

## **Implant location made simple: A novel technique using multifaceted RPD- A case report**

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### **Abstract**

Exact location of an implant head during second stage surgery is a paramount procedure, which involves either opening of a full thickness flap or a tissue punch. Usage of removable partial denture in implant treatment as radiographic stent, surgical guide had been mentioned in the literature. Furthermore the usage of RPD is limited as a provisional prosthesis. This article illustrates a simple modification in the Removable Partial denture utilizing it further ahead in implant treatment. These techniques expedite precise removal of the mucosa overlying the cover screw of the implant which is found to be very simple and reliable for novice dentists.

**Keywords:** Submerged implants, Implant location, Removable dental prosthesis, Flapless technique.

### **1. Introduction**

Each implant must be planned and positioned properly using stents for good esthetics, adequate embrasures, and proper occlusion. Preoperative models are used in the fabrication of both radiographic and surgical stents which not only indicates the planned location of each implant but also serves as a guide during osteotomy along the planned long axis.[1]

The use of CAD-CAM has revolutionized in recent era where stereolithic models are made and 3-dimensional images are coupled with appropriate software and are used to allow precise implant placement, especially in situations of inadequate or insufficient bone structure.[2,3] The clinician however must have access to such software and facilities, and more importantly the patient should be affordable for the additional cost.

Berglundh et al observed that the implant site lacks periodontium, hence lacks vascular plexus in the interface.[4] The connective tissue part of transmucosal attachment to the underlying implant receives blood supply only from the suprapariosteal plexus, hence removal of the overlying mucosa has to be very conservative, while denuding the bone during second stage surgery.[5] Ideal protocols should be followed during bone preparation for implant placement for a promising functional ankylosis of the implant to the bone. During osseointegration, overgrowth of osseous tissues over submerged implants

occasionally makes it difficult to locate the implant even after raising a full thickness flap. Hence a guide that would decrease the chances of iatrogenic damage to the host tissue would be very essential. Many authors have suggested using the existing partial denture as a pre-insertion positioning stent [6,7]. Barely there is any mention regarding the usage of the same partial denture in locating the implant head during second stage surgery. The technique described in this article utilizes the versatile use of Removable Partial Denture (RPD) in implant procedure from placement to locating.

### **2. Case Report**

A 24 year old male patient presented to Dental College with missing teeth in relation to 36 and 46 region of the lower jaw and wants to replace it. (Fig 1) The patient was very particular that he needs to be treated with minimal invasive surgical procedures. Intra oral examination was done to evaluate the status of adjacent and opposing teeth. The molars 47 and 48 had mesially drifted and the patient was unwilling for orthodontic treatment which was advised, hence missing teeth were planned to be replaced using implants. A premolar was planned to replace missing 46 due to space limitation, and a molar in 36 region which would be supported by implants. Ortho panoramic image was taken to evaluate

the status of existing bone and for the selection of implant length, based on the available bone.

Since the patient was very keen about the invasive procedure, conventional implant treatment techniques with simple modifications were discussed with a group of prosthodontists and oral surgeons. The treatment procedure was preceded after taking Informed consent of the patient. Three sets of maxillary and mandibular casts of the patient were made for diagnostic mounting, ridge mapping and RPD fabrication respectively. One set of cast was used for the fabrication of RPD and the processed RPD was tried in the patient's mouth for precise fit. An access hole was created on the occlusal surface of the teeth in RPD using tungsten carbide bur, in relation to the planned site of implant placement (Fig 2). A metal ball of known diameter was placed in this access hole and was stabilized with modeling wax and was used as a radiographic stent. Evaluation of available bone height was done using the conventional formula (Available ball diameter/Radiographic ball diameter=Available bone height/Radiographic bone height). The second set of cast was used for bone mapping to evaluate the bone width, following which the implant size was selected based on the available bone. The metal ball was removed and the same RPD was used as a surgical stent. A full thickness flap was raised and the modified RPD was used to make a mark on the bone surface by pilot drill. The angulations of the successive implant drills were guided using adjacent and opposing teeth. The implants were placed by conventional method. After implant placement, the intaglio surface of the access hole of the RPD was partially packed using soft tissue conditioning material (Soft -Liner, GC corporation Tokyo, Japan) (Fig 3). Tooth moulding powder self -cure acrylic (DPI, Bombay, India) was used for filling the access hole on the occlusal surface (Fig 4). This modified RPD was tried in the patient and necessary occlusal corrections were done and the same was used as an interim prosthesis. The patient was instructed to wear the removable prosthesis till the second stage surgery. During second stage surgery, the tissue conditioning material from the intaglio surface was removed, and the access hole was extended to remove the self cure on the occlusal surface correspondingly, and was used for locating the implant head. An applicator tip dipped in intra oral marker was introduced through the access hole and soft tissue marking was made to locate the previously placed implant head (Fig 5). After removal of the RPD a tissue punch was placed exactly over the mark and the overlying soft tissue was removed to gain access to the cover screw of the implant (Fig 6). The exposed implants were restored with metal ceramic restorations by conventional methods.(Fig 7)



**Figure 1: Missing teeth in relation to 36 and 46 region**



**Figure 2: Removable partial denture with access hole made in the planned site**



**Figure 3: Intaglio surface of RPD partially packed using soft tissue conditioning material**



**Figure 4: Occlusal surfaces of RPD filled using tooth moulding powder self -cure acrylic**



**Figure 5: Markings made on Soft tissue using applicator tip**



**Figure 6: Exposed implant cover screws**



**Figure 7: Implants restored using metal ceramic restoration**

### 3. Discussion

This technique seems to be simple and user friendly for beginners. Multipurpose application of same RPD as radiographic stent, surgical stent, also eases location of the same implant, which can be used for both single and multiple implant units. Minimally invasive soft tissue removal and the excess bone growth over the submerged implants can be precisely removed. Still, precise implant location is not possible with this technique, if the implants are unable to be placed at the planned site due to iatrogenic osseous drilling or angulated implant driving. Also, prudential maintenance of interim prosthesis till second stage surgery is imperative.

The physiology and maintenance of the percutaneous interface of the implant is just as critical as the maintenance of bony interface as the gingival attachment apparatus is the only line of defense. Therefore, one must realize that the nature of the epithelial tissue attachment to the neck of the implant is

unique to this area of the body, and not found anywhere else. Suture placement to approximate the full thickness flaps during the second stage surgery may lead to plaque accumulation affecting the soft tissue implant interface leading to peri-implant mucositis. This complication can be averted by following the above mentioned technique as the operator makes a precise tissue punch using the existing RPD to expose the implant head. Severing of the supraperiosteal blood vessels is very much minimized. In case of limited attached gingiva wherein conventional incision, flap raising becomes inevitable this technique still proves to be effective. Precise location and removal of overgrown bone using this technique is an added advantage.

### 4. Conclusion

In patients with systemic conditions, where repair and regeneration process are comparatively less effective, this technique would be advantageous because of minimal damage to the blood supply of the peri-implant tissues. Additionally this procedure would be very useful in cases of multiple implant placement and location. Above all this technique combines the reliability in implant placement with accuracy of locating the same implant using the existing partial denture. In spite of all the advanced techniques in implant placement this technique is found to be less cumbersome with least disadvantages and user friendly especially for the beginners.

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