# 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 not only helps in maintaining the periodontal ligament but also prevents the resorption of the alveolar bone thus maintaining the ridge. 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.



Key words : Root Submergence, Maryland bridge, 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 treatment option for such kind of situation is to preserve the alveolar bone thus maintaining the 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 instead of extracting the whole tooth, the crown part of the tooth is surgically removed and the root is submerged at or below the level of the alveolar crest, modified RST(MRST) is a technique which is comparatively bloodless and minimally invasive and shows good results.[3]

Anterior teeth fracture 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 advancement of contemporary ceramic and ceramic free materials, the non-metallic RBFPDs frameworks has also been popularised.[6] Current reports have suggested that RBFPDs with a cantilevered pontic show 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). The patient was informed about all the treatment options and based on his choice MRST was planned with respect to maxillary left lateral incisor followed by a Maryland bridge. This treatment modality was actually chosen because patient wanted to get implant placed later in life rather than immediately, so our main motive was to preserve the remaining alveolar ridge, along with esthetic replacement of the coronal part.

In the same visit, local anaesthesia (lignocaine 2% with 1:80,000 adrenaline) was given to the patient. The root submergence began with the use of air rotor along with flame shaped bur to create a concave surface on the centre part of the root so that it was more apical in comparison to its periphery. (figure 2). Later a thin layer of Glass ionomer cement was used to restore the central area of the submerged root. The lingual preparation of both 11 and 22 was initiated with tapered round bur that was 2mm short of the incisal edge, along with it 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, the pontic was planned as a hygenic one so that it can be self cleaning. (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 coarse diamond bur was used to create a good roughened surface on the wings of the Maryland Bridge by producing webbings on the incisal edge. The Maryland bridge was them cemented with a resin cement in a well isolated environment. (figure 7). The patient was put on regular follow up until he was ready to get a permanent replacement done.

**DISCUSSION**

In patients with either systemic diseases or financial constraints the partial extraction therapy is a potential treatment modality for the preservation of the bone when other treatment options aren't favourable. The RST can be performed for both vital and non-vital roots. The tooth is endodontically treated before decoronation in the non-vital RST whereas the vital tooth's pulp is kept intact and it is made sure that the root is covered with a flap after decoronation in vital RST. In vital RST the pulp remains vital as it receives 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 specially in cases if the roots are not covered fully that can aggravate the situation leading to resorption of root, ankylosis, periapical pathology, and perforations in the soft tissues, especially used under overdentures because it may transfer pressure through the denture base to the soft tissues

around the roots. Therefore it is mostly advised to treat the tooth endodontically initially .[1]In the present case , the patient had broken tooth so we planned to get it endodontically treated so that there will be no risk of postoperative perforations and infections, hence non vital RST was performed, the patient could not afford implants at the current situation but he was willing to get it done hence the choice was made to do modified root submergence along with Maryland bridge as this would ensure preservation of bone along with good esthetic rehabilitation till the permanent prosthesis. 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 RBFPDs are associated with less postoperative morbidity alongwith superior esthetics and less cost. However, RBFPDs sometimes result in compromised aesthetics when there are a lot of interdental spacing as the color of the metal can show through when using metal framework. These prosthesis are also contraindicated in patients which do not have adequate interocclusal space, have habits like bruxism or other parafunctions habits, or short coronal structure of the abutment tooth.

**CONCLUSION**

The root submergence technique has a 5decade history and is one of the best practiced technique for conservation of ridge and and interdental papilla. The primary goal should be to preserve the patient's own tissues rather than opting for other measures like extraction and later augmentation. 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 proffers several benefits like it requires less tooth preparation, patient acceptance is better, its economical and can offer esthetically acceptable results at a comparatively less number of patient visits.

**Ethical Approval:**

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

**Consent**

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

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Figure 1(A-B): Preoperative frontal and intraoral view of the patient.

(A) (B)

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.