Case Report

Immediate Functional Loading in Posterior Mandible: A Case Report on Flapless Implant Surgery

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ABSTRACT

Edentulous space management has been made easier by dental implants. Patients having sufficient gingival tissue with sufficient bone volume at recipient site are preferred for implant surgery with flapless approach. The aim of our article is to report a case of flapless implant surgery procedure for the management of edentulous space in posterior mandibular area.

Key words: *Edentulous Spaces, Dental Implants, Flapless Implant Surgery.*

Traditionally, missing teeth were replaced with dentures or bridges permitting restoration of chewing function, speech, and aesthetics [1]. As an alternative to natural teeth, dental implants are inserted into jawbones to support dental prostheses and are retained due to the close apposition of bone [2]. The term osseointegration, was first described by Branemark in 1977 and is defined as direct connection between living bone and implant surface [2,3].

In the past 30 years, implants have been one of the most revolutionary and significant advances in dentistry. It is based upon concept of surgery which involves flap elevation for placement of implant. Patients having sufficient bone volume at implant recipient site are preferred for flapless implant surgery. In this procedure, dental implant is installed in mucosal tissue without reflecting flap. Flapless implant technique is preferred because it minimizes the possibility of postoperative peri-implant tissue loss and helps to overcome the problem of soft tissue management during and after surgical procedure [4]. Over the past few years, flap designs for implant surgery have been modified [5].

A recent innovation has introduced the possibility of placing implants without elevating flaps and without exposing bony tissue. Flapless implant surgery has been used since a long time for tooth extractions and site preservation. There has been less morbidity associated with this procedure [5]. Surgical procedures that involve incision along with flap elevation results in resorption of crestal bone due to alteration in vascularization of bone periosteum [6].

Often evident after dental implant insertion, bone remodeling processes occur around implants which lead to varying degrees of crestal bone loss [7,8]. Experimental studies have proven that by flapless implant surgery we can prevent alteration of vascularization of involved area. In atraumatic techniques, less crestal bone resorption is seen which has an influence on final aesthetics [9,10].

Table 1: Difference between flap vs flapless implant surgical procedures

	Advantages	Disadvantages
Flapless	✓ Minimal incision and less trauma ✓ Patient comfort ✓ Less bone resorption ✓ Allows for immediate loading ✓ Improved esthetics ✓ Decreased surgical time ✓ Patient perception of "minimally invasive surgery"	– Lack of surgical visibility especially near vital structures – Greater learning curve – Limited irrigation to osteotomy – Limited hard/soft tissue manipulation
Flap	✓ Surgical visibility enhanced ✓ Allows for bone and soft tissue re-contouring ✓ Increased surgical control for osteotomy site selection	– Greater surgical exposure required – Increased postoperative sequelae – Delayed recovery time – Reduced blood supply after flap – Patient perception of "more invasive surgery" – Increased surgical time

Success of oral implant treatment depends upon cooperation between patient and dentist, treatment plan, surgical techniques that are followed, and prosthodontic techniques of implant restoration [11].

There are two types of flapless implant surgery:
a) Direct drill method
b) Soft tissue punch technique.

Favourable results using immediately loaded (IL) implants enabled clinicians to broaden the field of implant dentistry. This treatment procedure uses less surgical time and intervention with IL implants. This one-staged surgical approach also increases patient comfort, satisfaction and acceptance. Francetti et al. demonstrated that high bone-to-implant contacts ranging from 78 to 85% using the IL implant in edentulous mandibular ridges [12].

The aim of the present case report is to discuss a case of flapless implant surgery w.r.t 45 and 47 for the management of edentulous space with IL implant.

CASE DESCRIPTION

A 63-year-old healthy female patient reported to our clinic with a chief complaint of missing teeth in the lower right back tooth region. On intra examination, multiple edentulous spaces along with generalized attrition and generalized spacing were present in the mandible (Figure 1A, B, C). Patient had no significant medical and dental history.

Patient wanted to have a fixed prosthesis in her lower right region with respect to 45, 46, and 47. Patient was advised to have an orthopantomogram (OPG). The findings revealed sufficient bone height which was suitable for implant placement (Figure 2).

Figure 1A, 1B, 1C: Preoperative intraoral photographs

Figure 2: Preoperative OPG

Patient was also advised to get a Cone Beam Computed Tomography (CBCT) done and bone mapping was done

for assessing accurate bone height and bone width. Treatment plan was explained to the patient and the surgery was planned. (Figure 3)

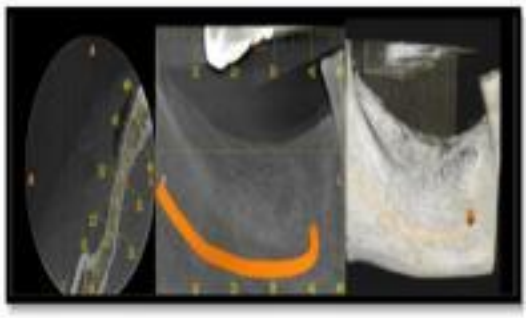

Figure 3: Preoperative CBCT

On the day of surgery, pre procedural mouth rinse of chlorhexidine (0.2%) was administered at the beginning of the procedure. Local anaesthesia was administrated in the region of 45, 46, and 47.

Osteotomy site preparation was done using direct drill method. A round bur was used initially followed by 0.16 mm precision drill, 2.0 mm drill, 2.4 mm drill, 2.8mm and finally ending the sequential drilling process with 3.8mm and 4.2 mm drill. The entire procedure was carried out under saline irrigation. The implant system used was Noble BioCare (Figure 4). Two Noble BioCare Active implants of sizes 4.3*13 mm were placed in the region of 45, and 47 at the osteotomy site.

Figure 4: Implant kit

At the time of implant insertion, a very good primary stability was achieved with insertion torque of more than 40 NCm. Implant stability quotient (ISQ) measurements were more than 80. So, it was decided to load the implant immediately (Figure 5).

Figure 5: Intraoral photograph after implant placement

Implant level impression was taken on the same day and it was sent to the lab for screw retained prosthesis. Thereafter, healing cap was placed. Patient was strictly instructed to follow hygiene protocol and not to eat actively from that side. She was already on soft diet for 1 year. She was given postoperative instructions and was kept on antibiotics and analgesics which included amoxicillin 500mg thrice daily for 3 days and Zerodol-P twice daily for 3 days. Patient was recalled after 3 days for final delivery of Porcelain fused metal (PFM) screw retained prothesis with function and occlusion load. (Figure 6A, 6B).

Figure 6A, 6B: Photograph showing final prosthesis

Patient was recalled after 15 days for follow up upon which appropriate soft and hard tissue architecture was in place and occlusion was stable. She was satisfied with the result and was recalled after 1½ year. Figure 7 shows her follow up OPG.

Figure 7: Post-operative OPG

After a few months, no deleterious changes were observed. Patient was advised to start using that side with good oral hygiene protocol. Two years after the initial follow-up, no adverse changes were observed.

DISCUSSION

Conventional implant surgery has direct access to the underlying alveolar bone during implant placement. The "blind" flapless technique aided by preoperative 3-D planning led to appropriate positioning and angulation of implant placement [13,14]. The flapless procedure can avoid detachment of periosteum to preserve peri-implant soft and bone tissue [15,16].

When flapless surgery is compared to conventional implant surgery, these benefits contribute to long-term clinical performance. Thus, flapless technique can be considered as a promising alternative to conventional implant approach without significantly compromising long-term outcomes of implant treatment. Additionally, although peri-implant bone gain was rarely observed in both flapless and conventional groups, flapless surgery can lead to minor discomfort (e.g., oedema and pain) for patients during postoperative recovery [17].

Placement of dental implants has no contradiction [18]. Placing dental implants with flapless approach has become increasingly popular in recent years. Benefits of flapless procedure include:

a) Less bleeding at the site of implant placement,
b) Operative time is reduced,
c) Post-surgical healing is accelerated,
d) Amount of crestal bone loss isdecreased
d) Patient comfort and satisfaction increased [19-21].

When implant placement is done, soft tissue flaps are raised, which results in cutdown of blood supply to bone, thus leaving poorly vascularized cortical bone without vascular supply, leading to bone resorption during initial healing phase [22].

In 1986, Albrektsson et al. proposed criteria for assessment of success in implants. According to this criteria, less than 0.2 mm bone loss annually following implant's first year of function is necessary for long-term success [23]. Since then, crestal bone area is considered as significant indicator for implant health. Salama et al. established that interproximal bone height is essential for achieving optimal aesthetic results [24]. There are various advantages of flapless implant surgery over conventional technique. Flapless implant placement is very efficient and new technique of implant placement done in short interval of time with lower patient morbidity [25].

In this case report we have discussed the use of direct drill technique for flapless implant placement. This approach is novel and requires less time consumption. It also leads to lower patient morbidity.

CONCLUSION

Flapless implant surgery using IL implants results in enhancement of implant aesthetics. Flapless implant placement provides many benefits, such as decreased trauma at site of implant placement, recovery time is short, pain is reduced, infection rate is reduced, patient compliance is improved, bone loss is decreased and inflammation is reduced due to improved vascularity. The protocol for this procedure includes a) proper evaluation of bone type, b) height and width of the residual ridge, c) oral hygiene, d) patient oral habits e) amount of available keratinized tissue. Long-term clinical trials of flapless implant surgery with high level of evidence, adequate sample size and comparison group (i.e., flapless implant surgery) are required to verify the conclusions of this study.

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