

**Modified implant supported fixed prosthesis- A novel approach**

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**Abstract**

There are two designs commonly followed for implant supported fixed prosthesis- cement retained and screw retained prosthesis. Both designs have advantages and disadvantages one over another and are clinically proven. Prosthesis design should be such that it provides flexibility in fabrication, delivery and maintenance of prosthesis. An alternate design was followed for the rehabilitation of a patient with implant supported fixed prosthesis in anterior

maxillary region. It combines the design features of the cement retained and screw retained prosthesis.

**Keywords:** screw retained prosthesis, cement retained prosthesis, screw access hole, implant supported prosthesis.

**Introduction**

For years attempts have been made to replace lost teeth with some kind of esthetically pleasing, fixed prosthesis that mimics natural dentition in both appearance and function. Implant supported dental prosthesis offers a most

predictable and cost-effective prosthetic option for patients. Hence dental implant therapy has become one of the most exciting and rapidly developing aspects of dental practice in the past decade<sup>1</sup>.

After the implants are surgically placed, prosthesis must be tailored to the positions of implants and there remains very little scope for modification. Hence, placement of implant using surgical guide is advocated<sup>2</sup>. Furthermore, some clinicians suggested correction of implant site soft and hard tissue deficiencies so that not to compromise ideal implant placement<sup>3</sup>. In addition to making the prosthesis inconspicuous, pleasing in appearance and proper in function, it should be easily delivered and maintained by both patient and dentist.

There are basically two ways of providing implant supported prosthesis- screw retained or cement retained. Both designs are clinically proven and well accepted over last 20 years, and each has advantages and disadvantages. This article provides outline of two basic designs of implant supported prosthesis and describes a clinical report that followed an alternate design for fabrication of prosthesis.

#### **Screw retained prosthesis**

Screw retained type of prosthesis to restore missing tooth with dental implant using UCLA abutment was introduced in 1988 by Lewis and colleagues<sup>4</sup>. UCLA abutment consisted of a castable component that is attached to implant platform by either engaging or not engaging the anti-rotational mechanism. This was advocated initially for single implant restoration<sup>5</sup> but later modified to multiple unit prosthesis<sup>6</sup>.

#### **Advantages**

- It enables to overcome unfavorable implant angulation.
- Simple and easy delivery of prosthesis.

- It allows retrieving the prosthesis if needed in easy manner.

#### **Disadvantages**

- The fit of the abutment is inferior to machined abutment.
- With gold alloy base type UCLA abutment, potential for an unfavorable mucosal attachment to the gold alloy exists.
- Potential for lack of proper mucosal attachment in comparison to titanium and ceramic based abutments.
- To avoid exist of screw access hole through the incisal edge, implant platform is positioned palatally/lingually to ideal position.

#### **Cement retained prosthesis**

Cement retained prosthesis is a two-piece prosthesis, an abutment and a crown<sup>7</sup>. Crown or FPD is cemented over the abutments similar to crown or FPD cementation over the prepared natural teeth. Before cementation of prosthesis abutments are prepared parallel to path of placement of the prosthesis.

#### **Advantages**

- It offers clinical versatility i.e. combination of biocompatible titanium or ceramic abutment and any crown material can be selected.
- Implant can be positioned ideally without concern for screw access.

#### **Disadvantages**

- It requires implants to be positioned exact or nearly to parallel to path of placement of prosthesis.
- If provisional luting agent used for cementation, it can wash out and prosthesis can loosen. Re-cementation is a difficult task due to collapse of gingival collar.

- If abutment screw loosens with permanent luting agent, re-fabrication of prosthesis is required. Complex delivery of prosthesis and re-cementation.

### Case Report

A 26 years old lady visited to the department of prosthodontics, dental college and hospital, with chief complaint of missing upper front teeth. Her teeth were avulsed due to trauma over anterior maxillary region about 6 months back. At the private clinic, she was treated for mucosal injury but avulsed teeth were not re-implanted. On intra oral examination 12, 11, 21, 22, 23 were missing (fig.1). 25, 36, 46 were also missing but they were extracted because of carious lesions 8 years back. Hence 37, 38, 47, 48 were mesially tilted.

After radiographic and CT scan examination, bone quantity and quality in the edentulous areas was evaluated. Diagnostic casts were mounted, examined for edentulous areas, abutment teeth and diagnostic wax up was completed. Due to esthetic reasons, patient's desire was to get upper front teeth replaced before lower back teeth. After case analysis, treatment plan was formulated and patient agreed to it. Maxillary anterior region was planned to restore with implant supported fixed prosthesis and mandibular first molar with conventional FPDs.

At the first stage surgery, three implants each of dimensions 3.3x13mm (Swell, Adin, Israel) were placed at 12, 21, 23 (fig.2). After six months, gingival formers were placed during second stage surgery. Three weeks later, gingival formers removed and gingival collar width measured. Two stage open tray technique was followed for making the impression with VPS putty-wash materials (fig.3). Both maxillary and mandibular casts obtained and mounted on Whip-Mix (8500) articulator using face bow record and centric and eccentric records. After examination of analog positions, it was confirmed that implants were not only at different levels in horizontal

plane but also there was no parallelism between the three implants. Screw retained prosthesis could be considered but achieving passive fit of prosthesis appeared difficult without soldering of framework.

An alternate design of prosthesis was planned that combines the features of both screw and cement retained prosthesis. This design includes two-piece prosthesis, as like cement retained prosthesis but with a hole at each retainer for abutment screw. Standard abutments selected and prepared so that there was 1.5 -2 mm of clearance for metal ceramic FPD. Wax pattern was fabricated and exist of screw access holes in cingulum areas verified. It was tried intraorally and checked for lip support, exposure, placement of gingival surface of pontics. After casting, framework verified for passive fit over abutment. Between the retainer and pontic, outline of interdental papilla marked so as to add gingival toned porcelain (fig.4). After sealing screw access holes in the abutments with guttpercha, final prosthesis was initially cemented with provisional luting agent. Screw access holes in the prosthesis were blocked with same luting agent. Following 8 days console function, prosthesis removed by removing sealing agents in the access holes then unscrewing with hex driver. It was recemented by same technique except with permanent luting agent and sealed with same luting agent (fig.5). Postoperative OPG was taken (fig.6).

### Discussion

Alternate design for implant supported prosthesis fabrication has benefits of both screw retained and cement retained prosthesis designs. With this design, prosthesis can be fabricated with abutment and crown of different materials to create the best esthetics. The prosthesis can be cemented outside the mouth, which helps to remove excess cement completely; prosthesis is then screwed in place. Another benefit of the design is when it is necessary to remove prosthesis, eliminate the sealing material in the

hole and unscrew the prosthesis similar to screw retained prosthesis. Critical point in this design is the size of the screw access hole and its location in the prosthesis. It should be small enough that implant can be positioned in ideal site and screw does not pass through the incisal edge area of anterior restorations or functional cusp area of posterior restoration.

### Conclusion

In the clinical practice, we encounter a variety of problems in patient management, material and equipment handling, and few others. But successful rehabilitation of patient requires scientific basis, clinical skill and management of problems by choosing correct alternate ways. A clinical report was described that encountered problem of implant positions that are not parallel to single path of insertion of prosthesis. An alternate design of prosthesis fabrication was followed; it is cement retained prosthesis with screw access holes for easy delivery and retrieval.

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### Legend Figures



Fig. 1: Preoperative Intra-oral view

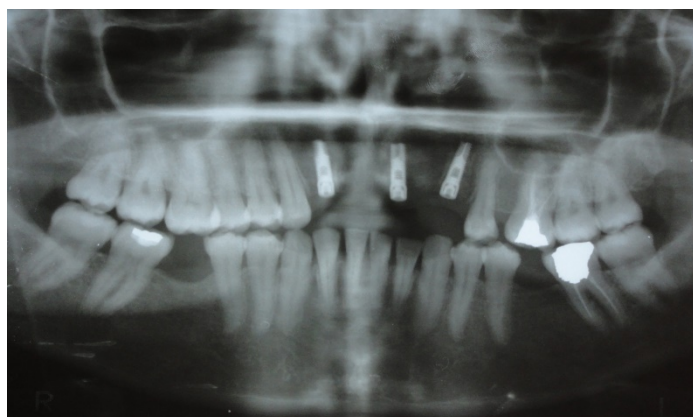


Fig. 2: OPG after implant placement



Fig. 3: Final impression



Fig. 4: Final prosthesis –Gingival view



Fig. 5: Screw access holes sealed-occlusal view

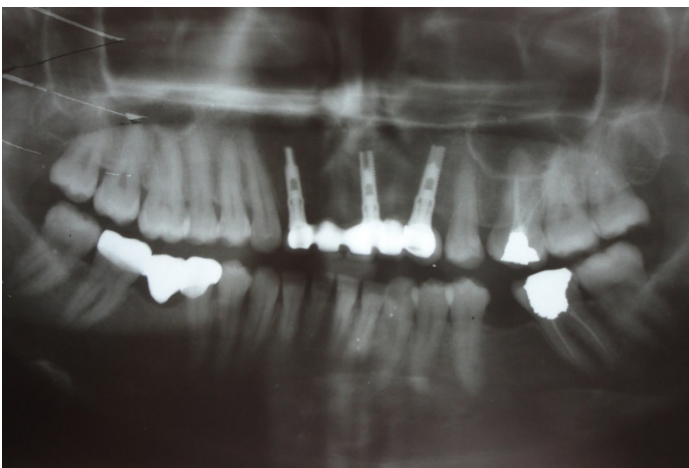


Fig. 6: OPG-Post operative