



Management of Anterior Dentogenic Diastema with Loop Connectors in Fixed Partial Denture: A Case Report

Dr. Komal Shah¹, Dr. Mukesh Kumar Goyal², Dr. Isha Saxena³, Dr. Nidhi Shree⁴, Dr. Bajaj Amit Kumar Shamlal⁵, Dr. Aakash Gupta⁶

¹Post Graduate Student, Department of Prosthodontics and Crown & Bridge, Inderprastha Dental College and Hospital, Ghaziabad, Uttar Pradesh, India

²Professor and Head, Department of Prosthodontics and Crown & Bridge, Inderprastha Dental College and Hospital, Ghaziabad, Uttar Pradesh, India (Corresponding Author)

³Senior Lecturer, Department of Prosthodontics and Crown & Bridge, Inderprastha Dental College and Hospital, Ghaziabad, Uttar Pradesh, India

⁴Post Graduate Student, Department of Prosthodontics and Crown & Bridge, Inderprastha Dental College and Hospital, Ghaziabad, Uttar Pradesh, India

⁵Post Graduate Student, Department of Prosthodontics and Crown & Bridge, Inderprastha Dental College and Hospital, Ghaziabad, Uttar Pradesh, India

⁶Post Graduate Student, Department of Prosthodontics and Crown & Bridge, Inderprastha Dental College and Hospital, Ghaziabad, Uttar Pradesh, India

(Received: 16 November 2024

Revised: 11 December 2024

Accepted: 11 January 2025)

KEYWORDS

Diastema, Esthetic,
Fixed Partial
Denture, Loop
Connector

ABSTRACT:

Patients with a missing tooth accompanied by diastema face limited options for restoring the edentulous space. Utilizing a conventional fixed partial denture in such cases often results in disproportionately wide anterior teeth, compromising aesthetics. The loss of anterior teeth, combined with pre-existing diastema, frequently creates an excessive pontic space, posing a significant aesthetic challenge for the prosthodontist. When an implant-supported prosthesis is not feasible due to inadequate bone support, an fpd with a loop connector serves as a viable alternative. This approach not only preserves the diastema but also ensures a visually appealing and functional restoration. This report highlights a clinical case where an fpd with a loop connector was employed to achieve aesthetic rehabilitation in the maxillary anterior region, successfully maintaining the midline diastema while addressing the patient's functional and cosmetic needs.

Introduction

The replacement of missing anterior teeth has long posed a complex and challenging task for prosthodontists, requiring a delicate balance between achieving optimal aesthetics and ensuring functional success that aligns with patients' expectations.¹ Various treatment options are available for addressing this challenge, including implant-supported restorations, conventional porcelain-fused-to-metal restorations, all-ceramic crowns, and resin-bonded fixed partial dentures. Restorations in the anterior region are particularly demanding due to the heightened aesthetic considerations of the "esthetic zone" and the minimal margin for error.² These complexities are further exacerbated in cases where there is a pre-existing

diastema or when teeth adjacent to the edentulous space have drifted, leading to an enlarged mesiodistal dimension in the pontic space. Such scenarios require meticulous planning and execution to achieve a harmonious and natural appearance.³ In these cases, the loop connector is a valuable yet often overlooked treatment option. This non-rigid connector incorporates a loop on the lingual aspect of the prosthesis, effectively linking adjacent retainers or pontics while accommodating unique clinical situations such as diastemas. By using this design, the loop connector allows for the replacement of missing anterior teeth while preserving the natural spacing between teeth, ensuring both functionality and aesthetics. This article discusses a case involving excessive space in the



anterior maxillary region, managed using a loop connector. the approach demonstrates how this innovative solution can address complex clinical challenges while maintaining the aesthetic integrity of the anterior segment.

Case Report

A 38-year-old female patient presented to the department of prosthodontics with the primary concern of replacing a missing right maxillary central incisor. Clinical examination revealed a notably wide mesiodistal edentulous space accompanied by spacing between the existing anterior teeth. A radiographic assessment indicated insufficient bone availability in the region of the right maxillary central incisor, limiting certain treatment options. The proposed treatment approaches included an implant-supported prosthesis, a resin-bonded fixed partial denture (fpd), or an fpd incorporating a loop connector. Taking into account the patient's bone deficiency, the aesthetic necessity with financial concern, and preserving the natural spacing between the maxillary anterior teeth, the selected treatment plan was a four-unit porcelain-fused- to-metal fixed partial denture with loop connector design. This restoration would span from the right maxillary lateral incisor to the left maxillary lateral incisor, utilizing an intermittent loop connector for optimal functionality and aesthetics.

Clinical Procedure

The treatment plan, including the use of a four-unit porcelain-fused-to-metal (pfm) fixed dental prosthesis (fdp) with loop connectors, was thoroughly discussed with the patient. Upon obtaining informed consent, the following steps were initiated.

- Teeth preparation was carried out on the left maxillary central incisor, right and left maxillary lateral incisors. Equi-gingival margins were created, and a shoulder finish line was established to enhance aesthetics.
- Gingival retraction was achieved using a gingival retraction cord to expose the margins. Final impressions were made with elastomeric impression material (Zhermack Zetaplus, Italy) using a two-stage double-mix technique for accuracy. an interocclusal record was made using bite registration material (Zhermack Occlufast

Rock,Italy) to ensure proper alignment of the prosthesis.

- Temporary restorations were fabricated using tooth-colored auto-polymerizing acrylic resin and cemented with non-eugenol temporary cement (3M Relyx Temp Ne, Karnataka) to protect the prepared teeth.

Laboratory Procedure

- The impressions were poured using type iv dental stone (Neelkanth, Jodhpur) to create a master cast.
- A wax spacer (Maarc, Maharashtra) was adapted to the palatal region, ensuring sufficient space for the loop connectors to facilitate oral hygiene maintenance. Wax patterns were designed with blue inlay wax (Pyrax, Uttarakhand).
- The wax patterns were invested (Sut Ezyvest Max, China) and casted in a base metal alloy.
- The metal framework was evaluated intraorally for precise fit and layered with ceramic. a final trial was done to ensure esthetical results.
- Prosthesis was highly polished to achieve a smooth, high-shine finish, minimizing plaque accumulation.
- The final prosthesis with loop connectors was cemented using glass ionomer cement (Shofu Hybond Glasionomer cx, Okhla) for secure and long-lasting retention.



Figure 1: Per-Operative Intraoral Photograph

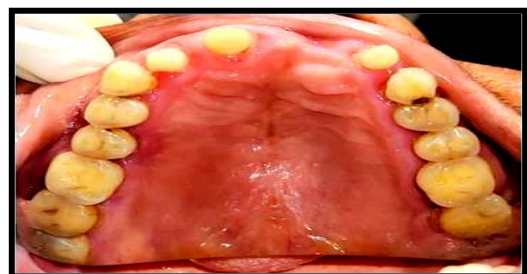


Figure 2: Abutment Preparation

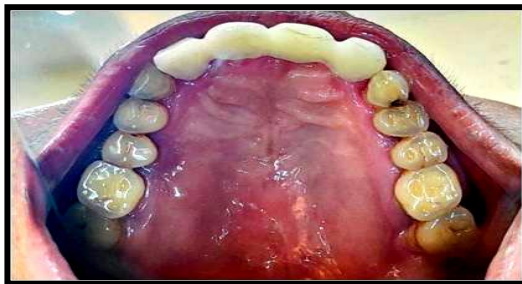


Figure 3: Provisionalization



Figure 4: Wax Pattern Fabrication with Loop Connector Design



Figure 5: Metal Coping Trial



Figure 6: Final Prosthesis Cemented- Occlusal View



Figure 7: Final Prosthesis Cemented- Frontal View

Postoperative Instructions and Follow-Up

The patient was advised on maintaining proper oral hygiene, including the use of dental floss and interdental brushes for effective cleaning around the prosthesis. A follow-up appointment was conducted after one week to evaluate the prosthesis and assess the patient's oral hygiene status.

Discussion

Connectors in fixed partial dentures (FPDs) play a crucial role by linking the retainers and pontics. These connectors can be classified as either rigid or non-rigid, depending on their design and function.⁴ While conventional FPD connectors are predominantly rigid, loop connectors are designed to be more flexible. The flexibility of a loop connector is influenced by factors such as its length, diameter, and cross-sectional shape. Indications for loop connectors: preservation of diastema, excessive pontic space, localized or generalized spacing and pathological migration or periodontal weakness advantages of loop connectors include: enhancing the natural appearance of the prosthesis, maintaining the existing diastema for a harmonious smile, ensuring a proper emergence profile for the prosthetic restoration and preserving the remaining tooth structure of the abutments.^{5,6} Loop connectors have certain drawbacks despite their benefits. Their fabrication involves complex laboratory procedures, making the process time-consuming and technically demanding. Oral hygiene can be challenging due to the difficulty in cleaning around the connectors, increasing the risk of plaque accumulation. Large or poorly designed loop connectors may interfere with tongue movement, affecting speech and causing discomfort.^{7,8} However, these issues can be minimized by ensuring the connectors are small, round, and properly contoured, enhancing patient comfort and oral hygiene. By addressing these challenges with precise design and meticulous fabrication, loop connectors can be a highly effective solution in restoring missing anterior teeth while maintaining aesthetic and functional harmony.

Conclusion

Proper planning is the key to successful tooth replacement, especially when dealing with complex cases. It is important to choose a treatment that fits the specific needs and expectations of the patient. This



clinical report focuses on the use of a loop connector to replace a missing central incisor while maintaining the natural space (diastema) between the teeth. The loop connector helps keep the natural shape and appearance of the teeth by providing a good emergence profile. It also improves the overall aesthetics of the restoration, making the replacement look natural and pleasing. By carefully considering the patient's situation and using a well-planned approach, this treatment option shows how functional and beautiful results can be achieved in challenging dental cases.

References

1. Levin EI. Dental esthetics and the golden proportion. *J Prosthet Dent* 1978; 40:244-52.
2. Balkaya MC, Gur H, Pamuk S. The use of a resin-bonded prosthesis while maintaining the diastemata: A clinical report. *J Prosthet Dent* 2005; 94:507-10.
3. Menezes N, Chitre V, Singh RK, Aras M. Maintaining diastema in a fixed partial denture: A case report. *J Indian Prosthodont Soc* 2003; 3:8-10.
4. Plengsombut K, Brewer JD, Monaco EA Jr, Davis EL. Effect of two connector designs on the fracture resistance of all-ceramic core materials for fixed dental prostheses. *J Prosthet Dent* 2009; 101:166-73.
5. Kalra A, Gowda ME, Verma K. Aesthetic rehabilitation with multiple loop connectors. *Contemp Clin Dent* 2013; 4:112-5.
6. Dr. Ravikumar Akulwar, Dr. Susheen Gajare, DR. Shivkumar Mule, DR. Ashwin Kodgi. Oral Rehabilitation with Multiple Loop Connectors: A Case Report. *Indian Journal of Applied Research* 2014; 4:512-4.
7. Rosensteil SF, Land MF, Fujimoto J. *Contemporary Fixed Prosthodontics*. 3rd ed. St. Louis, Mo: Mosby; 2001. p. 710.
8. Bhadari U, Bakshi S. Survival and complications of unconventional fixed dental prosthesis for maintain diastema and splint pathologically migrated teeth: A case series up to 8 years follow-up. *Indian J Dent Res* 2013; 24:375-80.