mandibular molar intrusion, along with intrusion of premolars, was greater than the amount of the maxillary first molars' extrusion, therefore inducing mandibular counterclockwise rotation. Furthermore, one will notice that maxillary superimposition did not include the maxillozygomatic temporal sulcus, the most stable area for superimposition in the maxilla, because the superimposition used in this article was the palate curvature. The choice for this type of maxillary superimposition might have increased the amount of extrusion seen in the first maxillary molars. The bite closure change, as seen on all superimpositions, occurred mostly by the extrusion of maxillary and mandibular incisors and secondarily by the intrusion of maxillomandibular first molars.

Tongue posture/thrust habit was a problem detected before initiation of treatment, which along with condyle resorption, might have been the cause of failure from previous orthodontic treatment, as reported in this case, and, if not controlled, could induce anterior open bite relapse.[1,2] The choice for controlling pernicious habit is a matter of personal treatment preference, which in this clinical case was not chosen. The only attempt to control the habit was the delivery of a Hawley retainer with a hole in the palate and verbal instructions on how to correct deglutition habits. If the patient returned to the habit, then open bite relapse might have been, in part, the cause of the small open bite seen at the 50 months' visit.

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Orthodontics-periodontics relationship

We write in praise of Dr Zoizner et al for their publication on the effect of orthodontic treatment on the interdental alveolar crest level, published in the September 2018 issue (Zoizner R, Arbel Y, Yavnai N, Becker T, Birnboim-Blau G. Effect of orthodontic treatment and comorbidity risk factors on interdental alveolar crest level: a radiographic evaluation. Am J Orthod Dentofacial Orthop 2018;154:375-81).

We all know that without the periodontal ligament and its unique qualities, our profession could not exist. However, in the literature, the relationship between orthodontics and periodontics is almost abandoned. The number of randomized controlled trials published on that topic is negligible compared with other fields. Therefore, we were thrilled to explore this article, hoping that it will serve as a professional milestone to the knowledge in that field.

As we know, abstracts and conclusions are the most readable and quotable parts of articles. Therefore we question the sentence that appears in the conclusion part of this publication (as well as in the abstract): "Therefore, comprehensive periodontal examination is necessary during orthodontic treatment, especially in adults." Unfortunately, this sentence does not appear to meet the criterion that should stand in front of every reviewer before his decision whether to publish a new study, that is, "Are the conclusions based on the study results?"

As we understand the material and methods and the results parts of this publication, there is no finding in the study that can serve as a positive answer to that important question. On the contrary, no statistically significant findings were reported, in any part that was studied, between the orthodontic patients and the control group. In addition, we do not know whether the patients (all? some?) were under comprehensive (meaning what?) periodontal examination during the treatment, and if so, how often they were examined or the most important parameter, whether there were differences between patients who underwent comprehensive periodontal examination compared with those who did not. In fact, we want to point out that this sentence, which was not even closely related to the study and its findings, positions our profession in danger from a legal point of view and in inferior status in relation to periodontics.

Furthermore, this study, in trying to explain the findings of alveolar crest "build up" (decrease in the distance between the crest and the cementoenamel junction [CEJ]) ignores at least 3 important parameters: 1) the angular differences while taking the bitewing x-rays, which can affect the picture of crest and CEJ height; 2) the local inflammation during treatment on the mineralization and demineralization processes of the crest, because we know that as long as the bone matrix exists, this mineralization process can temporarily "change" every bone morphology as it appears on the x-ray film; and 3) the exposure time and amperage that modify the x-ray pictures such that slight changes

in those parameters can easily burnout existing structures and affect the outcome of the study.

We hope that our remarks will be implemented in further studies.

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Author's response

We thank Drs Brezniak and Wasserstein for their comments. They raise three methodologic questions concerning the validity of our results and express some concern about our conclusions and their future ramifications.

1. As we mentioned in the discussion, a method based on 2-dimensional x-ray for diagnosis of periodontal status is not optimal. A cone-beam computed tomographic (CBCT) scan can provide better accuracy, but because the radiation dosage of 2 CBCT scans (one at the beginning and another at the end of treatment) is not negligible, we could not ethically justify adding an extra imaging technique. To enable a valid comparison between the treatment and control groups, we set the threshold to 1 mm of difference in the cementoenamel junction–interdental alveolar crest distance. Regarding the question of reliability of bitewing radiographs due to possible angular differences, a bitewing radiograph taken with the use of a film holder is considered to be reliable.[1] If anything, bitewing radiographs tend to underestimate the loss of alveolar crestal bone.[2] In addition, because the bitewing in both treatment and control groups were taken with the use of the same technique, angular differences, if they existed, would have had the same effect in both groups.
2. In general, the active orthodontic treatment has 3 main stages: leveling and alignment, the working stage, and the finishing stage. Indeed, tooth movement creates local inflammation which influences the mineralization/demineralization of the interdental alveolar crest and mineralization of bone matrix and can continue for weeks after tooth movement has ended. Because most of the tooth movement is achieved in the first 2 stages of treatment, we assumed that changes of the interdental alveolar crest level after the treatment were negligible in comparison.
3. Although different exposures to the x-ray might change the image on the radiographs, standard E-speed bitewing films were used and the radiographs were taken according to the guidelines of the medical corps to standardize the radiation exposure.

The patients in the treatment/control group were not referred to a periodontist for periodic examination during the treatment, and therefore the benefit of a periodic periodontal examination was not tested in our study.

As for the main concern regarding the conclusions, we explicitly stated that the difference between the orthodontic patients and the control subjects did not reach statistical significance: "Twenty-two patients (65%) from the treatment group and 10 patients (34%) from the control group had an increase in the cementoenamel junction–interdental alveolar crest distance of >1 mm in at least 1 site, with borderline significance between the groups ($P = 0.079$)." One should remember that a significance of $P = 0.079$ means that there is a $>92\%$ confidence that the difference between treatment group and control group is not random. Thus, an effect size of nearly 2-fold along with borderline significance is important enough to emphasize to orthodontists. The orthodontist must be vigilant for signs of periodontal deterioration during treatment and monitor the periodontal status during adult orthodontic treatment. A diagnosis of periodontal deterioration during orthodontic treatment is important and might change the treatment goals or at least should alert the orthodontist to halt the active treatment temporally and refer the patient to a periodontist.

In retrospect, we should have worded our conclusions more carefully. The phrases that Drs Brezniak and Wasserstein were concerned about represent our interpretation of the trend that we observed, and we agree that it would have been more conservative to express them in the discussion. We hope that larger studies that will have better statistical power will enable a more clear-cut conclusion to the issue at hand.

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