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LETTER TO EDITOR

Deep Learning in Crown Design, Inquiring into the Details: A Letter on AI Designed Crown Parameters

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Tooth morphology, internal fit, occlusion and proximal contacts of dental crowns designed by deep learning-based dental software: A comparative study by Cho et al.[1] in the Journal of Dentistry (Feb 2024). This study, which compares AI-based deep learning software with manually designed crowns by dental technicians, holds significant implications for restorative dentistry. While the methodology is commendable, certain aspects require further clarification to understand the study's clinical relevance fully.

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The study suggested that the dental crowns designed by deep learning-based dental software showed higher root mean square and positive average values on the axial surface compared to the reference design (technician-based). Understanding the clinical implications of these geometric parameters would be crucial for the adoption of this system by dental practitioners. Additionally, the patient comfort and crown longevity could be influenced by the variations in occlusal and proximal contact intensities across the group. Previous studies have shown that digitally designed crown methods have an impact on the fit and functionality of restorations.[2] Further research should be warranted to explore the effectiveness of the current software programs in clinical settings.

While in the study the crown's marginal gap was designed as cited in the literature,[3,4,5] I would appreciate further elaboration from authors on the additional gap of 50 µm after they have given a 40 µm gap and on how this specific size was determined.

While the study provides valuable insights into crown design, aspects of cusp angle measurements in Fig. 1 remain unclear. Although the selection of functional cusps was well explained, clarification on consistent plane identification across tooth morphologies is needed. Additionally, it would be helpful to know if variations in cusp heights or anatomical landmarks influenced angle measurements, particularly when comparing crowns fabricated by different methods. Further details on these points would enhance understanding of the geometric evaluations.

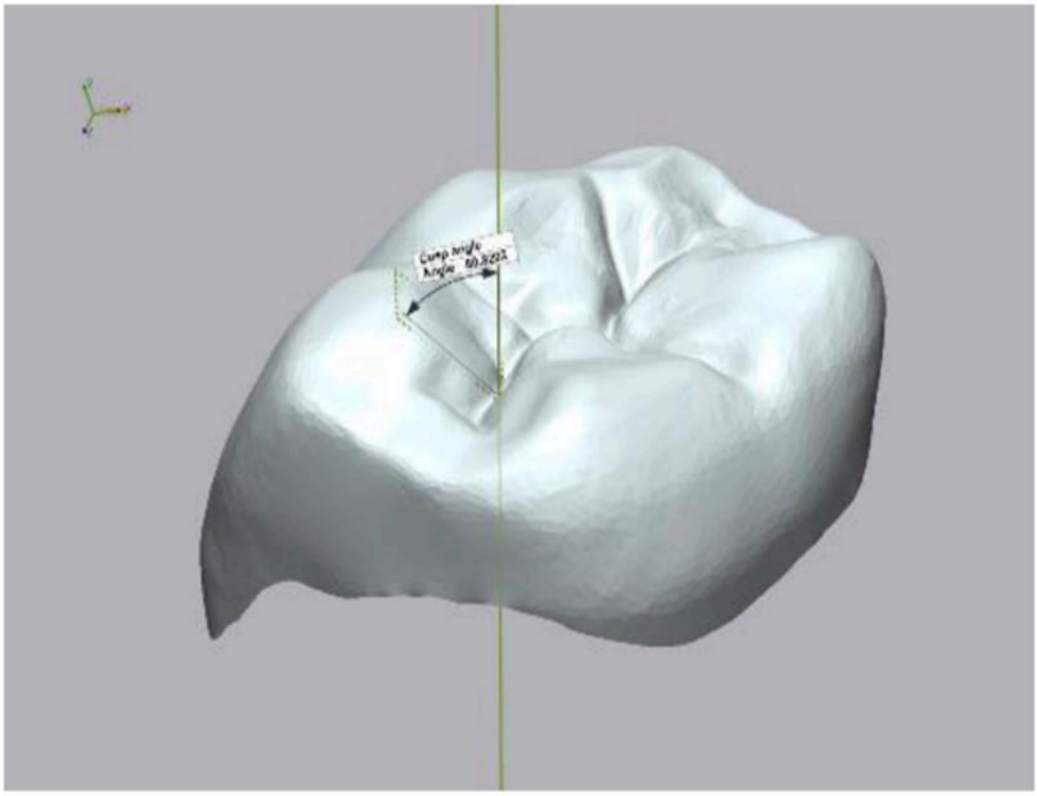

Figure.1: Evaluation of cusp angle of designed crown. The angle was measured between the cusp plane and longitudinal tooth axis vector

In conclusion, the previous author's and the team's research highlights the significant

potential of AI in enhancing digital dental workflows and restorative dentistry, demonstrating its ability to boost productivity without compromising therapeutic outcomes.

Author Contributions

TS: Contributed to the conception and drafting of the letter, provided critical revisions for important intellectual content, and approved the final version of the manuscript. Ensured the accuracy and integrity of the work.

AY: Contributed to the conception and drafting of the letter, reviewed and critically revised the content, and approved the final version of the manuscript. Ensured the accuracy and integrity of the work.

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Consent for publication

Not applicable.

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Conflict of Interest

The author reports no conflicts of interest.

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