Case report

MARYLAND BRIDGE WITH ROOT SUBMERGENCE- A ROBUST COMBINATION

ABSTRACT

The ultimate objective of a prosthesis is preservation of remaining teeth while lost function is being restored. The Root Submergence technique maintains the periodontal attachment surrounding the root, preventing the resorption of alveolar bone and maintaining the dimension of the ridge and surrounding tissues. A Maryland bridge is a type of resin bonded prosthesis that not only fills the space between the two teeth but also helps in recovering the lost functionality of the tooth. This helps the patient to regain his self-confidence and simultaneously allows him to chew, speak and smile without any setbacks. The combination of root submergence technique with the maryland bridge is one such modality which conserves the remaining root of the diseased tooth and thereafter rehabilitated with a prosthesis which requires minimal preparation. The prosthesis is thereafter luted with a resin cement with adequate isolation. Apart from it, this method of rehabilitation is very cost effective as compared to the implants and other expensive treatment modalities. The present case report highlights both the techniques step by step in the treatment of a patient with mutilated central incisor.

INTRODUCTION

Since time immemorial the dentists have endeavoured in preservation of what has remained rather than totally concentrating on replacing the diseased. It was well, stated by Atwood and

Coy that after extraction there is a reduction of maxillary and mandibular ridge of up to 1mm/year and 0.4mm/year respectively and following the tooth loss there is disintegration of the periodontal ligament, severing the soft tissue contact that leads to its apical migration leading to loss of interdental papillae which eventually leads to black triangles. The only predictable treatment option is preservation of alveolar bone for the maintenance of functionally healthy ridge.[1]

Root submergence technique (RST) is a type of partial extraction therapy (PET) which was firstly published in a report by Bjorn in the year 1961.[2] RST is a technique in which the coronal part of the tooth is surgically decoronated and the root is submerged at or below the level of the alveolar crest instead of extraction, modified RST(MRST) is a technique which is comparatively bloodless and minimally invasive and shows good results.[3]

Trauma to the anterior tooth is not uncommon and can be a result of different circumstances like congenital defects, accidents, endodontic failure and not everyone can afford replacement with an implant or some patients are so medically compromised that undergoing surgery can be life threatening and in some young patients growth spurts haven't culminated which warrant permanent replacement. Maryland bridge is a type of resin bonded fixed partial dentures (RBFPD's) which was introduced by Livaditis et.al and Thomson et.al.[4] This is a fixed dental prosthesis which requires minimal intervention of the abutment teeth and can be made retentive with the help of grooves and usage of chemically or light cured resin cements.[5]

With the introduction of newer and stronger ceramic and non-ceramic materials, the use of RBFPDs with non-metallic frameworks has increased significantly.[6] It has been reported that RBFPDs with a single retainer, also known as cantilevered pontics, had better survival rates

than RBFPDs with double-sided retainers. Similar results were found in a meta- analysis conducted in 2016 by Wei et al.[7]

The present article illustrates the prosthodontic rehabilitation of a case with help of Modified Root Submergence and Maryland bridge.

CASE REPORT

A 26year old male patient reported to the Department of Prosthodontics and Crown & Bridge with a chief complaint of broken left central incisor and wanted to get it replaced as soon as possible (figure1). Based on the patient's chief complaint and preferred treatment modality, a modified RST was planned in relation to maxillary left lateral incisor followed by a Maryland bridge over the endodontically treated left central incisor.

In the same visit, local anaesthesia (lignocaine 2% with 1:80,000 adrenaline) was given to the patient. Then using a flame shaped bur with an air rotor was used to submerge the root stump subgingivally so as to create a concavity in the root such that the central portion of the submerged root was more apical compared to peripheral root margins (figure 2). The central area of the submerged root was restored by a thin layer of restorative glass ionomer cement (GIC). The lingual preparation of both 11 and 22 was initiated with tapered round bur which ended 2 mm from the incisal edge and a light chamfer finish line was prepared 1 mm supragingivally. A flame shaped bur was used to shape the palatal fossa. Then a proximal groove was given in the mesial part of 11 and other mesial of 22. After that cingulum rest was given with respect to both 11 and 22. Subsequently the preparation was finished.

Following the tooth preparation putty and light body impressions were made with elastomeric impression material and cast was poured. (figure 3). The patient was called for the next visit in which metal trial was done. (figure 4). Shade selection was also done in the same appointment. The final prosthesis was then tried in the succeeding appointment and was evaluated for esthetics, phonetics and mastication (figure 5-6). Before cementation, a modification was made in the wings of the Maryland Bridge by producing webbings on the incisal edge with coarse diamond bur which leaves a good roughened surface. After isolation the Maryland bridge was cemented using a resin cement. (figure 7). A 6-month follow-up was advised until the patient was ready to replace the bridge with a more permanent solution.

DISCUSSION

Partial extraction therapy can be opted as a potential treatment modality for the preservation of the bone when other modalities are restricted due to systemic diseases and financial constraints. The root submergence technique is possible in both vital and non-vital roots. In non-vital root submergence, the tooth is endodontically treated before decoronation.

In vital root submergence, the vital tooth is decoronated, keeping the pulp intact and ensuring that the root is covered with a flap. The pulp tissue in the roots remains vital because of the blood supply through the apices and collateral occlusal circulation from the soft tissue.[8]

However, in vital root submergence complications can occur like pulpal infection, root caries especially in cases if the roots are not covered completely that can aggravate the situation leading to root resorption, ankylosis, periapical pathology, and soft-tissue perforations, especially used under overdentures because it may transfer pressure through the

denture base to the soft tissues around the roots. Thus, endodontic-treated tooth being submerged is advised.[1] Salama et al. (1998) studied the interproximal height of bone (IHB) as a factor in achieving optimal esthetic outcomes and classified the predicted height of interdental papillae based on the IHB measured from crest of bone to future contact point of the prosthesis.[9]

The failures of RBFPDs are usually less catastrophic than failures with conventional FPDs.[10] The main advantages of RBFPDs are conservation of tooth structure, reduction of pulpal morbidity, and use of supragingival margins. Compared to implant placement, RBFPDs are less expensive and associated with less postoperative morbidity and better aesthetics. This is especially true in growing patients with a missing anterior tooth in the long-term or patients who are not good candidates for other more aggressive treatment modalities, because of their age, medical condition, or finances. However, RBFPDs may lead to compromised aesthetic outcomes when abutment teeth are highly translucent or when interdental spaces are present owing to the metal color which can show through the tooth when a metal framework is used. RBFPDs are contraindicated in patients with limited interocclusal space, parafunctional habits, and abutment teeth with short clinical crowns.

CONCLUSION

The root submergence technique has a 5 decade history and is one of the best practiced technique for conservation of ridge and and interdental papilla. Preserving the patient's own tissues should always be considered as a treatment option rather than the extract-and-augment mindset. It is wise to choose less invasive options when the abutment teeth are healthy and

due to some reasons implant placement is not possible. A Maryland Bridge offers multiple advantages, such as minimal tooth preparation, more comfortable to the patient, affordability and esthetically satisfactory result can be achieved at a comparatively less number of patient visits.

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Figure 1: Preoperative frontal and intraoral view of the patient.

Figure 2: Modified root submergence of the left central incisor with a concavity created on the submerged root

Figure 3: Elastomeric impression of the prepared teeth.

Figure 4: Metal trial occlusal view showing ridge lap design for creation of self cleansing area.

Figure 5: Final prosthesis.

Figure 6: Intraoral occlusal view of final prosthesis.

Figure 7: Post cementation frontal view.