



Case Report

Full-mouth digital rehabilitation of a young adult with midline diastema and occlusal discrepancy: A clinical report

Ujjal Chatterjee¹, Sumit Kumar Roy¹, Suruchi Singh¹, Monika Kumari^{1*}

¹Dept. of Prosthodontics and Crown & Bridge, Buddha institute of Dental Sciences and Hospital Patna, Bihar, India

Abstract

Purpose: To present a digital full-mouth rehabilitation case in a 30-year-old female with diastema and occlusal discrepancy using CAD/CAM and occlusal deprogramming.

Background: Midline diastema and occlusal disharmony often co-exist and complicate esthetic outcomes. Digital workflows enable accurate diagnosis and execution with less invasive approaches.

Case Presentation: A 30-year-old female presented with anterior spacing, occlusal instability, and a fractured #21. Using a Lucia jig for occlusal deprogramming, digital scans and CAD veneer design were completed. Temporary restorations were delivered based on a 3D-printed mock-up. Follow-up revealed improved esthetics and function.

Conclusion: This digital protocol resulted in predictable, minimally invasive rehabilitation and patient satisfaction.

Keywords: Digital workflow, Midline diastema, Exocad, Occlusal deprogramming, Veneers

Received: 10-09-2025; **Accepted:** 26-11-2025; **Available Online:** 08-12-2025

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

Midline diastema, a common esthetic concern in young adults, may stem from multiple causes including genetics, labial frenum, or trauma.^{1,2} When combined with occlusal interferences, particularly edge-to-edge canine relationships, treatment planning becomes more complex.³ The evolution of digital workflows in prosthodontics has allowed clinicians to plan prostheses with enhanced precision while ensuring conservative tooth preparation.⁴

Occlusal deprogramming plays a vital role in restoring function by removing neuromuscular interferences and guiding the mandible to centric relation. Devices such as the Lucia jig allow passive muscle relaxation and reproducible jaw position.⁵ CAD/CAM platforms like Exocad (exocad GmbH, Darmstadt, Germany) enhance diagnostic capability through 3D visualizations and mock-up simulations before any irreversible intervention is performed.

2. Case Report

A 30-year-old female, presented to the Department of Prosthodontics at our academic Institute of Dental Sciences,

Patna, complaints of “spaces between her front teeth” and difficulty in biting properly. (**Figure 1A**) There was no relevant systemic or medication history. Dental history revealed trauma to the anterior maxilla three months prior, resulting in a crown fracture of tooth #21. The patient expressed concerns regarding esthetics and was seeking minimally invasive correction. Intraoral examination revealed:

1. Maxillary and mandibular midline diastema. (**Figure 1B**)
2. Edge-to-edge occlusal relationship on the right canines
3. Ellis Class II fracture of #21
4. Periodontal tissues were healthy, with no signs of inflammation or mobility. Radiographic evaluation (periapical and panoramic) confirmed that tooth #21 had no periapical involvement and the alveolar bone height was preserved. These findings established a favorable prognosis for a veneer-based, conservative restorative approach.⁶

*Corresponding author: Monika Kumari
Email: sim291097@gmail.com



Figure 1: Pre-operative (A) Extra-oral; (B) Intraoral photograph depicting midline diastema in maxillary and mandibular teeth.

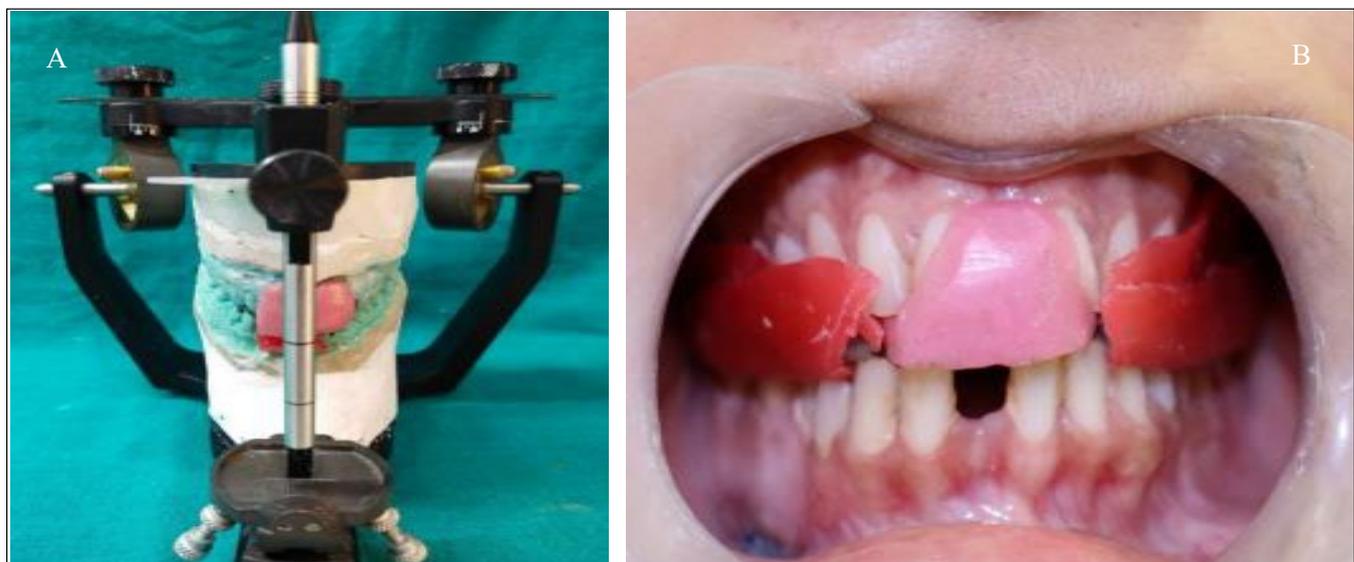


Figure 2: Fabrication of Lucia jig for occlusal deprogramming: (A) Bite recorded and mounted on semi-adjustable articulator with manufactured Lucia Jig; (B) Intraoral view with lucia jig

2.1. Treatment objectives

1. Esthetically close the diastemata
2. Restore anterior guidance and proper occlusal scheme
3. Preserve tooth structure via conservative veneer restorations
4. Employ a digital workflow to enhance accuracy and reduce treatment time

2.2. Treatment plan

Following informed consent, a staged, fully digital treatment plan was formulated. Occlusal deprogramming using the Lucia jig was performed to record a centric relation position⁵. **(Figure 2A)** Digital intraoral scans were taken and imported into Exocad for virtual wax-up and veneer planning. **(Figure 2B)** A 3D-printed mock-up was fabricated and transferred intraorally. Approved mock-ups were replicated using putty indices to fabricate bis-acryl provisional restorations. The patient was scheduled for follow-up and

eventual final restoration fabrication. The Lucia jig was placed on the maxillary anterior teeth and worn by the patient for one hour. This allowed muscle deactivation and accurate centric relation recording. Lucia's technique has long been validated for predictable mandibular positioning.⁵ Digital impressions were made using primescan (Densply sirona), capturing maxillary and mandibular arches and bite records. **(Figure 3A)** These were imported into Exocad software, where the anterior and posterior veneer restorations were designed with focus on midline correction and establishing canine guidance⁷. **(Figure 3B–D)** A 3D-printed resin mock-up was fabricated and temporarily bonded to the anterior teeth. The patient evaluated esthetics, phonetics, and occlusion over 48 hours. Following approval, putty indices were made to replicate the mock-up during provisionalization. Teeth were minimally prepared through the index, conserving maximum enamel. Bis-acryl resin temporaries were fabricated using the putty index. Adjustments were made to ensure anterior guidance and occlusal balance.

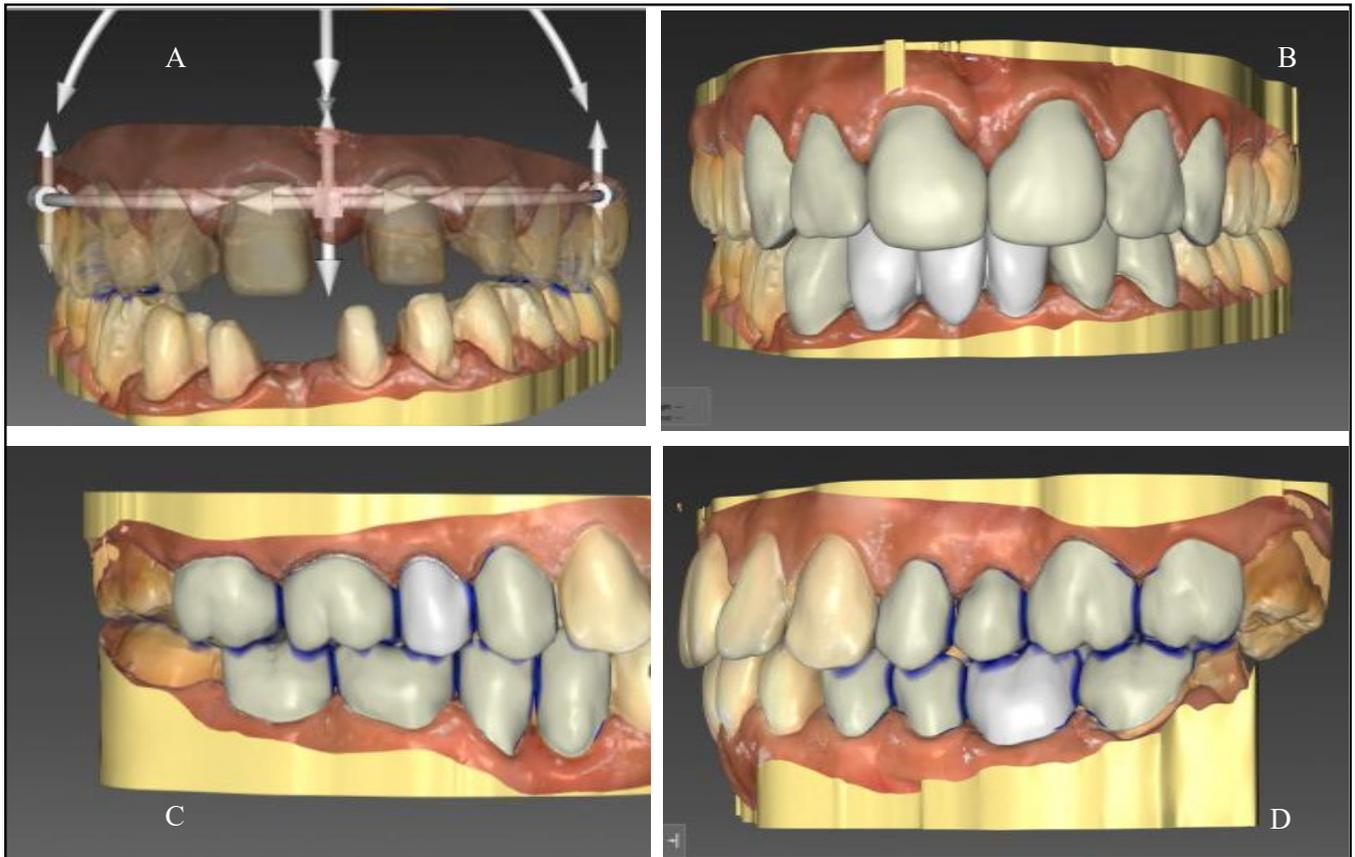


Figure 3: (A) Intraoral scanning of prepared teeth; (B) Frontal view of designed prosthesis on exocad software (C) Right lateral and (D) Left lateral view of designed maxillary and mandibular taco crowns.



Figure 4: Definitive prosthesis (A) Extra-oral smile view; (B) Frontal view; (C) Right lateral view; (D) Left lateral view

2.3. Follow-Up and Outcome

At 1 and 2-week follow-ups, the patient reported no discomfort or sensitivity. Speech, mastication, and esthetics were significantly improved. Midline diastema was closed, and canine guidance was restored. Aesthetic satisfaction was high. Final ceramic veneer fabrication and cementation are planned at the next visit. **(Figure 4)** No pulpal or periodontal complications were observed.

3. Discussion

The conservative rehabilitation of anterior diastemata and occlusal disharmony requires a balance between esthetics, function, and tooth preservation. Occlusal deprogramming allows clinicians to record centric relation accurately, which is essential when re-establishing occlusion in full-arch cases.⁵ CAD/CAM systems like Exocad help visualize the esthetic outcome and guide minimal-prep veneer design, improving reproducibility and efficiency. Minimally invasive option for reestablishing vertical dimension and occlusal contact points in younger patients. Provisionalization is not merely a temporization phase; it functions as a diagnostic and verification step. The patient's adaptation to esthetics and function prior to final restorations contributes to long-term success.⁸

4. Conclusion

Digital workflows integrating occlusal deprogramming, Exocad-driven design, and conservative provisionalization enable effective full-mouth rehabilitation. This approach restored esthetics, function, and confidence in a young adult patient, without invasive procedures or orthodontics.

Consent for Publication

Written informed consent from patient was obtained for treatment and publication of photographs

Source of Funding

None.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Güth JF, Keul C, Stimmelmayer M, Beuer F, Edelhoff D. Accuracy of digital models obtained by direct and indirect data capturing. *Clin Oral Investig*. 2013;17(4):1201–8. <https://doi.org/10.1007/s00784-012-0795-0>
2. Nainar SM, Gnanasundaram N. Incidence and etiology of midline diastema in a population in south India (Madras). *Angle Orthod*. 1989;59(4):277–82. [https://doi.org/10.1043/0003-3219\(1989\)059<0277:IAEOMD>2.0.CO;2](https://doi.org/10.1043/0003-3219(1989)059<0277:IAEOMD>2.0.CO;2)
3. McNamara JA, Brudon WL. Orthodontics and dentofacial orthopedics. Ann Arbor (MI): Needham Press; 2001.
4. Beier US, Kapferer I, Burtscher D, Dumfahrt H. Clinical performance of porcelain laminate veneers for up to 20 years. *Int J Prosthodont*. 2012;25(1):79–85.
5. Lucia VO. A technique for recording centric relation. *J Prosthet Dent*. 1964;14(3):492–505. [https://doi.org/10.1016/S0022-3913\(64\)80017-2](https://doi.org/10.1016/S0022-3913(64)80017-2)
6. Brägger U, Krenander P, Lang NP. Economic aspects of single-tooth replacement. *Clin Oral Implants Res*. 2005;16(3):335–41. <https://doi.org/10.1111/j.1600-0501.2005.01112.x>
7. Coachman C, Calamita M. Digital smile design: A tool for treatment planning and communication in esthetic dentistry. *Quintessence Dent Technol*. 2012;35:103–11.
8. Edelhoff D, Sorensen JA. Tooth structure removal associated with various preparation designs for anterior teeth. *J Prosthet Dent*. 2002;87(5):503–9. <https://doi.org/10.1067/mp.2002.124094>

Cite this article: Chatterjee U, Roy SK, Singh S, Kumari M. Full-mouth digital rehabilitation of a young adult with midline diastema and occlusal discrepancy: a clinical report. *J Pierre Fauchard Acad*. 2025;39(4):121–124.