

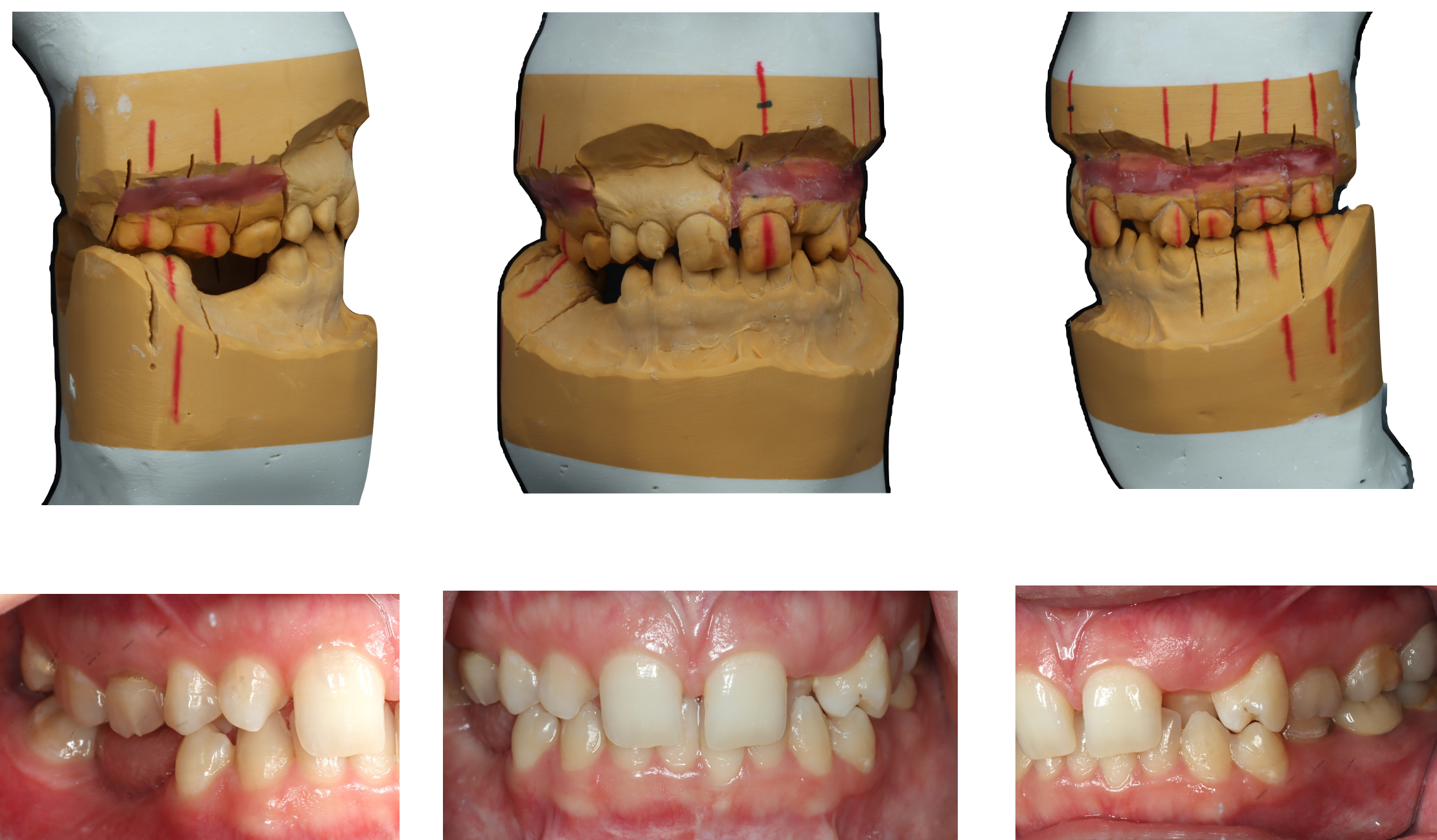


Background

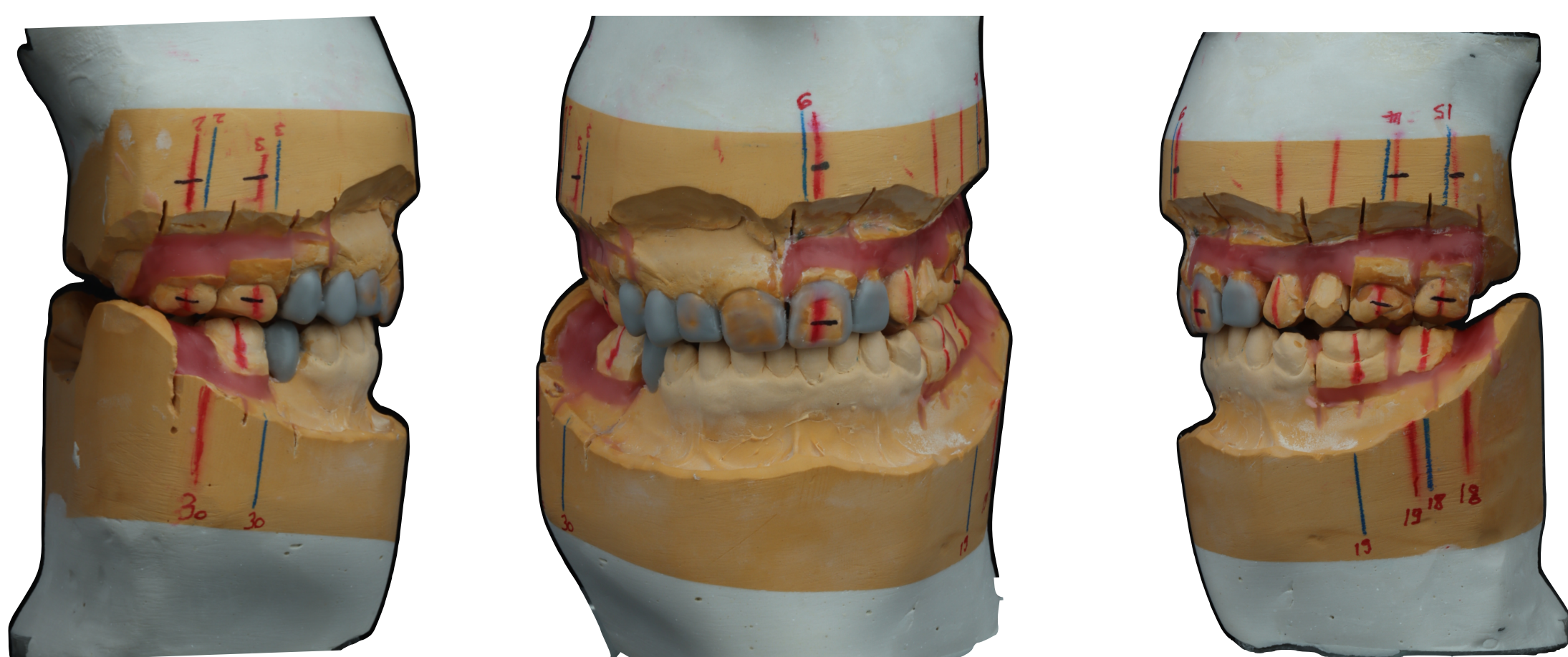
Clinical and radiographic evaluation revealed congenitally missing maxillary lateral incisors, retained primary molars, and missing mandibular teeth at sites #29 and #30. Crowding in the maxillary left quadrant involving teeth #12 and #13. Additionally, the maxillary centrals exhibited central midline diastema and unfavorable width-to-length proportions.

Conventional workflow

Both maxillary and mandibular diagnostic models were duplicated and cross-articulated. Teeth were sectioned and repositioned individually using reference markings to simulate the desired orthodontic outcome.

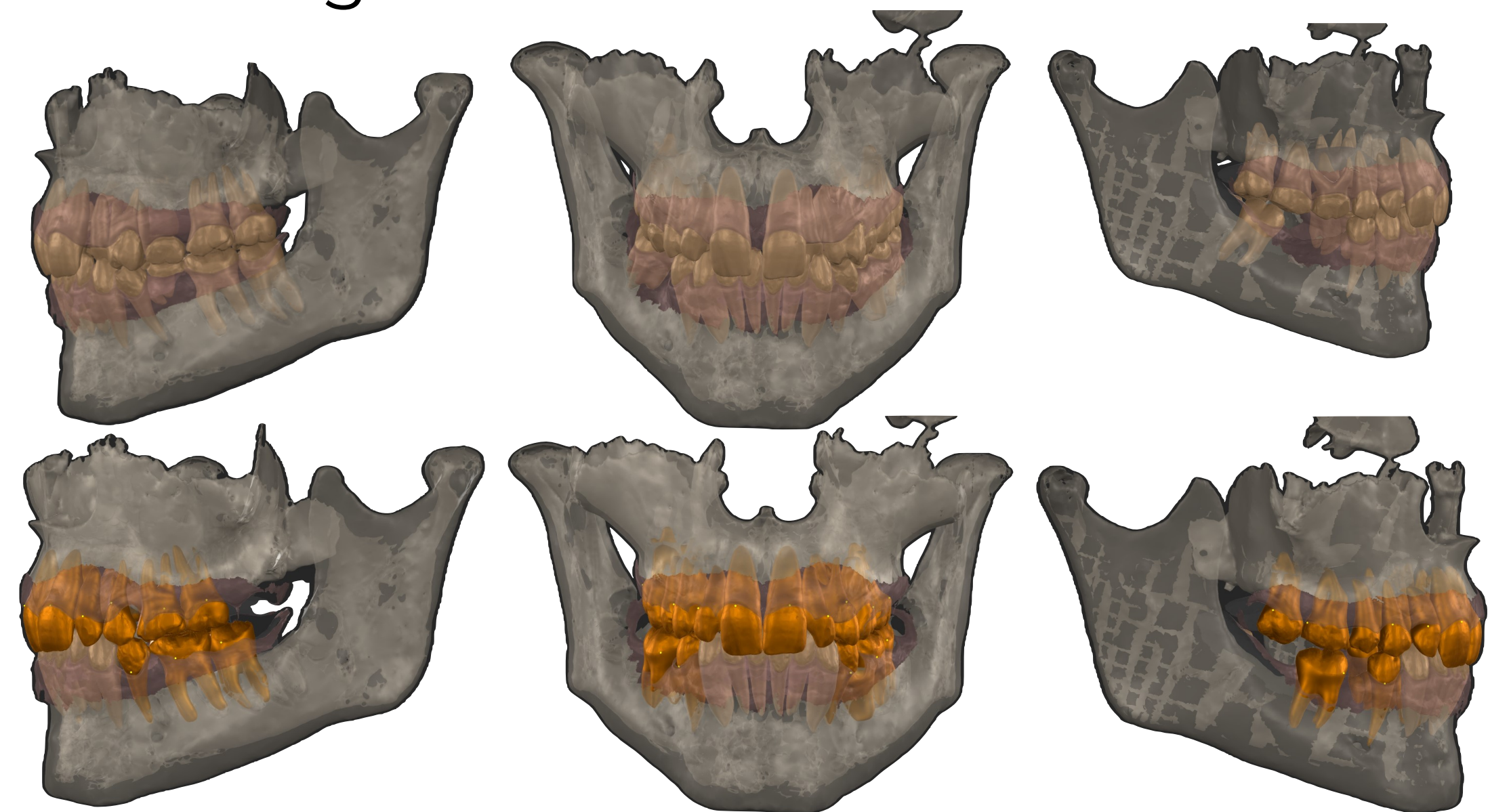


A diagnostic wax-up was performed to optimize maxillary central incisor proportions and simulate canine substitution. Maxillary premolars were reshaped in wax to mimic canine morphology, and occlusion was refined.



Digital workflow

Intraoral scans and cone-beam computed tomography were integrated into a cloud-based platform. Artificial intelligence-assisted orthodontic setup was used to reposition teeth digitally while visualizing anticipated root positioning.



AI-technology generated photo-based smile simulations and animated before-and-after videos, allowing visualization of the projected treatment outcome. The digital models were exported into CAD software to quantify tooth movement and facilitate communication with the orthodontic team.



Clinical significance

Both workflows supported interdisciplinary treatment planning where the AI-assisted digital workflow provided enhanced visualization of root position, quantification of tooth movement, and advanced smile simulations, therefore addressing some of the limitations of the conventional workflow. The photo and video simulations improved patient understanding and motivation by illustrating the anticipated outcome.

