Orthod Dentofacial Orthop 2025;168:451–65), we would like to respectfully highlight certain methodological and representational inconsistencies that may influence and question the validity of its findings.

1. In the Abstract, the applied forces are described as 200, 100, and 50 g for the tie-back model and 200 g continuous force for the temporary skeletal anchorage device (TSAD) model. However, the Material and Methods section specifies 200, 150, and 100 g for the tie-back, and in Table III, displacements are presented for both models under 200, 150, and 100 g. These contradictions make the methodology unclear.
2. The authors, despite acknowledging and citing the work of Nihara et al[1] (p.11, p.1), who emphasized the importance of applying force from the center of resistance of the molar through a power arm, did not implement a comparable model for the tie-back model. Instead, in the tie-back model, the force was applied through the buccal tube, which is coronal to the center of resistance and would obviously result in a greater tipping moment compared with the TSAD model.
3. TSADs were positioned between the canine and premolar, while the hooks were modeled between the lateral incisor and canine. This difference alters the line of action of the applied force vector.
4. In Figures 1 and 6, models 1-3 are labeled as the tie-back scenario, and models 3 and 4 as the TSAD scenario. However, in models 1-3, the diagram depicts a spring, whereas the Material and Methods section states that an Elastic chain was used. These inconsistencies in graphical representation lead to confusion among the readers in understanding the mechanics being compared.
5. Authors have considered force degradation in elastic chains but not in nickel-titanium coil springs. However, sufficient evidence from existing studies supports the fact that force degradation also occurs in nickel-titanium coil springs.[2,3]

Given the above-mentioned discrepancies—in force magnitudes, model positioning, figure representation, and anchorage—the conclusions of the study, particularly in relation to bodily vs tipping movement, appear debatable.

We present these observations with due respect to the authors' work and in the interest of advancing accurate and consistent orthodontic research.

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Authors' response

We sincerely thank the reader for their thoughtful interest in our article, "Optimizing mandibular second molar mesialization: A comparative analysis of stress distribution and displacement using tie-back and temporary skeletal anchorage device-assisted mechanisms with a nonlinear finite element model" (Am J Orthod Dentofacial Orthop 2025;168:451–65). We appreciate their careful review and the opportunity to clarify several methodological points raised in their correspondence.

In the Material and Methods section, it was stated that a continuous force of 200 g was applied to the temporary skeletal anchorage device (TSAD) model for 3 seconds (steps). In addition, when the analysis output image representing the boundary conditions (Fig 1; models IV-VI) is examined, it can also be seen that the continuous force applied to the TSAD model was 200 g. Therefore, we would like to kindly clarify that there is no inconsistency or methodological ambiguity related to the boundary conditions defined in the analysis. In Table III, the title mistakenly indicates the forces applied to the miniscrew-closed coil spring as 200, 150, and 100 g. The correct value should be a continuous force of 200 g, and we would like to inform you that this will be corrected after contacting the journal editorial office.

The positioning of the TSAD between the canine and premolar and the hook between the lateral incisor and canine was designed to replicate clinically accepted configurations for these mechanics. Although these variations indeed influence the line of action of the applied force, this difference was part of the comparative purpose of the study—to evaluate how distinct anchorage systems, each with its own geometries and force vectors, influence stress distribution and tooth movement. Thus, it represents a variable of interest rather than a

methodological inconsistency. The reference we provided to the Nihara model was not intended to replicate or imitate their design, but rather to cite a study that involved molar mesialization in a finite element model—an area that is notably limited in the existing literature.

We believe that there was some confusion regarding the model scenario question sent to us by the reviewers, leading to a possible misunderstanding of the model design. For the mesialization movement of the M2M tooth, an elastic chain model was used in scenarios I and III, whereas a spring element model was used in scenarios IV and VI. The reviewers mentioned that the graphical representations of the elastic chain and spring models in Figures 1 and 6 appeared similar, which could cause inconsistency or confusion for readers. However, in the Material and Methods section, it was clearly stated that "in Ansys Workbench, the helical spring and elastic chain models were defined using the COMBIN39 element." When representing a constant force or a force-displacement relationship between 2 bodies, the COMBIN39 element in Ansys Workbench is commonly used as a nonlinear spring or connection element.[1-4] Although the visual appearance of the elements may seem similar across models, the Material and Methods section provides detailed explanations of how the longitudinal stiffness, stress values, and calculations were determined for both the helical spring and elastic chain. These calculated parameters were then entered into the Ansys Workbench program as boundary conditions.

In finite element analysis (FEA) programs, muscle, spring, and elastic band element models are defined as COMBIN39 in Ansys Workbench and as SPRING in Abaqus.[1-6] The elastic chain can be modeled as a loop-shaped structure; however, in the FEA method, defining the material model, tension-reaction forces, and deformation (stretching or relaxation) can lead to methodological inaccuracies.

This study represents the first finite element method analysis in orthodontic literature to include both helical spring and elastic chain force models in the analysis. Although previous studies have stated in their Material and Methods sections that elastic chains were included as boundary conditions, examination of their figures (analysis images) reveals that no visual representation was provided. In most finite element method analyses, a simple straight or elliptical line—often in red or another color—has been drawn between 2 attachment points on the model, and this line is described as a spring or elastic chain element. The images or figures generated by the FEA program do not depict springs or elastic chain elements as lines. The spring stiffness value of the elastic material was not calculated in any of these studies. It was not entered into the analysis program as a boundary condition. Consequently, the forces applied by the elastic material, such as tension, stress, deformation, and reaction, were not included in the analysis.[7-15] Furthermore, authors have considered force degradation in elastic chains, but not in nickel-titanium (NiTi) coil springs. However, sufficient evidence from existing studies supports the fact that force degradation also occurs in NiTi coil springs.

We agree that force degradation may also occur in NiTi coil springs, as supported by prior studies. However, the extent of force decay in NiTi springs is significantly lower than that in elastic chains, especially under short-term loading conditions. Because our FEA was conducted under static loading assumptions to isolate mechanical differences between systems, both force decay and time-dependent viscoelastic effects were intentionally excluded from the model. This approach is consistent with most FEA in orthodontics, which aim to evaluate the instantaneous biomechanical response rather than long-term clinical performance. Because the force degradation in helical springs occurs over a longer period compared with elastic chains (approximately 12% reduction over 4 weeks),[16] a continuous force application was assumed in the 3 TSAD-supported scenarios in which helical springs were used as boundary conditions in the analysis.

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