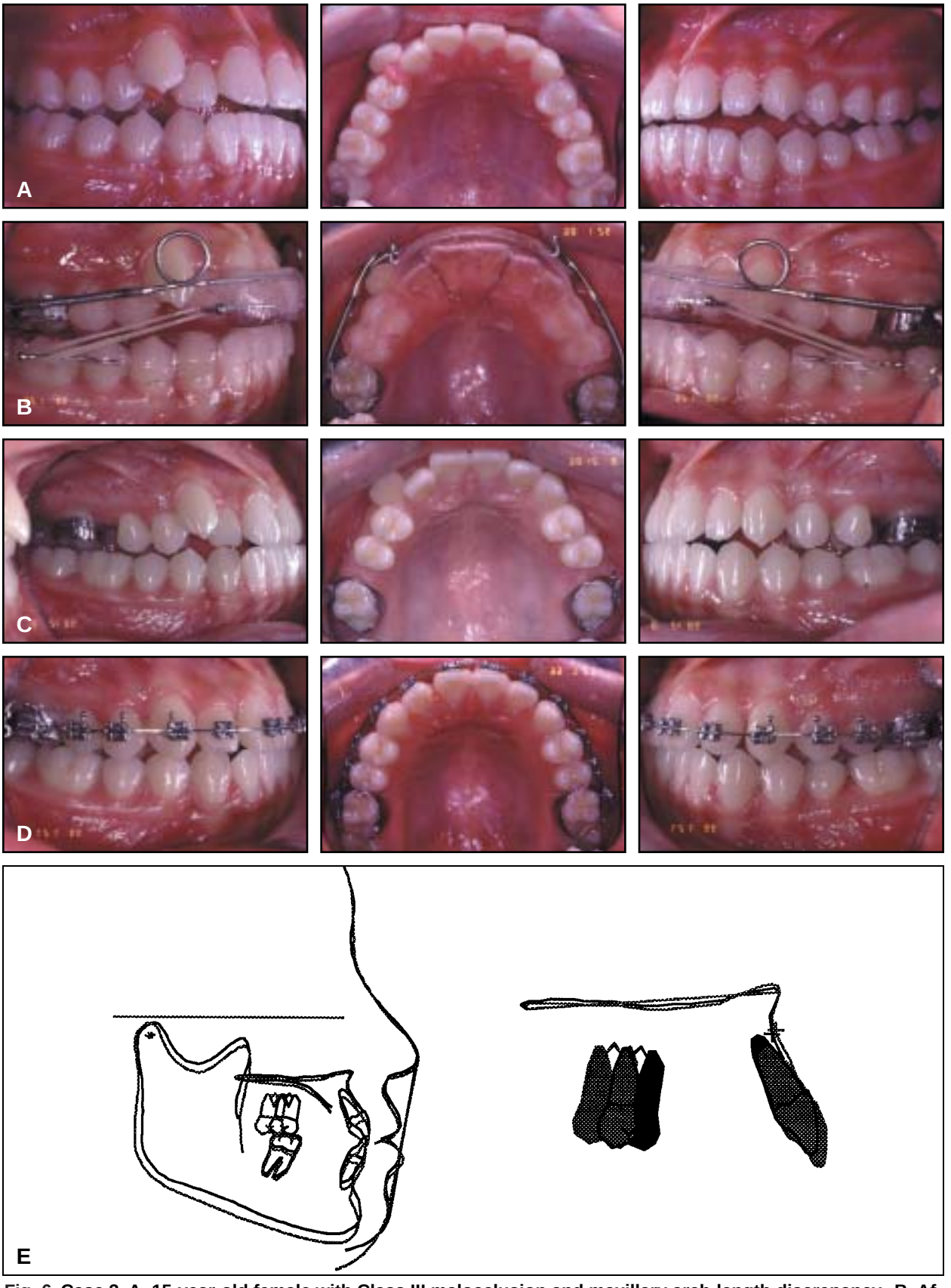

Fig. 6 Case 3. A. 15-year-old female with Class III malocclusion and maxillary arch-length discrepancy. B. After extraction of maxillary second molars and placement of C-space regainer. C. Distalization and intrusion of maxillary first molars in 11 months. D. Placement of maxillary fixed appliance, eight months later. E. Superimpositions of cephalometric tracings before and after molar distalization show relative intrusion of maxillary first molars.

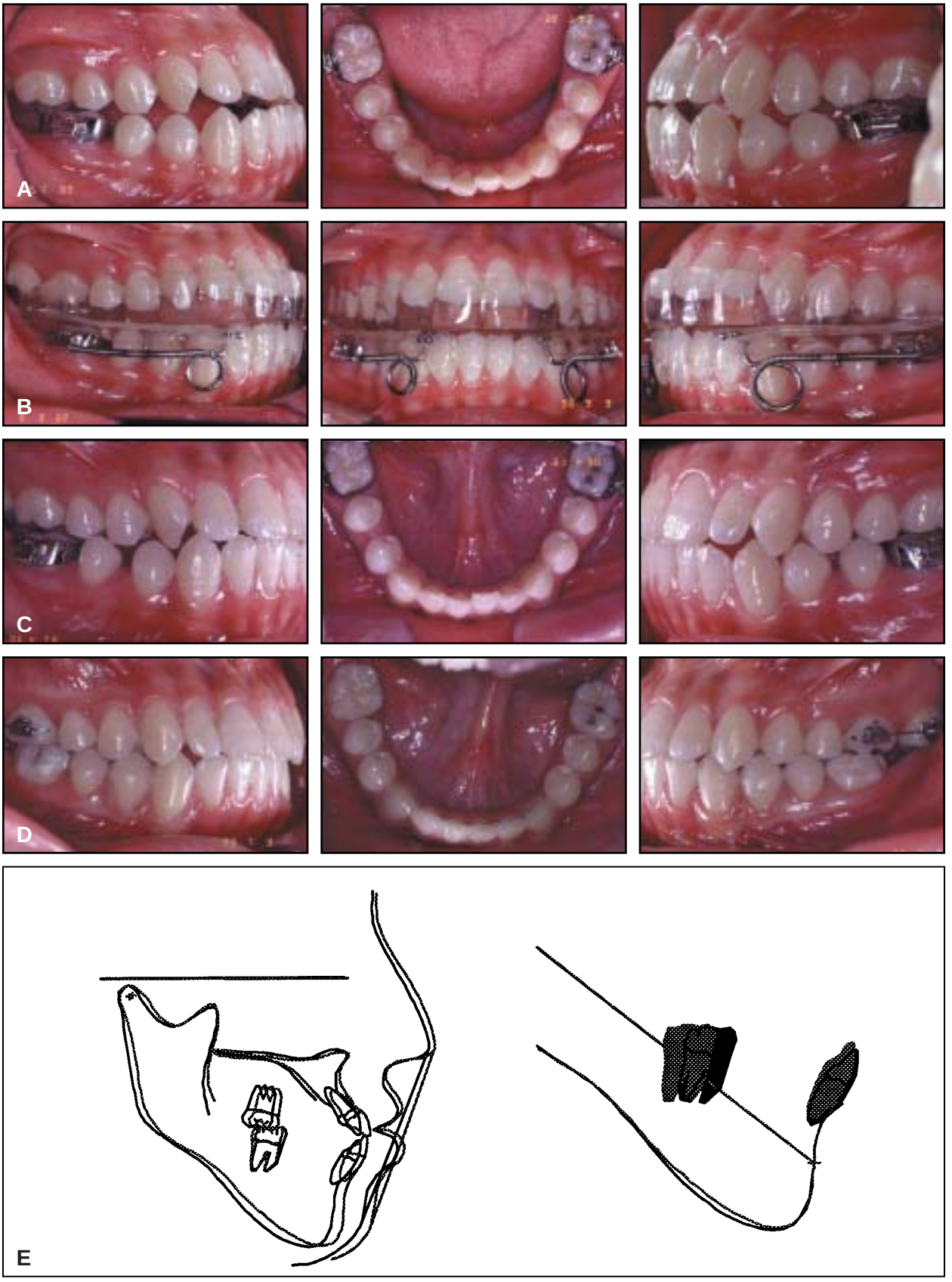

Fig. 7 Case 4. A. 15-year-old male with Class III malocclusion and anterior open bite. B. After extraction of mandibular second molars and placement of C-space regainer and Class III elastics. C. Distalization and intrusion of mandibular first molars in four months. D. Patient 27 months later. E. Superimpositions of cephalometric tracings before and after molar distalization show distal movement and intrusion of mandibular first molars.

controlling all variables (amount of distalization required, posterior crowding, force levels, resistance of the anchor unit, type of malocclusion, and quality and quantity of posterior alveolar bone) is needed before firm conclusions about treatment effects can be drawn.

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