CASE SERIES

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Extraction and immediate implantation has become a very reliable and time saving method of prosthetic rehabilitation of a patient. Achieving high primary stability and preservation of hard and soft tissues is of great importance with this treatment modality. Therefore using implant system which addresses these concerns would be important. The presenter with his vast experience with oral implantology will highlight his own method of atraumatic extraction, implantation and immediate provisionalization with nonfunctional loading, with the help of clinically treated cases. He will demonstrate his method which may have universal acceptance.

Immediate implant placement, optimum primary stability, nonfunctional loading, provisional restoration.

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Advantages of immediate implant placement into extraction sockets and provisional restorations

- Immediate esthetics by a fixed restoration
- Prevents collapse of the peri-implant soft tissue through support given by a carefully crafted provisional restoration
- Reduces the number of surgeries
- Reduces time required for rehabilitation.

Gargiulo² documented a biologic width from the base of the gingival sulcus to the crest of the alveolar bone to be 2.04 mm, with epithelial attachment of 0.97 mm and connective tissue attachment of 1.07 mm. The dimensions in implants are supposed to be similar to those of natural teeth and are stable even after loading. These dimensions are a key determinant of esthetics.

Following abutment connection, the crestal bone loss has been shown to recede from the implant abutment connection by 1.3 to 1.4 mm as measured horizontally.³ However, with certain implant systems like 'Ankylos' (Dentsply Friadent, Germany) which employ platform switching of the implant abutment connection, this crestal bone loss at Stage 2 surgery is nearly eliminated. The 'Ankylos' system in the mid 1980's was the first system to introduce the morse taper conical connection with platform switching of the implant abutment connection. Other companies who have followed in adapting this feature are AstraZeneca, Sweden; Bicon, Boston; Curasan, Germany and more recently Nobel Active, Nobel Biocare; and Straumann, Switzerland. The 'Ankylos' system is unique because it not only has platform switching which brings the bacterial inflammatory infiltrate from the bone towards the axis of the implant but more important the very strong conical implant abutment connection has no microgaps and also prevents micromovements resulting in no bacterial colonization. This unique combination of platform switching and strong implant abutment connection has been documented since the last 20 years to virtually eliminate crestal bone loss which in turn preserves soft tissue architecture.⁴⁻⁷ The preservation of the perimplant bone is particularly important in the esthetic zone where the objective is to prevent postprosthetic bone loss and preserve soft tissues. The 'Ankylos' implant system is also grit blasted and thermally acid etched right up to the shoulder of the implant with no polished collar which encourage the bone to grow right up to the top of the implant thus allowing 1mm subcrestal placement of the implant. Implants with smooth collars when placed subcrestally, the bone resorbs all the way down to the rough-to-smooth transition line.

Immediate placement and providing a customized immediate provisional restoration with appropriate subgingival emergence profile can be of significant benefit in providing stability to the periimplant soft tissues. Careful manipulations of the hard and soft tissues is critical to a successful outcome of the procedure. Extractions should be done as atraumatically as possible with microsurgical blades, periostomes and fine luxators taking care not to injure or fracture the labial cortical plate of bone. Intrasulcular incisions and minimal or no reflection of the periosteum (flapless procedure) should be employed.

Although, implant placement into fresh extraction sockets is now considered to be a predictable and accepted treatment procedure. There are important prerequisites for immediate implantation which must be addressed (Table 2).

Prerequisites for immediate implantation

- Adequate primary stability
- Adequate bone all around the implant covering and stabilizing the implant
- Preferably no grafting procedure need to be undertaken especially no major grafting. If grafting has to be done, implant should be submerged wait for bone and implant to osseointegrate before loading
- No major infection or soft tissue inflammation should be present. Small periapical granulomas is not a contraindication as they can be eliminated by surgical curetting and subsequent osteotomy
- Sufficient bone apically to ensure primary stability.

In the maxillary esthetic zone, implant placement should be undertaken towards the palatal aspect of the extraction socket and one should not follow the same direction of the extraction socket. Care must be taken during the osteotomy preparation on the palatal wall, as this is dense and difficult to prepare.

If immediate provisional restoration is considered, it is essential to have about 35 Ncm of insertion torque. If moderate primary stability of about 25 Ncm is achieved, then a transmucosal healing screw can be placed to avoid second stage surgery. If however, there is poor primary stability with less than 20 Ncm, then it is advisable to place cover screws and submerge the implant and wait for osseointegration (3 to 4 months) before loading the implant.

The purpose of the following case reports is to further explain and elucidate the concept of immediate implantation and when it is not advisable to immediately load.

A female aged 40 years, the CEO of a multinational company fractured the crown off from her upper right first premolar and was faced with an embarrassing situation because the tooth gap was visible when she smiled. She requested an immediate esthetic solution with a fixed restoration (Figs 1A and B). Looking to the emergency of the situation, the treatment plan was to extract the remaining root and place an implant immediately with nonfunctional loading. This plan according to us would be the most conservative (no reduction of adjacent natural teeth) and long lasting method of rehabilitation. On an emergency basis, the next day; after the usual preoperative investigations and medications, the roots were atraumatically removed using first the no 15 blade to sever the periodontal fibers (Fig. 1C) followed by the periostome (Fig. 1D) and finally using the very thin luxator (Fig. 1E). Only after the root was mobile, was the straight root forceps used to remove the roots (Fig. 1F). There were two separate roots with a clear septa (Fig. 1G). It

5A Preoperative OPG

5D Subsequent use of periosteal elevator to sever and widen the periodontal membrane space

5B Intraoral view of fractured tooth

5E Use of luxator on the mesial and distal surface

5C Use of no. 15 blade to sever the periodontal fibers

5F Use of forceps only after tooth is mobile

grafted bone was next covered with a resorbable membrane (BioGide Geistlich, Switzerland) (Fig. 4H). Good primary closure of the wound was achieved due to waiting for 3 weeks and due to design of flap (Fig. 4I). A new modified 'Maryland' bridge was bonded immediately after surgery. Figure 4J show intraoral radiograph taken immediately after surgery.

Progressive thread design of the Ankylos' implant

crowns (PFM) two months after surgery (Figs 2G and H). The reduced treatment time of two months after surgery for rehabilitation was possible due to the grit blasted and thermally acid etched "cell plus" surface of the 'Ankylos' Implant and also due to the patented progressive thread design of the 'Ankylos' implant (Fig. 3).

A male aged 42 years reported with fracture of his left lateral incisor which was fractured vertically. Since there was a possibility of loss of labial bone due to pathology, it was decided that we would only extract and wait for 3 weeks for soft tissue closure to take place. As expected after extraction it was found that the labial bone was partially lost in the coronal half of the socket (Figs 4A and B). Therefore, the tooth was only extracted and the socket closed. A modified Maryland bridge of composite was bonded to the palatal surface of the adjacent teeth (Fig. 4C). The plan was to wait for 3 weeks and then implant with simultaneous guided bone regeneration (GBR). After 3 weeks of healing (Fig. 4D) it was decided to take a full thickness mucoperiosteal flap with two vertical incisions (Fig. 4E). After the usual osteotomy on the palatal aspect of the socket, a 4.5 mm diameter and 14 mm long 'Ankylos' implant was placed with excellent primary stability. Cover screw was removed and sulcus former was placed to support soft tissue and facilitate second stage surgery (Fig. 4F). However, immediate provisionalization on the implant was avoided because of the necessity of bone grafting. From the experience of the authors they have found that if the membrane in GBR is exposed then optimum bone generation does not take place. Artificial bone mineralized Algae (Algipore, Dentsply Friadent) (Fig. 4G) was placed to cover the exposed threads of the labial surface. The

Vertically fractured root

Loss of coronal half of labial plate

Modified Maryland bridge"bonded to adjacent teeth

5D After 3 weeks of soft tissue closure

5C Aligpore bone graft material placed

5E Use of microsurgical blade for incision

5H Aligpore covered by BioGide membrane

5F Sulcus former placed

5I Achievement of primary closure due to delayed implant placement 3 weeks after extraction and design of flap

Intraoral radiograph taken immediately after surgery

CONTRAINDICATIONS FOR IMMEDIATE IMPLANTATION

- nonfunctional loading is an acceptable procedure, case selection and experience is required before undertaking it.
- Implant placement is typically undertaken towards palatal aspect of extraction socket.
- AVOID TEETH WITH LARGE OR ACUTE PERIAPICAL INFECTIONS
- AVOID TEETH WITH LARGE BONE DEFECTS
- INADEQUATE PRIMARY STABILITY OF AT LEAST 1 CM IS REQUIRED FOR IMMEDIATE NONFUNCTIONAL LOADING.
- INADEQUATE BONE SHOULD BE PRESENT AROUND THE IMPLANT COVERING IT.
- PREFERABLY NO GRAFTING PROCEDURE SHOULD BE UNDERTAKEN ESPECIALLY NOT MAJOR GRAFTING. In which case primary closure is indicated and wait for tissue and implant to integrate before loading.
- NO MAJOR INFECTION OR SOFT TISSUE INFLAMMATION SHOULD BE PRESENT. A small chronic periapical granuloma is not a contraindication because it can be eliminated by surgical curettage and subsequent osteotomy.
- THE DOCUMENTED ADVANTAGES OF IMMEDIATE IMPLANTATION are: (a) Preservation of hard and soft tissues

(b) Psychological benefit to the patient (c) No need to wear removable dentures.

- REDUCES TOTAL TREATMENT TIME BY ELIMINATING NEED FOR SECOND STAGE SURGERY.
- APERED PROGRESSIVELY THREADED IMPLANT (Dentsply Friadent) is documented to give best success rates with immediate implantation.
- ERIT BLASTED AND THERMALLY ACID ETCHED plus (Dentsply Friadent) has been documented with increased surface for bone to implant contact (BIC) and also contributing to improved primary stability.
- LOADING SHOULD BE NONFUNCTIONAL CONTACT IN CENTRIC AND IN EXCURSIVE MOTIONS.
- PROGRESSIVE LOADING AFTER ONE AN MONTHS CAN BE STARTED TO IMPROVE BONE DENSITY.
- THE IMPLANT ABUTMENT CONNECTION SHIFTING FROM THE PERIPHERY TO THE CENTRAL AXIS OF THE IMPLANT. However, more important, it should have a friction locked morse taper conical connection which eliminates microgaps and micromovements and in turn preserves hard and soft tissues (Ankylos Dentsply Friadent).

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