

Unusual orthodontic retreatment

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This case report describes the retreatment of a patient with a Class II Division 1 malocclusion; she had the same anteroposterior discrepancy after undergoing fixed appliance treatment with extraction of 4 first premolars. (Am J Orthod Dentofacial Orthop 2003;123:468-75)

Class II malocclusions that are treated with extraction of 4 premolars require significant patient compliance and anchorage control to ensure a successful result.¹⁻⁹ However, not all patients comply as required, and anchorage can be difficult to control. Therefore, poor results can be expected, primarily in correcting an anteroposterior (AP) discrepancy.^{1,2,4,10,11} In this case report, we present the retreatment of a patient with a Class II malocclusion who was initially treated with 4 first premolar extractions, but, at the end, the same amount of Class II AP discrepancy remained. This unusual retreatment consisted of extracting the maxillary second premolars to correct the large overjet. The mechanotherapy and the pros and cons of this approach are discussed.

DIAGNOSIS AND ETIOLOGY

A 23-year-old woman came for orthodontic treatment to the private orthodontic office of Dr M.R.J. Her major complaint was the persisting large overjet. She was undergoing orthodontic treatment with extraction of 4 first premolars to correct a Class II Division 1 malocclusion. Unfortunately, her treatment was not proceeding well because of her lack of compliance with headgear to reinforce anchorage. As a result, despite the extractions, she still had a significant overjet (Figs 1-3). There was no crowding, and the curve of Spee was mild. Because she was not satisfied with her progress at

that stage, she abandoned treatment, with the orthodontic appliances still in place. One and a half years later, she decided to continue her treatment with Dr M.R.J. Cephalometrically, there was a severe Class II skeletal relationship with compensating maxillary and mandibular incisor tipping. The soft tissue profile was convex with a retruded mandible and chin (Fig 4 and Table). However, the patient said nothing about these characteristics. Radiographically, the maxillary third molars were in a favorable position functionally, but the mandibular third molars were not. Because of the previous unsuccessful orthodontic treatment, the maxillary incisors already had significant root resorption (Fig 5). There were no signs of active periodontal disease.

TREATMENT OBJECTIVES

The overall treatment objectives consisted of correcting the AP apical base and the occlusal relationships by advancing the retruded mandible. The compensatory tipping of the maxillary and mandibular incisors would also be corrected. As a consequence of these changes, an improvement of her soft tissue profile would be produced. However, the patient was unconcerned about her profile, so the objective of treatment was to reduce the overjet.

TREATMENT ALTERNATIVES

Based on the objectives, 3 treatment options were proposed. To obtain the overall objectives, a combined surgical and orthodontic treatment with mandibular advancement was proposed. However, the risks and treatment expenses would be high. The second option consisted of extracting the maxillary second premolars and retracting the anterior teeth. Although the risks and costs of this option were less than the other option, it demanded more time as well as compliance from the patient. The third option consisted of extracting the maxillary second premolars and chin augmentation to improve her profile. Because she was very reluctant to undergo surgery and was willing to accept a compro-

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Fig 1. Facial photographs before retreatment.



Fig 2. Intraoral photographs after incomplete treatment that included removing 4 first premolars.

mised or less than ideal result, she chose the second treatment option. Her major concern was the large persisting overjet, and she was satisfied with her profile. Therefore, orthodontic treatment with extraction of maxillary second premolars was performed to correct her 5-mm overjet and the persistent Class II canine relationship (Fig 6).

TREATMENT PROGRESS

The malocclusion was treated with conventional 0.022-in slot edgewise appliances. A transpalatal arch was soldered to the first molars to reinforce anchorage, and a cervical headgear was installed, to be worn 18 hours a day. Additionally, the maxillary second molars were banded to enhance the anchorage. Patient compli-

ance with the headgear was excellent. The anterior segmental retraction was accomplished with rectangular stainless steel archwires (0.019 × 0.025 in), intra-maxillary elastic chains, and Class II elastics ($\frac{5}{16}$ in). When the canines reached a Class I relationship, and the extraction spaces were closed, the transpalatal arch was removed, and the use of headgear was discontinued. Finishing occlusal procedures were then undertaken. Active treatment time was 35 months. The patient was retained with a maxillary Hawley plate and a mandibular bonded canine-to-canine retainer.

RESULTS

The facial photographs show that the posttreatment profile was satisfactory (Fig 7). The patient was satis-

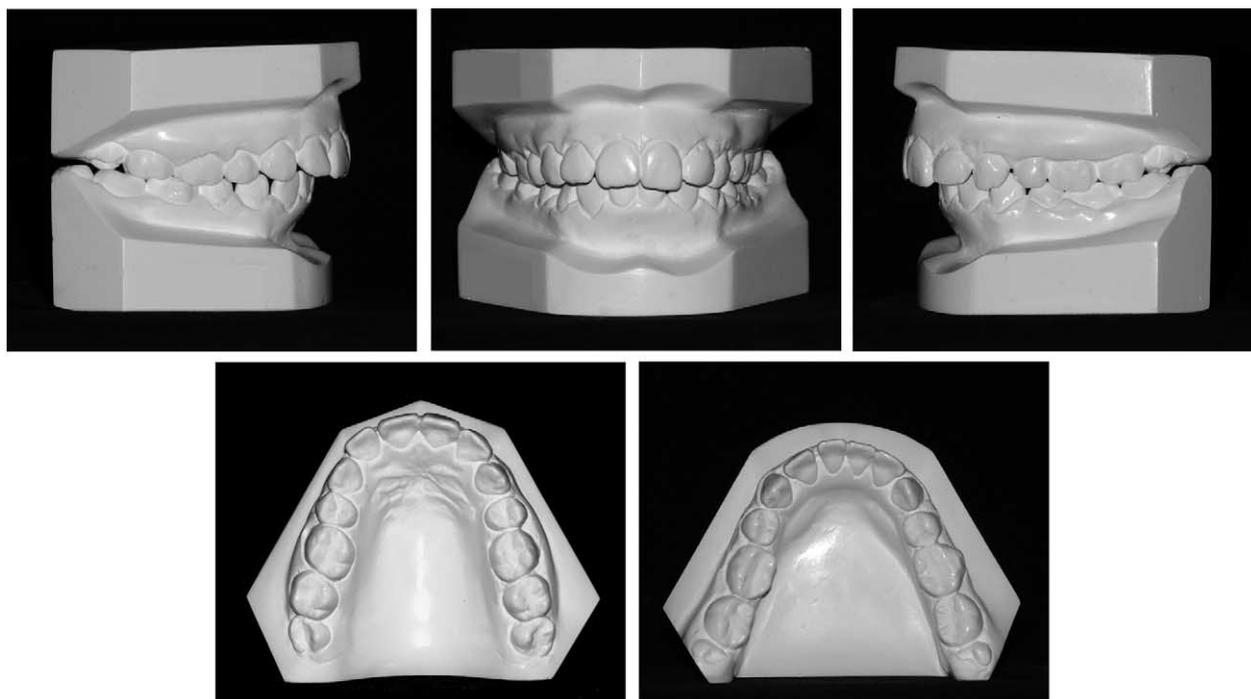


Fig 3. Study models before retreatment.

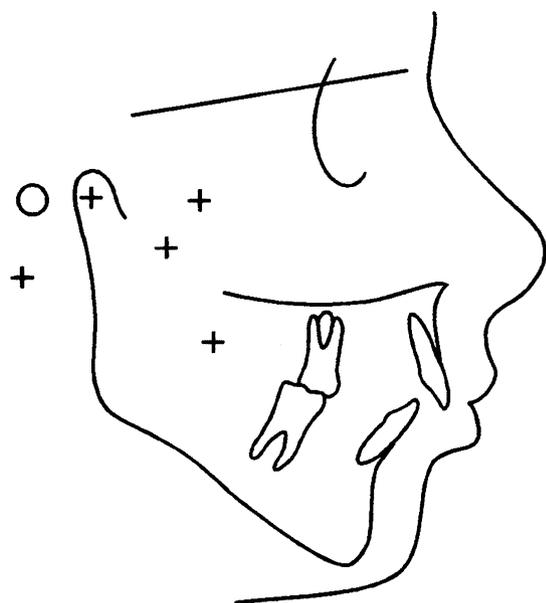


Fig 4. Cephalometric tracing before retreatment.

fied with her teeth and profile. The final occlusion showed reasonable Class I canine and Class II molar relationships on both sides (Figs 8-10). The maxillary third molars and the mandibular third molars were in function. Root resorption was minimal, even though this was a retreatment (Fig 11). The superimpositions

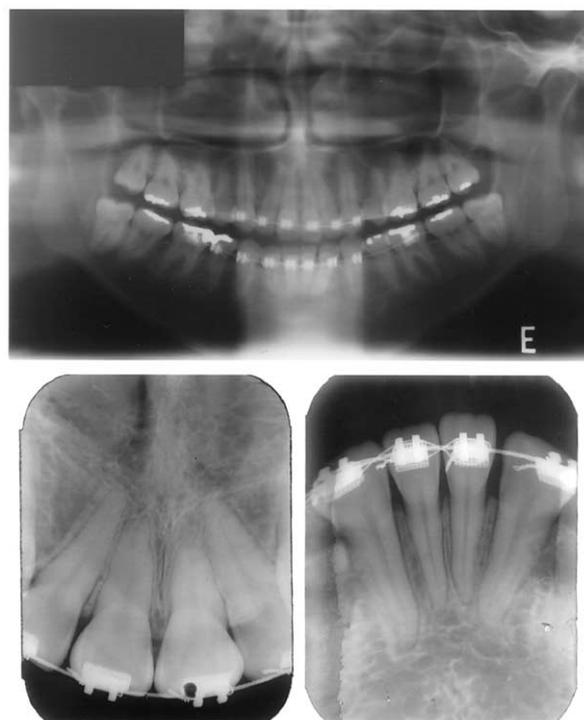


Fig 5. Panoramic and periapical radiographs before retreatment, with old appliances still in place.



Fig 6. Intraoral progress photographs show second premolar extraction sites during leveling and alignment.

Table. Cephalometric changes after treatment

Measurements	Pretreatment	Posttreatment
SNA	88°	85°
SNB	77°	75°
ANB	11°	10°
SND	74°	72°
Wits	10 mm	9 mm
NAP	22°	22°
Mandibular plane angle (FMA)	32°	32°
NS-Ocl	14°	20°
NS-GoGn	41°	42°
NS-Gn	71°	73°
1-NA	13°	5°
1-NA	3 mm	-1 mm
1-NB	32°	39°
1-NB	10.5 mm	11 mm
H-NB	19°	19°

show that the maxilla was slightly retruded with the extractions, and the mandible experienced a small downward and backward rotation (Fig 12 and Table). The maxillary incisors were retruded and palatally tipped even farther, and the molars moved slightly forward (Fig 12, B and C). The mandibular incisors were tipped labially and protruded, and the molars showed a slight mesial displacement and extrusion (Fig 12, D). All of these changes were expected to be associated with the treatment approach, except for the forward maxillary molar displacement. This reflects that, despite all the precautions taken, there was still some undesirable anchorage loss. This compromised attaining a perfect Class I canine relationship. Occlusal equilibration was performed after appliance removal to refine the tooth contact.

DISCUSSION

Although this retreatment approach could be considered unusual and perhaps risky, it provided satisfac-

tory occlusal and esthetic results. Treatment protocols involving the extraction of up to 8 teeth were once advocated by Begg to correct severe Class II cases.^{1,12} In these situations, he recommended removing the 4 first molars as a pretreatment step. Later, when the second molars had erupted, 4 premolars were extracted, and treatment began. This patient's initial characteristics were similar to many Class II untreated patients, except for the absence of the 4 premolars. Therefore, a similar treatment rationale—extracting 2 maxillary premolars—could be applied to correct the large overjet.¹³⁻¹⁸ Correcting this malocclusion by a surgical-orthodontic approach, primarily by advancing the mandible, could have provided even better profile results.^{8,19} However, because the patient did not want surgery and chose a nonsurgical approach, extraction of the maxillary second premolars was the only choice.^{8,20,21} This option could be applied because there was a mild upper lip protrusion.^{22,23} The availability of the maxillary third molars also helped to support the anchorage. Additionally, Class II elastics were used to move the mandibular teeth mesially to help correct the AP discrepancy.

In some cases, the better treatment option could be no treatment. This alternative would be chosen if the clinician realizes that the cost outweighs the benefits of treatment. When this rationale was applied to this patient, it became evident that the benefits of the treatment outweighed the costs. The patient's major concern was to reduce the overjet, and this option could fulfill that objective. However, the patient could have overemphasized the need to reduce the overjet because of her frustration with the first treatment attempt, and this could also have affected the orthodontist's decision for treatment.

On the other hand, conditions that could have contraindicated this treatment approach would be severe resorption of the incisors caused by the previous orthodontic treatment attempt, potential root resorption,



Fig 7. Posttreatment facial photographs.

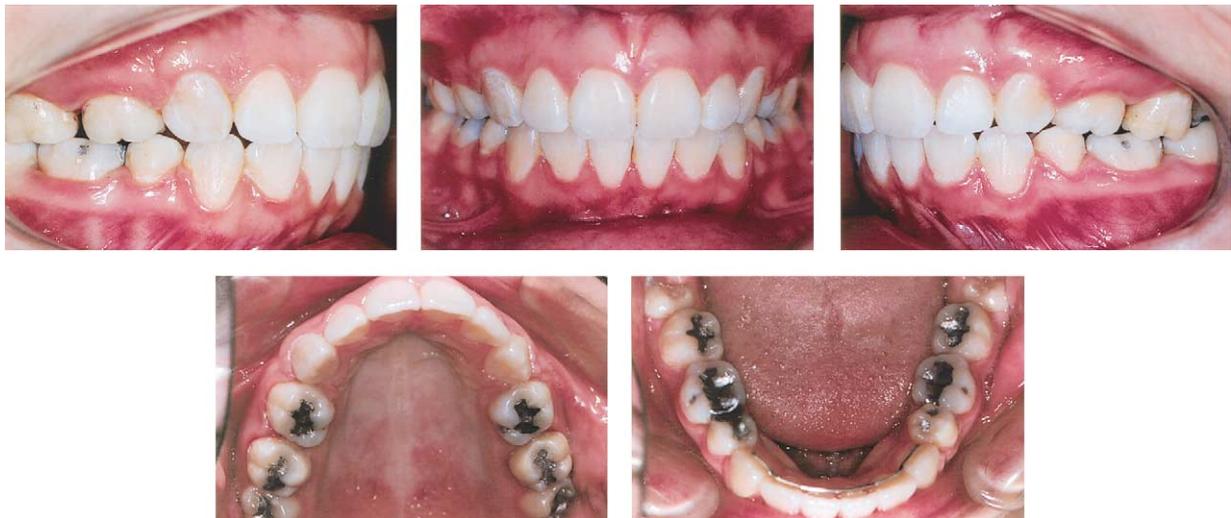


Fig 8. Posttreatment photographs after space closure and removal of fixed appliances.

temporomandibular joint symptoms, or active periodontal disease. Although her maxillary incisors exhibited greater root resorption than usual, we did not consider this factor to be a contraindication for treatment if we used light forces and evaluated progress with periapical radiographs. Additionally, she did not exhibit potential local factors for root resorption.²⁴⁻²⁶

If this patient had exhibited temporomandibular joint symptoms, it would have been advisable to begin orthodontic treatment after that problem was properly diagnosed and treated.²⁷ Orthodontic treatment could have been an important part in correcting that disorder.²⁸ Although orthodontic treatment usually reduces the incidence of temporomandibular disorders,²⁹ it might not provide a complete solution.³⁰ Therefore,

treatment of the temporomandibular joint symptoms would have to be coordinated with the orthodontic treatment.

Active periodontal disease could be another contraindication for this type of treatment, depending on the amount of supporting bone loss. In case of active periodontal disease, periodontal treatment should be performed before orthodontic treatment. After orthodontic treatment, the periodontal condition should be reevaluated. If the periodontal support is only partially compromised, orthodontic treatment could still be carefully undertaken. Nevertheless, if the periodontal support is severely compromised, treatment with extractions, which require great tooth movements, would be contraindicated. Therefore, in that situation, the best solution would be surgical advancement of the mandi-

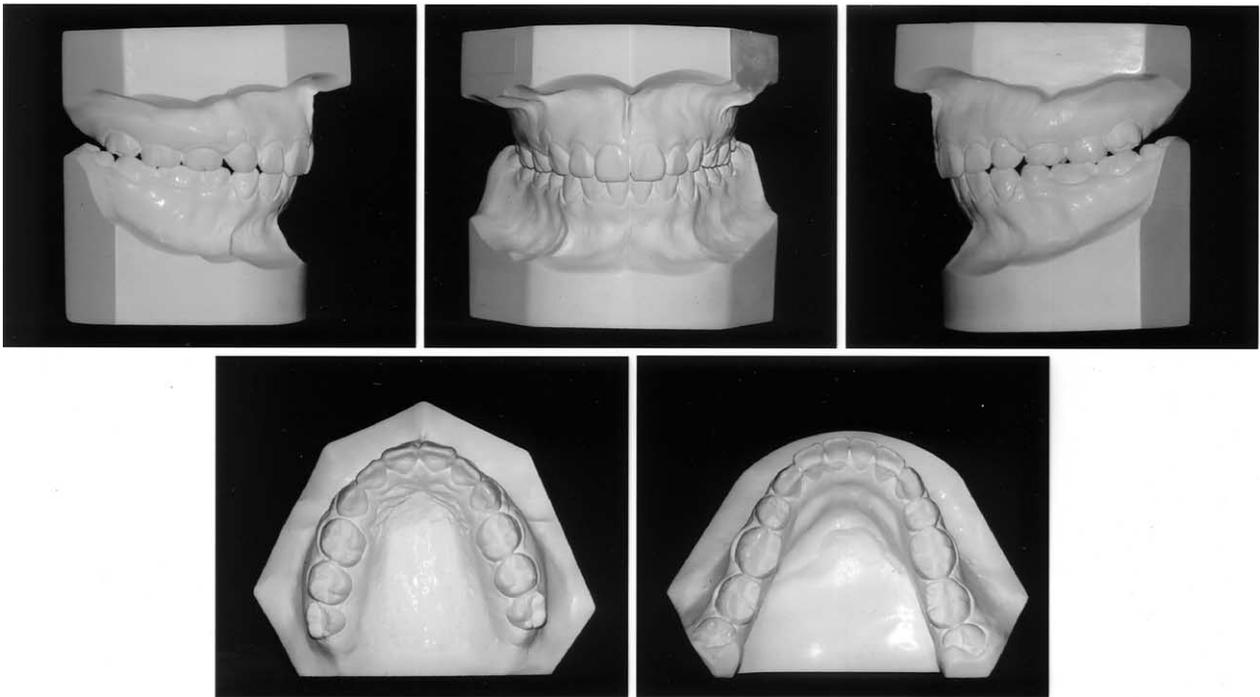


Fig 9. Posttreatment study models.

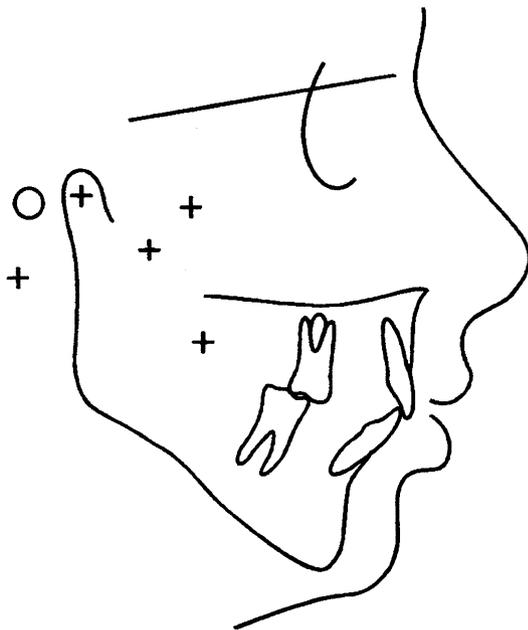


Fig 10. Posttreatment tracing.

ble, because the teeth would only have to be aligned preoperatively. This would not cause greater risk to support.³¹ Although orthodontic tooth movement when there is active periodontal disease can result in further bone loss,^{32,33} well-controlled orthodontic therapy



Fig 11. Posttreatment panoramic and periapical radiographs. Note maxillary and mandibular incisors (radiographs taken 3 months before finishing procedures, with appliances in place).

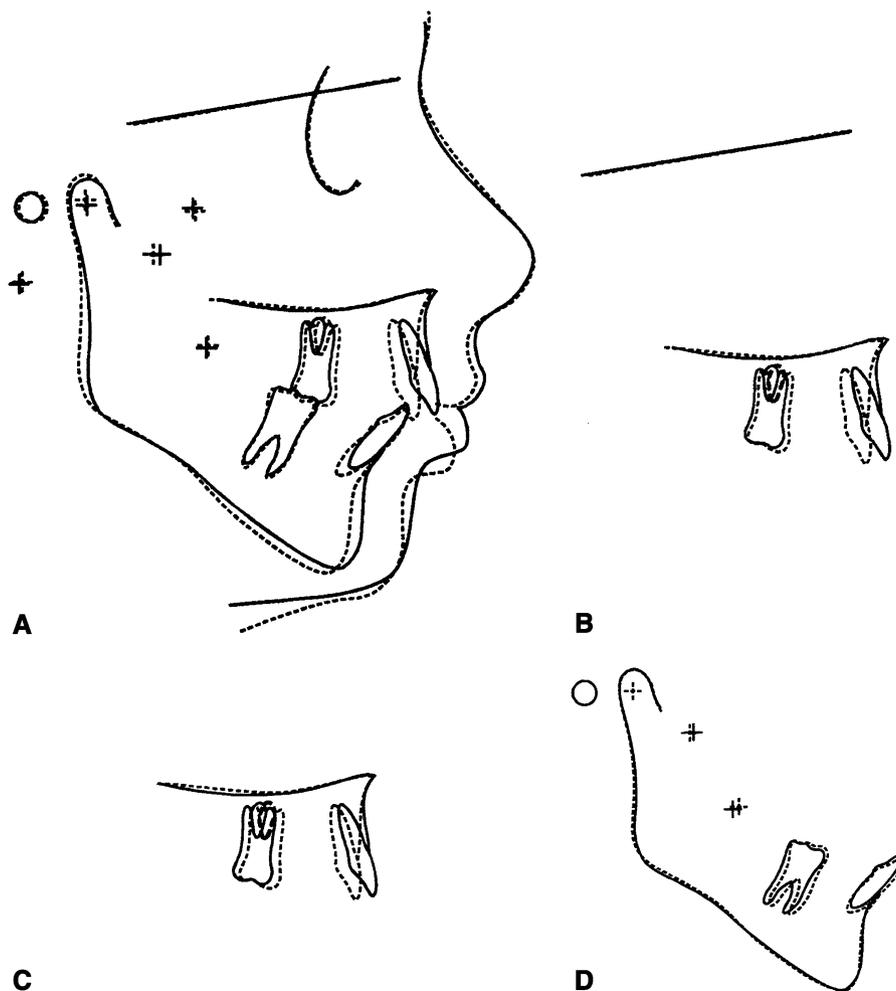


Fig 12. Superimpositions of initial and final tracings: **A**, Overall superimposition on BaN at CC; **B**, superimposition on BaN at N; **C**, superimposition on palatal plane at anterior nasal spine; **D**, superimposition on mandibular plane.

when tissues are healthy can result in stable or increased bone levels.³⁴

Critical assessment of the maxillary canine position shows that they are not in a Class I relationship (Figs 8 and 9). However, this was a retreatment of an adult. Orthodontic movement in adults is possible, but there are limitations. This patient cooperated in wearing the headgear to reinforce anchorage, but this was the maximum that the canines could be retracted. Additional improvement of the canine position would also require greater labial torque applied to the maxillary incisors. This could increase the risk of additional root resorption and prolong treatment time. Because of these limitations, the final position of the canines was satisfactory in this patient.

Another questionable aspect of this approach is placing the canines in contact with the first molars.

From an esthetic perspective, this does not seem to detract from the patient's smile (Fig 7). Although a good result was accomplished, this approach is not a common retreatment solution for Class II Division 1 malocclusions. It is an alternative in certain retreatment cases in which the maxillary third molars are available, and the patient's profile allows for retracting the maxillary incisors. The clinician must offer alternative choices that produce a good functioning environment for each patient.³⁵

CONCLUSIONS

Class II cases, poorly treated with 4 first premolar extractions, with a large, unpleasant overjet, can be successfully retreated with additional extractions of the maxillary second premolars. However, the decision to

undertake this procedure must be based on a sound diagnosis and discussed with the patient.

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