

Subdivision Malocclusions: Cracking the Riddle

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Almost every Class II malocclusion contains, to some degree, a discrepancy between centric occlusion and centric relation. A radiographic analysis should always be performed to determine whether additional factors, such as a mandibular or TMJ structural abnormality, are involved.

The majority of subdivision cases involve a mandibular shift rather than simply a dental shift. This can be confirmed in the individual patient by the following indications:

1. On closure, the mandible deviates to the right or left, and usually posteriorly as well.
2. With the jaw open, the maxillary and mandibular skeletal midlines coincide.
3. There is a Class II molar relationship on one side and a Class I molar relationship on the other.
4. The mandible can often be observed being forced into a more posterior position by occlusal interferences (or palatal tissue) during closure.

Treatment Goals

Once it has been determined that there is a mandibular shift, the first goal of subdivision treatment should be to unlock and center the mandible by freeing it in all three planes of space. It is the proper alignment of the mandible



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that allows a correct diagnosis to be made. For example, a case that may initially have appeared to need the extraction of a single mandibular bicuspid to align the mandibular dental midline might actually need no extractions at all if the midline shift is determined to be a CO-CR discrepancy instead of a dental shift.

Not all mandibular shifts are amenable to correction; in some adult patients, the musculoskeletal system has adapted to the errant position and will permit little or no change without surgery. In any case where one suspects a mandibular shift, however, its correction should be attempted as the first step in treatment.

To unlock the mandible, it is necessary to eliminate interferences. This can be accomplished in most cases by the following steps:

1. Advance the maxillary incisors.
2. Widen the buccal segments.
3. Eliminate cuspid interferences.
4. Reduce the overbite in severe overbite cases.
5. Correct crossbite relationships.

The mandible, once free, will usually center by moving forward on the posteriorly positioned side, correcting the unilateral Class II relationship. This change can be encouraged by the use of Class II elastics on the side where the mandible is distally displaced.

The exact sequence of subdivision malocclusion treatment is subject to the individual orthodontist's prescription for success. I view transpalatal arches and lip bumpers to be essential tools in these most difficult cases, as shown by the following examples.

Case 1

A 12-year-old girl presented with a Class II, division 1 subdivision malocclusion (Fig. 1). The following diagnostic criteria specific to subdivision were present:

- There was a Class II molar relationship on the

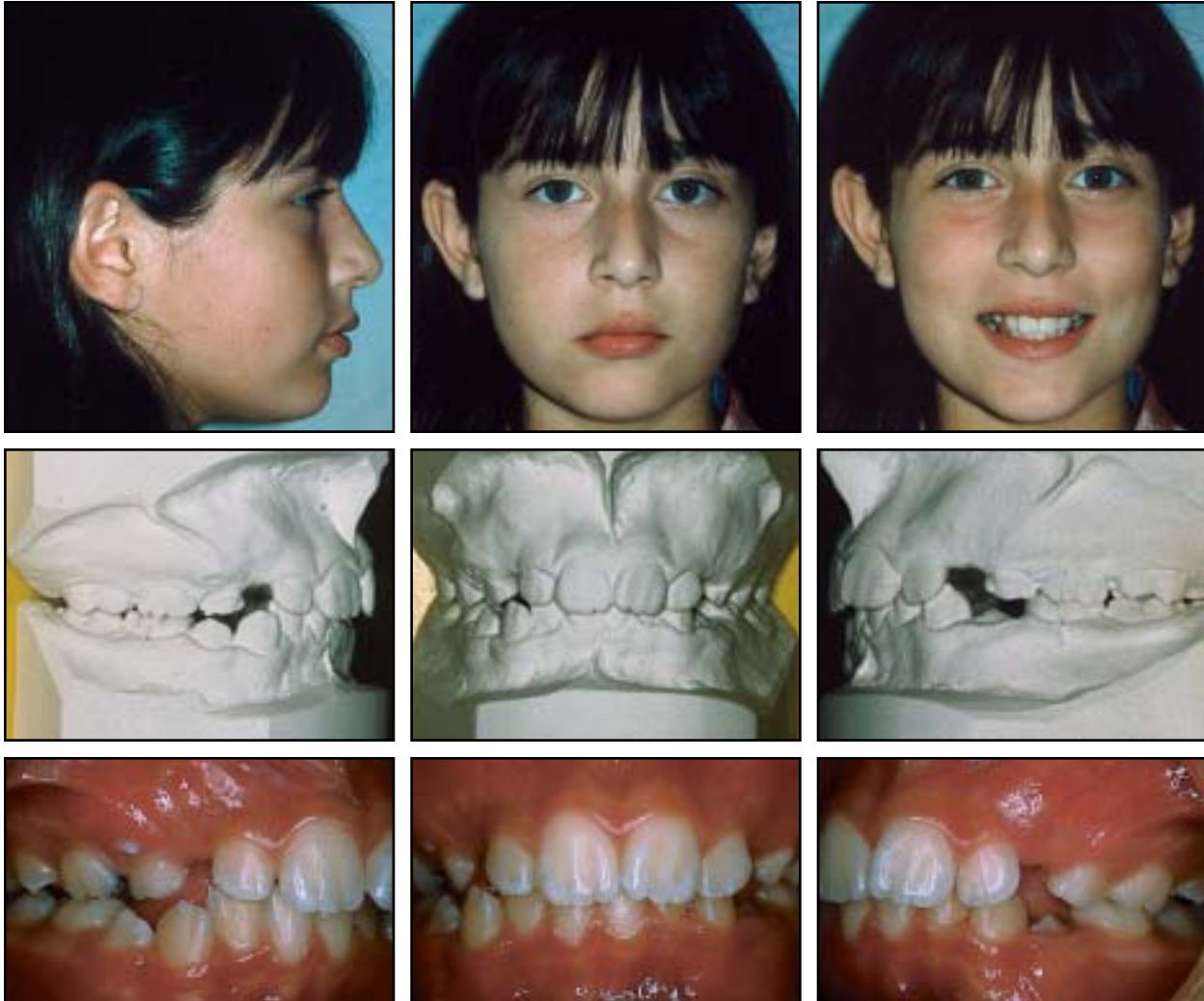


Fig. 1 Case 1. 12-year-old female patient before nonextraction treatment.

right and an end-on molar relationship on the left.

- The mandible aligned with the maxilla in the open position, but deviated to the right on closure from CR position into occlusion.

To free the mandible in three planes of space:

- A transpalatal wire was used to increase maxillary arch width.
- A multiloop archwire was used to advance the maxillary incisors.

- A lip bumper was used to open the bite while gaining space in the mandibular arch.

Once the mandible was free to close in a coordinated CO-CR position, it did so. This movement was aided by the use of a Class II elastic on the right side.

After nine months, edgewise appliances were placed, and a cervical headgear was added to help gain a solid Class I molar relationship. Total treatment time was 30 months (Fig. 2).



Fig. 2 Case 1. After 30 months of treatment.

Case 2

An adult patient presented with TMJ pain related to a Class II subdivision malocclusion (Fig. 3). The subdivision diagnosis was made by noting that:

- There was a Class II molar relationship on the right and a Class I molar relationship on the left.
- The mandible aligned with the maxilla when open, but as the mandible came into occlusal contact, it shifted to the right to achieve centric occlusion.

To free the mandible:

- Transpalatal wires were placed to the first and second molars to increase arch width and move the molars distally.
- The maxillary arch was bonded, and expansion was carried out in the cuspid-bicuspid area.
- The maxillary incisors were advanced and aligned.

Once the mandible was free to close in a centered position, it did so within 1mm. At this point, after 10 months of treatment, it became clear that the extraction of maxillary first bicuspids was required to reduce the overjet.



Fig. 3 Case 2. Adult female patient before maxillary first bicuspid extraction treatment.

After these teeth were removed, full edge-wise appliances were placed in the mandibular arch. The case was completed using anterior midline elastics, Class II elastics on the right, and Class III elastics on the left to finish the occlusion. The total treatment time was 24 months (Fig. 4).

Case 3

A 14-year-old boy presented with a Class

II, division 1 subdivision malocclusion (Fig. 5). The following diagnostic criteria indicated a subdivision malocclusion:

- There was a Class II molar relationship on the right and a Class I molar relationship on the left.
- The mandible aligned with the maxilla in the open position, but shifted to the left to come into centric occlusion.
- The mandible could be manipulated into a coordinated CO-CR position, but the patient could not close into this position due to interfer-



Fig. 4 Case 2. After 24 months of treatment.

ences.

A “headgear-expander” was placed to increase arch width and allow the mandible to center. The headgear helped reduce the overjet and gain a Class I molar relationship during four months of treatment.

The mandible was then free to center and move forward to reduce the overjet. The expander was removed, and edgewise appliances were placed, with the cervical headgear continued.

The case was finished with anterior midline elastics, Class II elastics on the left, and Class III elastics on the right. Total treatment time was 30 months (Fig. 6).

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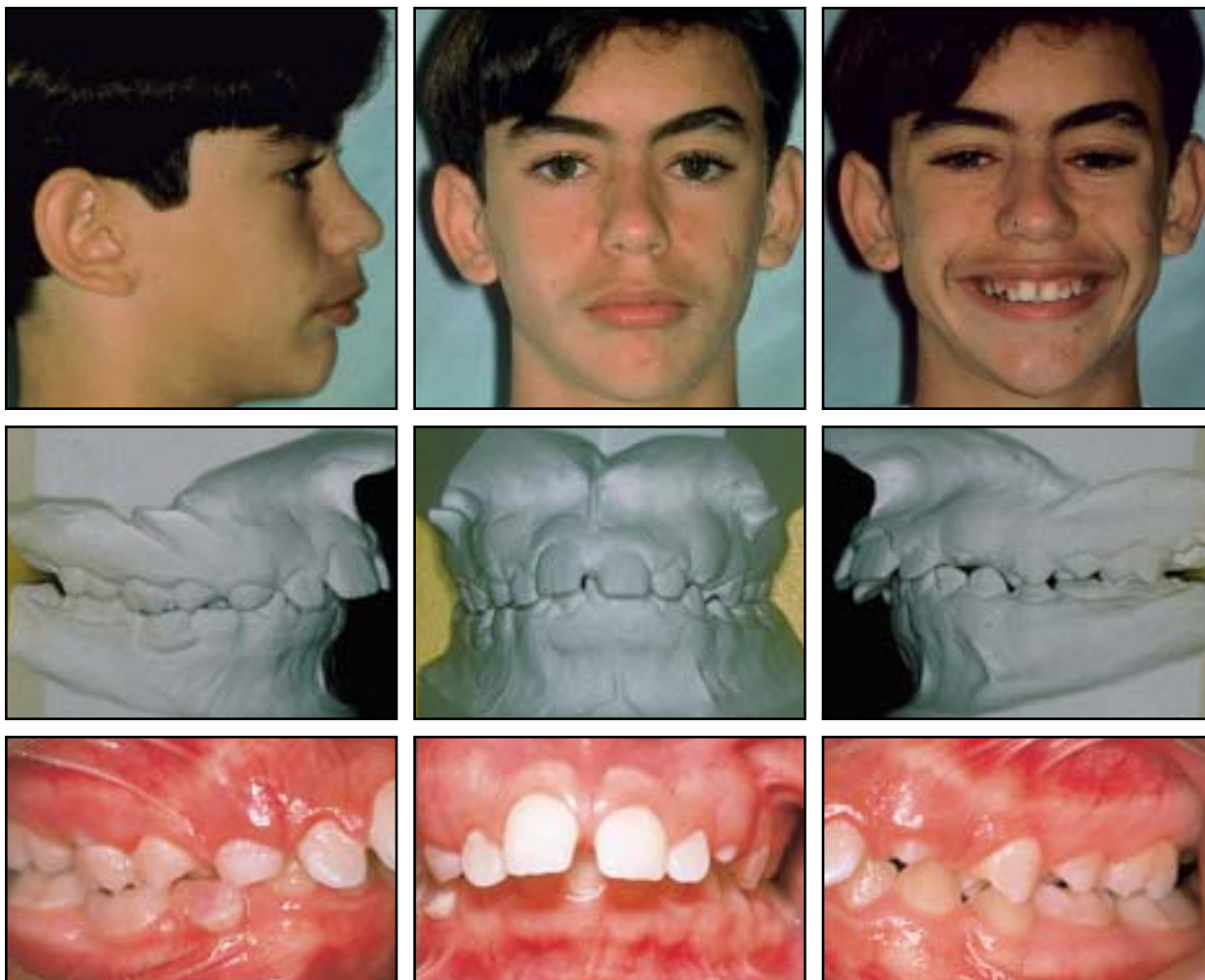


Fig. 5 Case 3. 13-year-old male patient before nonextraction treatment.

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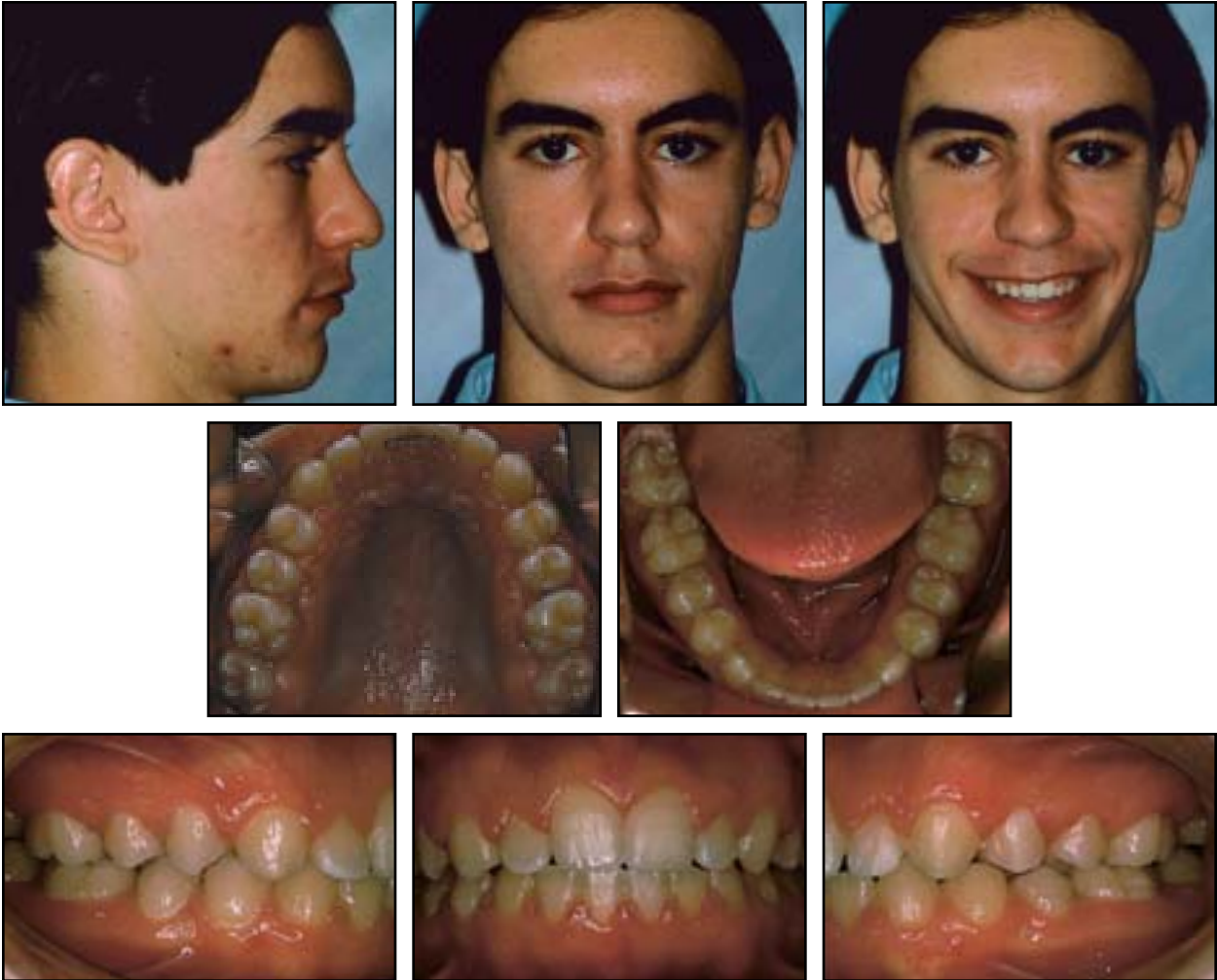


Fig. 6 Case 3. After 30 months of treatment.