

# Space Closure in Patients with Missing Mandibular Incisors

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**W**hen a patient presents with missing teeth, a decision must be made whether to open or close the spaces. In a case with a missing mandibular incisor, treatment considerations include esthetics, occlusal function, soft-tissue profile, and stability. Evaluating the tooth-size-arch-length discrepancy of the mandibular anterior teeth in relation to the maxillary arch can help guide treatment decisions.

If the remaining mandibular incisors have normal or large mesiodistal widths, the maxillary lateral incisors are smaller than normal, and the posterior occlusion is Class I or Class III, a non-extraction approach to space closure can be used. The final occlusion will then have Class I canine and molar relationships, but a mandibular central incisor will be in the middle of the arch. Maxillary interproximal enamel reduction may be needed to improve the relationship of the two arches.

If the patient has moderate-to-severe crowding in both arches, large maxillary incisors (especially lateral incisors), and a protrusive soft-tissue

profile, an additional mandibular incisor and two maxillary premolars can be extracted to improve the tooth-size discrepancy prior to space closure. If the maxillary lateral incisors are normal in size, maxillary second premolar extractions may be preferable to achieve better balance between the arches, since the first premolars are usually larger.

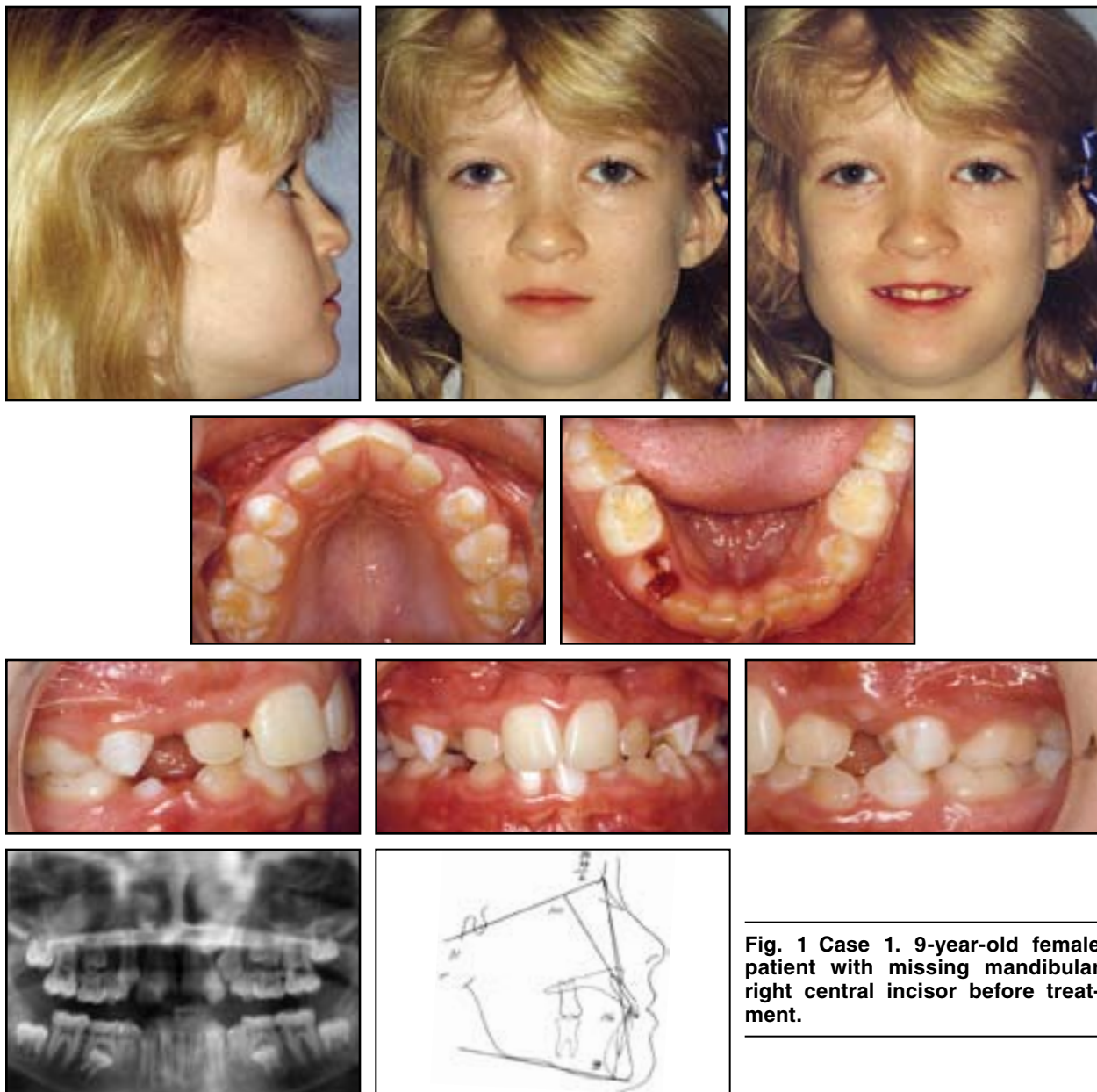
## Case 1 Nonextraction Approach

A 9-year-old female presented with a missing mandibular right central incisor (Fig. 1). The maxillary arch was narrow (intermolar width = 33.6mm), with blocked-out maxillary canines. The patient had a Class I molar relationship, an overbite of 4.0mm and overjet of 2.5mm, and a relatively straight soft-tissue profile. Cephalometric analysis revealed a Class I, low-angle skeletal pattern with normally positioned incisors.

Because of the patient's soft-tissue profile, the decision was made to pursue nonextraction treatment in two phases. The arch-length discrepancies were resolved with rapid transverse expansion using a palatal expander and a mandibular lip bumper<sup>1</sup> (Fig. 2). After a six-month maintenance phase, brackets were bonded first in the maxillary arch, then the mandibular arch (Fig. 3). A change in the usual bracket positioning was required for the three remaining mandibular incisors. The central incisor, placed in the middle of the mandibular arch, had a bracket angulation of 0°; the lateral incisors on either side were angulated at 4° (Fig. 4). All other teeth were bonded with their normal bracket angulations. A cervical facebow was worn at night to overtreat the molar relationships. The plan to obtain a functional final occlusion was achievable because of the patient's Class I molar relationship and small maxillary lateral incisors, which helped compensate for the tooth-



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**Fig. 1 Case 1. 9-year-old female patient with missing mandibular right central incisor before treatment.**



**Fig. 2 Case 1. Patient after 14 months of treatment with palatal expander and lip bumper.**



Fig. 3 Case 1. A. Patient after one month of treatment with .0175" Triple Flex\* wire in maxillary arch. B. Progress after treatment with .017" × .025" stainless steel wire in maxillary arch for four months and .017" × .025" D-Rect\* wire in mandibular arch for five months.

size discrepancy created by the missing mandibular incisor.

Final results showed the patient with good anterior and canine occlusal relationships and a final intermolar width of 37mm (Fig. 5). Post-treatment records taken 10 years later demonstrated long-term stability, with minor rotation of the mandibular right incisor (Fig. 6).

\*Ormco/"A" Company, 1717 W. Collins, Orange, CA 92867; www.ormco.com. Triple Flex is a trademark; D-Rect is a registered trademark.

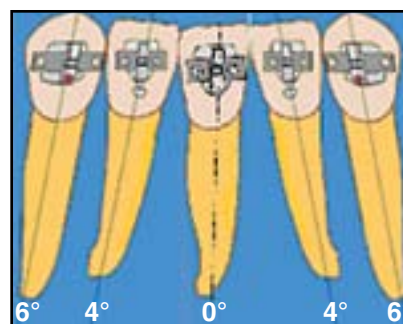
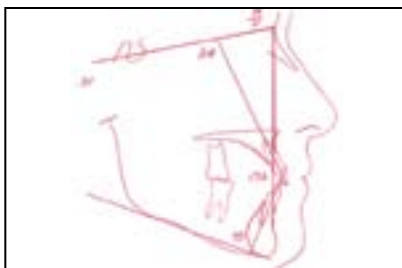
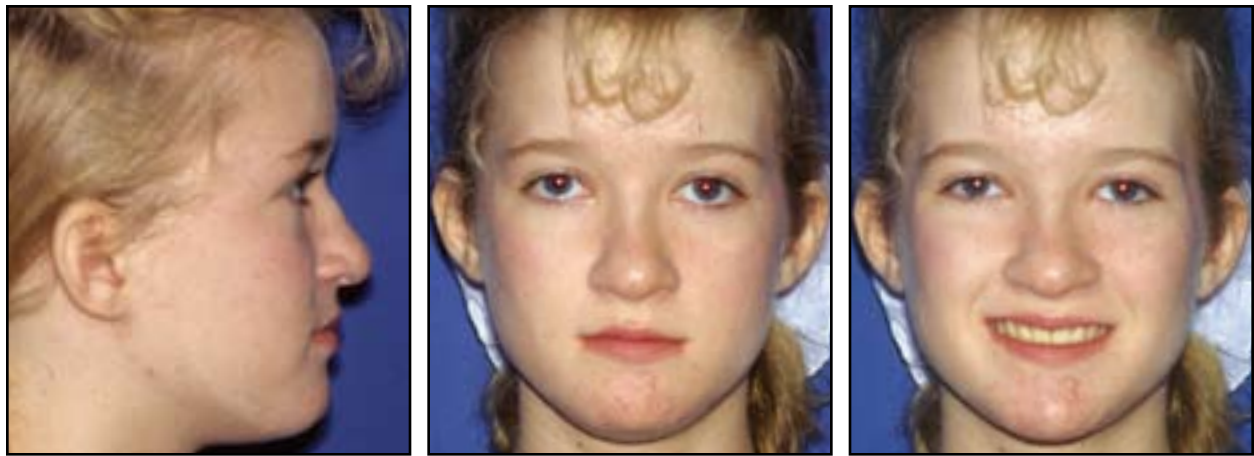


Fig. 4 Case 1. Mandibular bracket placement for incisor angulation.





**Fig. 5 Case 1. Patient at age 13, after 16 months of second-phase treatment.**



**Fig. 6 Case 1. Patient 10 years after treatment, at age 23. Note minor rotation of mandibular right incisor.**

### Case 2 Extraction Approach

A 13-year-old male presented with a missing mandibular right central incisor (Fig. 7). Clinical examination revealed minor crowding in the man-

dibular arch, unusually large maxillary lateral incisors, and a protrusive soft-tissue profile. The patient had a Class I molar relationship with an overbite of 5mm, an overjet of 7mm, and a mandibular midline deviation of 2mm to the right.

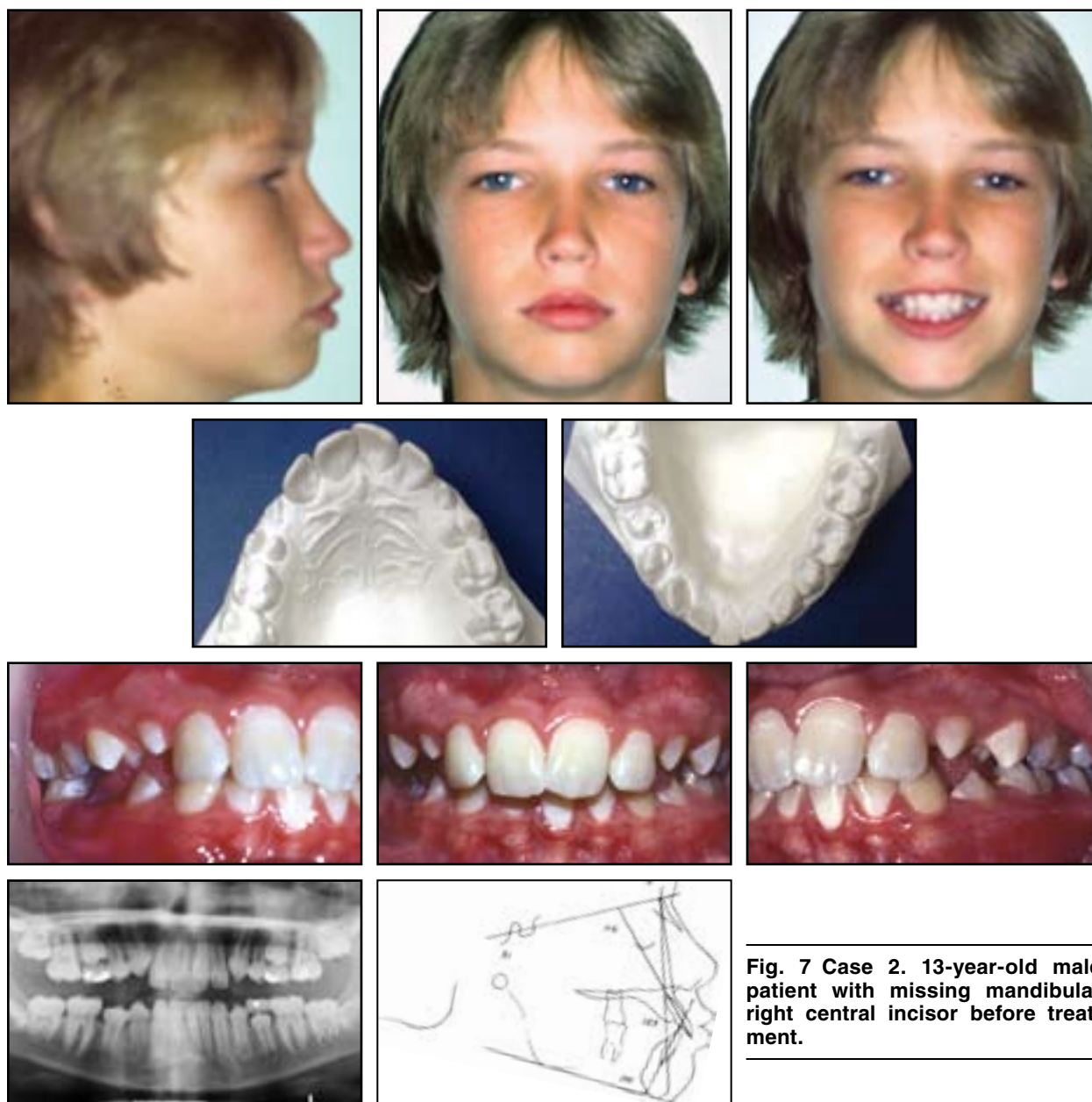
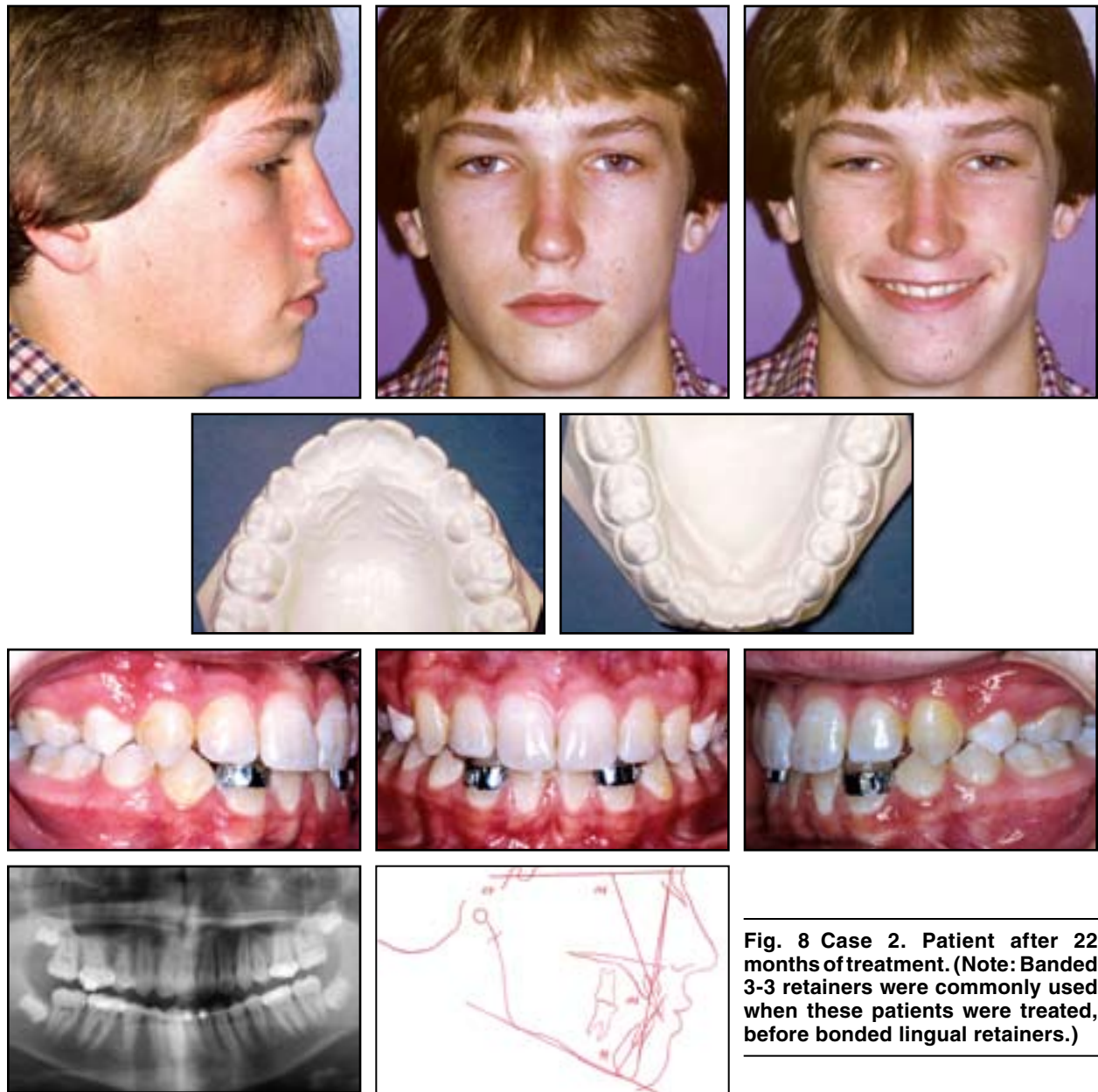


Fig. 7 Case 2. 13-year-old male patient with missing mandibular right central incisor before treatment.



**Fig. 8 Case 2. Patient after 22 months of treatment. (Note: Banded 3-3 retainers were commonly used when these patients were treated, before bonded lingual retainers.)**

Cephalometric analysis revealed a skeletal Class II relationship, a dental Class I relationship, and protrusive maxillary and mandibular incisors.

The treatment plan was to extract the remaining deciduous teeth, the maxillary first premolars, and the mandibular left central incisor. The patient wore a cervical facebow for 12 months.

After 22 months of treatment, he had bal-

anced facial features, Class I molar and canine relationships, normal overbite and overjet, a midline deviation of less than 1mm, and an ovoid maxillary archform (Fig. 8). Post-treatment records taken 28 years later demonstrated long-term stability, with minor rotation of the mandibular left incisor (Fig. 9).





Fig. 9 Case 2. Patient 28 years after treatment, at age 43. Note minor rotation of mandibular left incisor.

## Discussion

Some orthodontists would criticize the final occlusion in Case 2, arguing that it's undesirable to have the maxillary canines functioning on mandibular first premolars.<sup>2</sup> While the concern is legitimate, this patient's long-term follow-up records showed little change in cusp tips or gingival tissue, and no TMJ problems. Similar results have been found in other patients with unusual final occlusions.

The key to successful treatment of patients with missing mandibular incisors is the balance between maxillary and mandibular tooth sizes. The final occlusion should display normal overbite and overjet, anterior guidance, adequate canine

protection, and posterior function. In rare cases of two missing mandibular incisors, extraction of the maxillary second premolars rather than the first premolars can help rectify the tooth-size discrepancy. With continued improvements in dental implant techniques in recent years, opening space and placing a permanent implant has become an additional option.

## REFERENCES

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2. DiMatteo, A.M.: Pounding on the occlusion pulpit, *Inside Dent.* 4:102-110, 2008.