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From Concept To Clinic: Advancement In Maryland Bridge Applications: A Case Report

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Abstract

The presence of a gap in the anterior tooth region, whether due to trauma or a congenitally missing tooth, can cause both psychological distress and functional challenges. Traditional treatment options, such as implants, removable partial dentures, and fixed partial dentures, are available, but some patients may be reluctant to undergo implant placement or use removable dentures. They may prefer a fixed partial denture (FPD), yet hesitate to have adjacent healthy teeth prepared, especially in anterior cases. In such situations, a porcelain-fused-to-metal fixed partial denture, like a Maryland Bridge, offers an ideal solution. This case report details the creation of a Maryland Bridge with specific modifications tailored to the patient's needs.

Keywords: Fixed Partial Denture, Facial Aesthetics Lingual Surface, Maryland Bridge

Introduction

Trauma to the anterior teeth is not uncommon which can lead to fracture or avulsion of tooth leading to permanent loss of tooth structure and its function. Dental prosthetics are developed to resolve both functional and aesthetic problems resulting from missing teeth. The upper front teeth are essential for clear speech, effective

chewing, and facial aesthetics, and they play a major role in the harmony of one's smile. The absence of these teeth can severely affect a patient's self-confidence.

Traditional treatment options, such as implants, removable partial dentures, and fixed partial dentures, are available, but some patients may be reluctant to undergo implant placement or use removable dentures. They may prefer a fixed partial denture (FPD), yet hesitate to have adjacent healthy teeth prepared, especially in anterior cases. In such situations, a porcelain-fused-to-metal fixed partial denture, like a Maryland Bridge, offers an ideal solution.

Case Report

A female patient, aged 33 years reported to Department Of Prosthodontics, Crown and Bridge & Implantology, with the chief complain of missing maxillary left central incisor and desired a stable esthetic solution. (fig. 1) She gave history of trauma 3 months back. At that time she experienced pain and grade I mobility in Maxillary Right Central Incisior tooth. Past Dental History reveals Root Canal Treatment of maxillary right central incisors tooth 2 months back.

On clinical examination it was revealed that edentulous spaces in the maxillary central incisor region, contributing to aesthetic concerns and compromised bone width and length (siebert's class II defect.)

Procedure

- The treatment plan consists of fabrication of a single unit crown prosthesis for maxillary right central incisor with a groove on middle one-third of lingual surface of this prosthesis.
- Secondly a Maryland bridge was fabricated for maxillary left central incisors tooth.
- This treatment plan was selected as patient was not ready for preparation of adjacent tooth.
- The clinical steps for this procedure were as followed:

1. Diagnostic impressions of the maxillary and the mandibular arch were made using irreversible hydrocolloid material (Alginate, Zelgan 2002, Dentsply, India; Batch No. Z090218).
2. The impression was poured immediately using dental stone (Kalstone, Kalabhai Dental Pvt Ltd) and a positive replica was made.
3. Shade selection was done using Vita Shade Guide in natural daylight.
4. Tooth Preparation was done on right maxillary central incisor with shoulder finishing line supragingival using flat end tapper fissure bur. (Fig.2)
5. Tooth preparation was done on the lingual surfaces of the left maxillary lateral incisor with chamfer finish line prepared supragingival. The incisal end of the tooth preparation was kept 1mm cervical. .(Fig 3)
6. Finishing of the preparations was done using fine grit finishing bur.
7. Gingiva was retracted using the retraction cord and the final impression was made using addition silicone impression material (Flexceed Kit , Putty Consistency and Light body material) using double mix single impression technique. (Fig 4)
8. Indirect temporization was done and the provisional restoration was luted using temporary non-eugenol based cement.
9. Impression was poured using die stone (Zeltra Rock, India) after 30 min and cast was obtained.
10. The nickel-chromium metal coping was fabricated and try-in was done. (fig 5)
11. Preparation was done by making a groove on the lingual surfaces of metal coping with carbide bur.

The incisal and cervical end of the preparation was kept 2mm away from the margins.

12. The prosthesis was fabricated, ceramic build-up was done. (fig 6)
13. Maryland Bridge with gingival ceramic was fabricated for left maxillary central incisor. (fig 7)
14. The prosthesis was finished, polished and glazed.
15. The final prosthesis was luted using the self-etch resin X U200, 3M ESPE, Germany) on the abutment teeth. (fig 8)
16. The occlusion was assessed and post-cementation instructions were given to the patient.
17. Patient was kept on follow-up at regular intervals and she was satisfied with the result.

Discussion

In the early 1980s, a revolutionary advancement in dental care emerged with the introduction of the adhesive-retained fixed partial denture, known as the Maryland Bridge. Developed by faculty at the University of Maryland, this innovative method offered a ground breaking approach to replacing missing anterior teeth. Unlike traditional techniques that required extensive tooth preparation for full coverage crowns, the Maryland Bridge significantly reduced the risk of pulpal trauma and improved patient comfort.

The Maryland Bridge utilizes resin cements that chemically bond to both the tooth surface and the etched metal alloy, ensuring strong retention through micromechanical means. This approach offers numerous advantages: minimal tooth preparation that conserves enamel, reduced risk of pulpal trauma, decreased chances of gingival irritation, a single path of insertion to prevent displacement, improved aesthetics, and enhanced patient satisfaction. Additionally, it often eliminates the need for local anesthesia.

However, the Maryland Bridge does have some drawbacks. Its application is technique-sensitive, and the metal retainer may become visible through thin anterior teeth. To prevent issues such as caries, it is crucial to ensure proper sealing at the prosthesis and tooth surface margin. Maintaining gingival health also requires that the gingival surface of the pontic be highly glazed and make only passive contact with the tissue.

Several factors are vital when selecting cases for this treatment: sufficient enamel thickness, proper alignment of abutment teeth, healthy periodontal conditions, adequate occlusal clearance, and the absence of parafunctional habits. Successful outcomes depend on careful case selection, meticulous design and planning, precise tooth preparation, and careful cementation.

Overall, the Maryland Bridge remains an effective solution for restoring single anterior missing teeth, particularly in young patients, offering an aesthetically pleasing and minimally invasive option for tooth replacement.

Conclusion

The Maryland Bridge is an excellent option for tooth replacement, restoring both function and aesthetics while greatly enhancing patient satisfaction. With proper patient education and the use of precise clinical techniques, the Maryland Bridge should be more frequently considered as the preferred restoration choice for small spans.

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Legend Figures

Figure 1: Missing maxillary central incisor, with compromised bone width and length (siebert's class II defect.)

Figure 2: Tooth Preparation on right maxillary central incisor.

Figure 3: Tooth preparation on the lingual surfaces of the left maxillary lateral incisor.

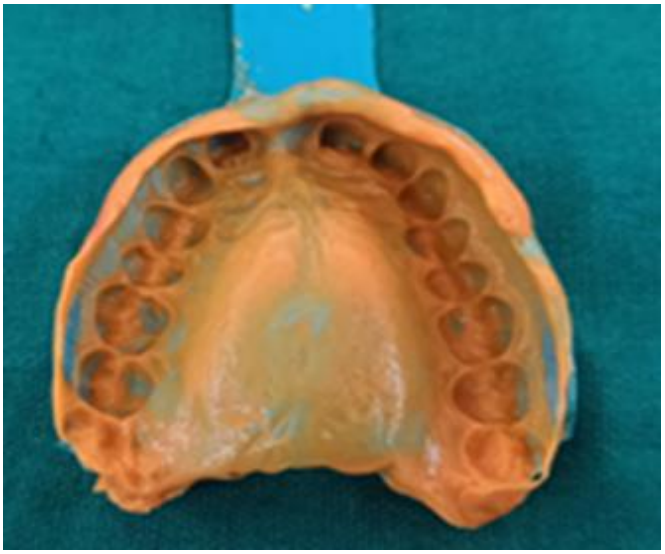

Figure 4: Final impression made using addition silicone impression material

Figure 5: Metal coping try-in done

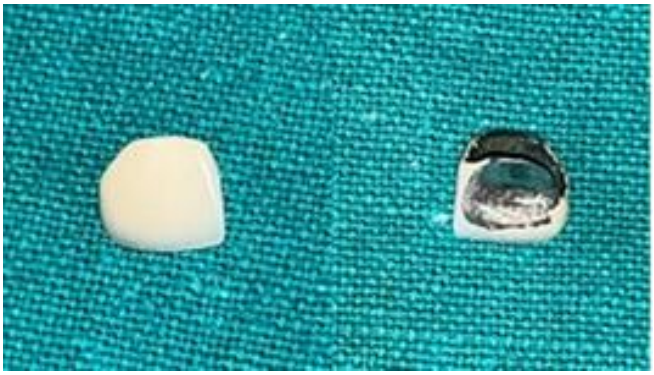

Figure 6: Prosthesis was fabricated

Figure 7: Maryland Bridge with gingival ceramic fabricated.

Figure 8: Final prosthesis luted