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RESEARCH ARTICLE

MINIMALLY INVASIVE TECHNIQUE FOR ANTERIOR TEETH REPLACEMENT- CASE SERIES

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Abstract

Patients are very much concerned nowadays about the replacement of their missing teeth. Missing anterior teeth are a serious concern for patients, be it an aesthetic concern or functional loss. Aesthetics is the harmony between the teeth and the entire stomatognathic system. Aesthetic is the art that the dentist must procure, with a subtle touch of artistry, appreciation, and scientific knowledge, touch to recreate the beauty of a smile that suits the face and the personality of an individual. Beauty is in the eye of the beholder; hence beauty is perspective. Science and dental treatment have progressed over the years, bringing us various options from removable partial dentures to fixed partial dentures and implants. Treatment options are delineated based on the patient's concern as well as anatomic, functional, and scientific norms. Every treatment being fixed or removable has its own merits and demerits. An appropriate treatment plan should look into not only the aesthetic needs of the patient but also try to restore and maintain the harmony of the entire orofacial complex. Anterior teeth replacement can be done using a short-span cantilever bridge, as it is conservative and has a significant survival rate. Conventional cantilever fixed partial dentures have a survival rate of 82% over 10 years [1]. Maryland bridge is amongst other options which necessitate minimal tooth reduction with optimum bonding using adhesive cement.

Introduction: -

Fixed prosthodontics gives us a wide opportunity of replacing a single missing tooth with a reconstruction of the entire occlusion. Fixed prosthodontics is a wide horizon of rehabilitating damaged teeth with various materials ranging from metal to ceramics. It involves either pontics or crown over the dental implant. Successful replacement of a lost tooth is important to restore the dynamic integrity of the arch and to maintain the equilibrium between hard and soft tissues [2]. For an adequate amount of retention of our prosthesis, a viable amount of tooth structure must be removed from the adjacent abutment tooth [3]. As we will always try to preserve what remains, than meticulously restore it, hence conventional FPD has a major drawback of a significant amount of tooth structure removal. In the best possible Fixed prosthesis, only the material requirements of the prosthesis were considered during tooth preparation. Other governing

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factors were tooth aesthetics, functional aspect, tooth orientation, retention, occlusal stability, and patient desires as well [4]. A study by Daniel Edelhoff et al concluded that only 3% to 30% by weight of the crown was removed in resin-bonded prosthetics, compared to all ceramic and metal-ceramic which required 63%-72% tooth structure removal
The cantilever bridge and Maryland bridge are two such options for minimal tooth structure removal for the replacement of missing teeth. Replacement of anterior teeth is feasible using a cantilever bridge [6] Maryland bridges are an appropriate treatment option in the case of young patients. As the pulp horns are high in young patients, so there is a high propensity of exposure during tooth reduction, so Maryland provides an ideal option, with less tooth reduction. As Maryland is Resin-bonded fixed partial dentures which require only minimal preparation of the abutments [7]. Also, the implant has its surgical limitations and is not feasible until growth is complete. Resin bonded cement has the least solubility, adequate strength, and acceptable film thickness, which makes it ideal in such cases. The longevity of the maryland bridge is limited, hence it is mostly preferred as an interim prosthesis. Also, it has a splinting effect. It is a beneficial option in cases where bone loss contraindicates implant placement [8]

CaseReport1

A 24-year-old girl came to dental OPD for replacement of her missing anterior teeth in the upper right arch. She gave a history of trauma from tube well tap, followed by pus discharge. She had undergone an extraction for the mobility of her teeth. Her chief complaint was speech problems and unaesthetic appearance. On clinical examination right lateral incisor in the upper arch was missing as shown in Figure 1.

Figure 1: - Front view of occlusion before treatment.

Primary impression was taken with irreversible hydrocolloid (DPI Algitex) impression material as shown in figure 2 and diagnostic casts were made with dental stone.

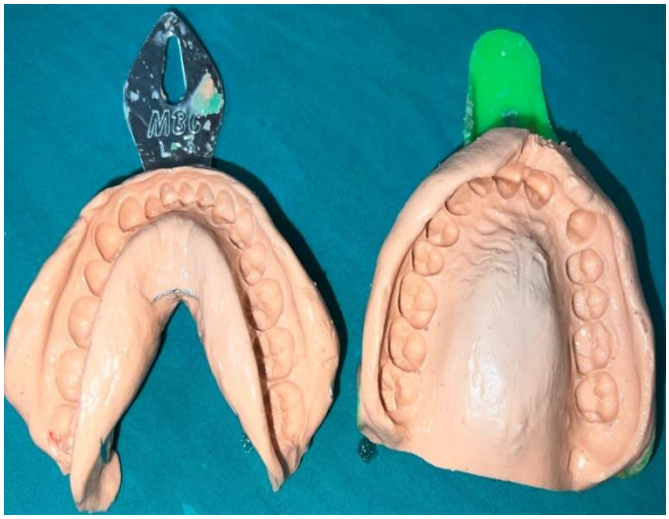

Figure 2: - Diagnostic impression.

To begin with, first, we place depth orientation grooves using coarse grit flat end tapered diamond bur, which helps us to control the depth of preparation. Grooves are made in two different angulations, one keeping parallel to the gingival half, the other parallel to the incisal half. Reduction is done on all the surfaces uniformly, keeping the bur parallel. Labial surface reduction is accomplished by flat end tapered bur; lingual surface reduction is done using coarse grit football-shaped bur. A clearance of 0.7 is optimum for metal-ceramic restoration [9]. The finish lines should be well de- fined and should be free of undercuts. Proximal reduction is done using long needle bur to prevent undue damage to the adjacent tooth. After adequate reduction, all the surfaces should be rounded and smoothened using a finishing fine grit bur as shown in Figures 3, and 4.

Figure 3: - Occlusal view after canine reduction.

Figure 4: - Frontal view after reduction

Figure 5: - Intraoral metal Try-in.

Figure 6: - Frontal view of metal Try-in.

Rubber base impression material (Avuegum Putty, Light body impression) was used for final impression material subsequently cast was made with die stone. The wax pattern was fabricated after individual die preparation. The metal try-in was then done on the patient's mouth to check the marginal fit of the prosthesis as seen in figure5,6. After the metal try shade selection was done. The prosthesis was then sent to a laboratory for final processing. In the lab final step of porcelain fusion to metal followed by glazing was done.

Figure 7: - Metal prosthesis fabricated from the lab.

The final prosthesis was then checked for proper fit and patient satisfaction. The area of interest was isolated well-using cotton rolls, with high volume suction being used. Cementation of the prosthesis was done using Type I Fuji Glass Ionomer cement as seen in figure 8. The patient was then instructed to come for a regular recall visit to maintain optimum oral hygiene.

Figure 8: - Cantilever Bridge.

Figure 9: - Post-op profile picture.

Case Report 2

An 18-year-old girl came to dental OPD for replacement of her missing anterior teeth in the upper right arch. She had undergone extraction 8 months after the trauma. Her main concern for the replacement of missing teeth was aesthetics. Figure 11 shows her profile before treatment.

Figure 10: - Pre-op intraoral view Case2.

Figure 11: - Pre-op profile picture.

The tooth was examined radio-graphically and clinically. The abutment teeth showed a high pulp chamber considering the patient's young age. The implant as well was not an option due to incomplete growth. A conservative approach was planned, with the least possible reduction. Maryland bridge was planned using adhesive cement restoration. Minimal preparation was done on #11 and #13. Lingual clearance was achieved followed by retentive countersink grooves placed. Adequate retention in this case is achieved by extra retentive grooves. Grooves may be placed in proximal line angles; figure 12 shows the final finishing of preparation was done.

Figure 12: - Intraoral tooth preparation.

Rubber base impression material was used for impression to record the details accurately. Addition silicone (Avuegum Putty, Light body impression) was used. Cast for sent to the lab for processing, metal framework was fabricated. Figure 14 shows the framework with wings on the adjacent tooth. The fit of the framework was checked and adjusted. Beaded nailheads were seen on the veneering metal substructure for retention.

Figure 13: - Intraoral Metal try in.

The restoration was cemented in place using a universal self-etch resin cement (Ivoclar universal self-curing luting composite with optimum light curing). Patient was quite happy with the delivered prosthesis 15, was advised for recall visits.

Figure 14: - Intraoral view after cementation.

Figure 15: - Post op profile picture Case2.

Discussions:-

A study by Younes et al showed that the survival rate of resin-bonded fixed dental prosthesis showed successful results in a 16-year retrospective study.[8]. Resin bonded fixed prostheses give optimum results and longevity with minimal tooth preparation. The dual cure self etch resin cement has sufficient working time, as well as enhanced strength, and reduced solubility. The minimum preparation helps to protect the pulp chamber, which is considerably high in young adolescents. Though being an interim restoration, it can serve for a long duration. A cantilever bridge uses a single abutment for a fixed prosthesis and the other end remains free. Here in my case, a healthy canine with adequate bone support is used. Following antes law [10] canine is strong enough for support and resistance to fixed prosthesis. Anterior teeth can successfully be replaced by short-span cantilever. Studies have shown 82% success rate over a period of ten years, as stated [1]

Conflict Of Interest

No conflict of interest.

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