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JPD DIGITAL - VIDEO ARTICLE

Expanding intraoral scanning capabilities: The role of nasal capture in long-term dental superimposition



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SUMMARY

Digital intraoral scanning has become a cornerstone of modern dentistry,¹ paving the way for a virtual patient cast that optimizes treatment planning, execution, and long-term care.² However, a key challenge in this digital transformation is the ability to accurately superimpose intraoral data over time, ensuring predictable outcomes—especially in complex restorative treatments.³ Traditional intraoral scans rely on dental and gingival landmarks, which are prone to change because of tooth loss,⁴ tissue resorption, and other biological factors. As a result, aligning scans made years apart becomes increasingly difficult when a patient's dentition is no longer present.

Nasal capture presents a novel solution by integrating facial and intraoral scans with an addi-

ABSTRACT

Intraoral scanning has revolutionized digitally assisted dentistry, enhancing precision and efficiency in complete arch restorations. However, long-term superimposition remains a challenge, particularly when tracking changes in a patient's dentition over time. This article explores an innovative approach—incorporating nasal capture within intraoral scans—to establish a stable reference for long-term digital alignment. By integrating the nasal structure as an additional landmark, this method facilitates accurate superimposition across multiple time points, allowing clinicians to restore previous dental characteristics even in patients with tooth loss or shifting occlusion. The technique enhances the reliability of digital records, improving treatment planning and long-term patient care. (J Prosthet Dent 2025;134:1-4)

tional extraoral stable reference structure.^{5,6} While facial features naturally change over time—such as soft tissue volume shifts and minor alterations in nasal cartilage—the nasal bone remains structurally stable after adulthood, making it an ideal reference point for maintaining acceptable alignment across multiple intraoral scans, even after significant dental changes.

This video article demonstrates the practical application of nasal capture in digital workflows. It explores the scanning process (Fig. 1), the superimposition of

I hereby affirm that there are no conflicts of interest associated with this manuscript. No financial assistance was received that could have influenced the outcomes of this research, maintaining the research's integrity and impartiality. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. Hence, there are no funding sources to report that might have impacted the research process or outcomes.

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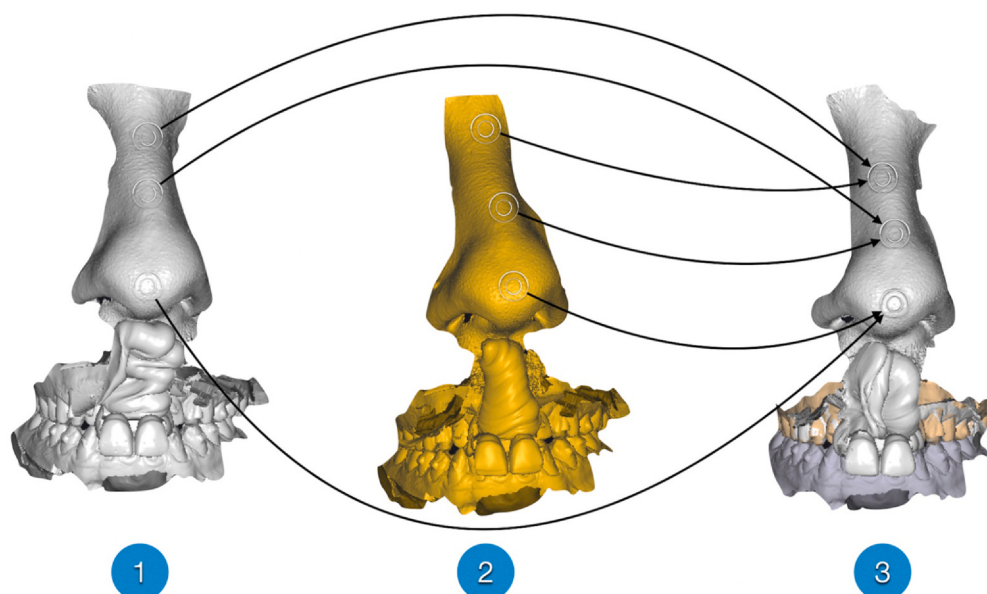


Figure 1. Superimposition of scan series using nasal reference. This figure illustrates how first and second series of scans aligned with third series by using nose as common reference point across all images.

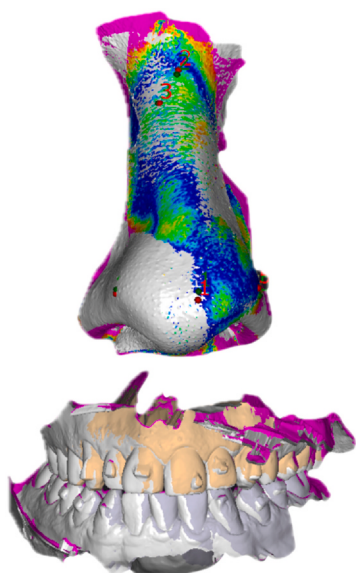


Figure 2. Three series of scans superimposed via exocad alignment. This figure displays three series of scans after being accurately aligned and merged using exocad software program, resulting in unified digital cast.

scans made at different time intervals (Fig. 2), and an evaluation of alignment accuracy (Fig. 3). The method's effectiveness is further illustrated through pre- and post-extraction scans (Fig. 4), showing how superimposition enables the retention of original dentition data for designing prostheses (Fig. 5). By incorporating nasal capture, clinicians can preserve occlusal relationships and anatomical structures, which is particularly advantageous for complete arch rehabilitations, including complete dentures (Fig. 6), overdentures, and implant-supported restorations.

Through a detailed patient treatment, this article highlights how nasal capture enhances long-term record-keeping, improves prosthetic design accuracy, and allows for precise restoration of the lost dentition. By leveraging stable anatomical structures, clinicians can achieve more predictable, patient-specific, and clinically reliable treatment outcomes. This approach marks a significant advancement in digitally assisted dentistry, ensuring that even in patients with extensive tooth loss, a patient's past anatomical records remain invaluable for guiding future restorative procedures.

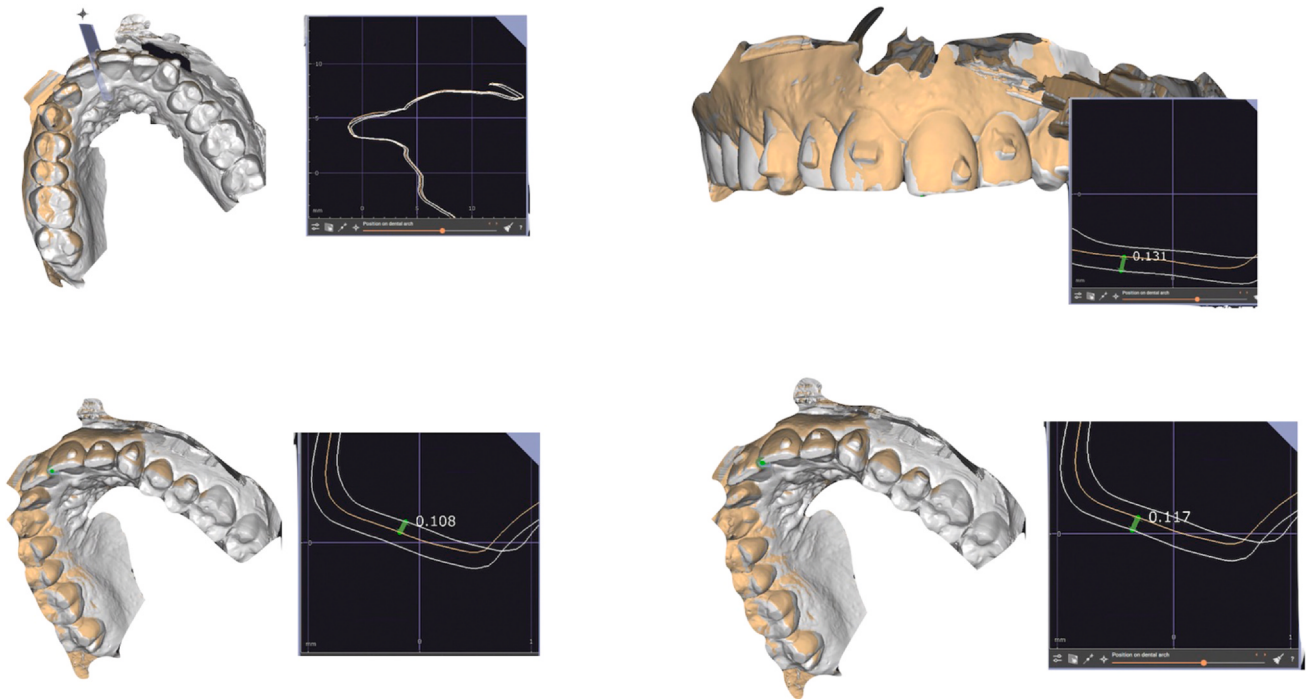


Figure 3. Superimposed maxilla scans with consistent alignment. This figure displays three maxilla scans superimposed to reveal consistent midline and incisal edge position, with minor discrepancy of 0.1 to 0.2 mm observed in occlusal plane among scans.

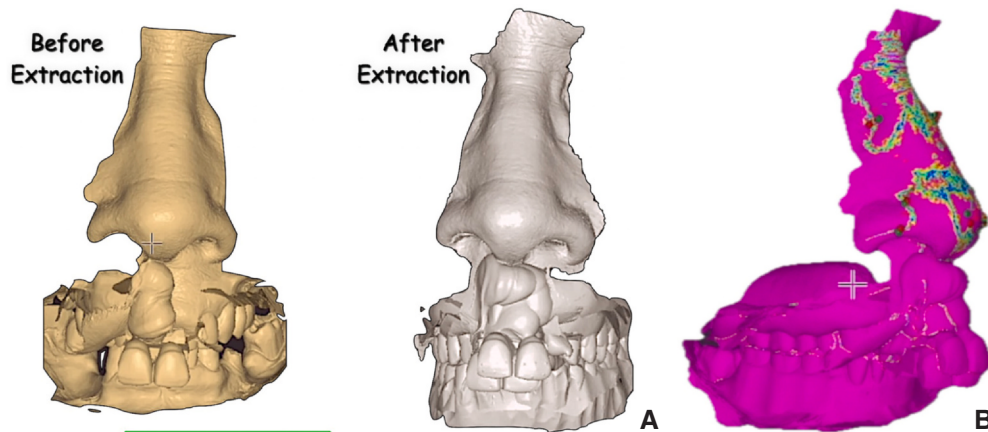


Figure 4. Scan superimposition process. A, This figure displays two sets of scans: one made before extraction and one after extraction. B, It further illustrates superimposition process, in which pre-extraction scan aligned with post-extraction scan using nose as a reference point for precise anatomical comparison.

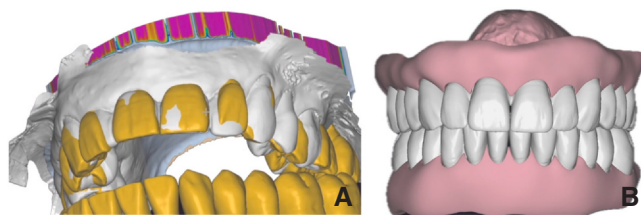


Figure 5. New denture design process. This figure illustrates designing process for new denture, featuring superimposition of pre-extraction scan onto soft tissue scan acquired after extraction. This integrated view aids in accurately tailoring denture to patient's updated anatomical structure.

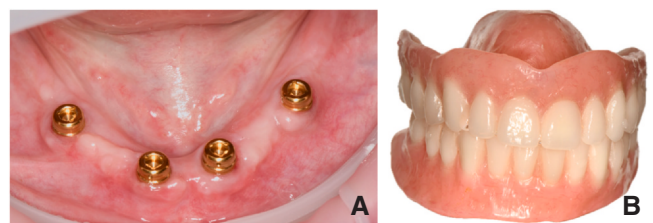


Figure 6. Definitive implant and denture outcome. A, Healed implants fitted with LOCATOR attachments. B, Definitive maxillary and mandibular dentures.

CONCLUSIONS

The inclusion of nasal capture in intraoral scanning represents a significant advancement in digitally assisted dentistry. By providing a stable landmark for superimposition, this technique allows for more accurate long-term comparisons, improving the precision of complete arch restorations and dental reconstructions. As digital workflows continue to evolve, expanding intraoral scanning capabilities beyond traditional dental structures opens new possibilities for patient care, record-keeping, and prosthetic accuracy. This method not only strengthens historical tracking but also refines the way clinicians approach comprehensive treatment planning, ensuring that digitally assisted dentistry continues to push the boundaries of innovation.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work the author(s) used [ChatGPT] in order to improve language and readability, with caution. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

APPENDIX A. SUPPORTING INFORMATION

Supplemental data associated with this article can be found in the online version at [doi:10.1016/j.prosdent.2025.05.001](https://doi.org/10.1016/j.prosdent.2025.05.001).

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<https://doi.org/10.1016/j.prosdent.2025.05.001>



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