

18



IMPLANTATION AND
RESTORATION ON
I.C.E. IMPLANTS

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IMPLANTATION AND RESTORATION ON I.C.E. IMPLANT

ABSTRACT

Implantation and immediate loading of an ICE type implant in an 82 year old male patient with a history of balanced blood pressure.

INTRODUCTION

- An implant-supported fixed denture for restoring edentulous jaws is currently considered to be the treatment of choice for restoring functionality, aesthetics and phonetic abilities.
- When the patient has a removable denture, the implantation can be performed and the existing denture can be used as a transitional denture. This enables the treatment to be both cost and time effective. However, there are also a few disadvantages to this:
 - The patient's mastication quality does not improve and can even be harmed. This is because the areas over the implants must be relieved after the implantation, which reduces the stability of the denture.
 - If a local bone graft is required, the non-balanced pressure on this area may cause bone resorption and sabotage the result.
 - The patient does not "experience" the change in the permanent denture, which differs in occlusal aspects, guidance, and occlusal height (particularly when there is a defect in the patient's previous denture); all of which bear information that is vital for the planning of the final denture. If we wish to examine the new data, a fixed transitional denture must be performed after the osseointegration of the implants; a procedure which requires additional sessions, lab stages, and naturally, additional costs for the patient.
 - In cases where a patient has either natural teeth or a fixed denture and there is a need for all his teeth to be extracted, the patient may find the transition to a removable denture difficult, as they are considered less comfortable, and offer a significant impairment to the quality of life.
 - Aesthetic parameters must be examined, since a denture has flanges that provide support for the lip; in comparison with the final denture, which is provided without flanges.
 - A removable denture completes the missing teeth and tissues, which is why it is important to examine lip support and the phonetic abilities after the treatment according to the planned restoration, particularly for the maxilla.

Additional considerations in performing a fixed provisional restoration

- Bone availability must be examined for executing immediate implantation with or without immediate loading. For immediate implantation, it is important to evaluate alveolar bone and the quantity of the bone that remains after extraction. The gap between the implant and the inner alveolar wall that does not require augmentation, should be up to 2 mm.
- To ensure sufficient initial stability of the implant, attention should be paid to maintaining sufficient bone in the alveolar apical part.
- Examination of the buccal plate thickness: the minimum recommended thickness for preventing a buccal recession is at least 2 mm.
- The implants' minimal initial stability for performing a safe immediate loading should be 35 N/cm.
- The design of the implant is vital for good initial stability. The implant should be convergent, spiral, and with good self-compression ability.
- The drilling protocol must match the bone type, implant design and bone dimensions.

CASE DESCRIPTION

A 82 year old male patient, complaining of pain in the mandible, and chewing difficulties.

History:

Hypertension stabilized by medication, using a B-Blocker type drug.

Extra-oral

Mouth opening of 42 mm, TMJ, normal mastication muscles, low smile line.

Intra-oral:

Soft tissues: tongue, palate and mouth floor are normal, saliva secretion is at the lower normal limit, shallow super-posterior vestibule, normal inferior vestibule, BOP, pocket depth of 8 mm in mandible. Deficient Fixed Partial Denture (FPD) type restoration: poor fit, partial bridge mobility, deformed occlusal plane, and upper midline deviates by about 2 mm to the left, from the center of the face.

X-ray examination:

- Maxilla: FPD supported by teeth and implants, poor fit, pockets of 3-5 mm without BOP, no mobility.

- Mandible: missing teeth, FPD supported by teeth with poor fit and extensive loss of osseous support around most teeth, secondary caries down to the bone height, former root canal treatments and extensive abutments, edentulous ridges demonstrating moderate resorption.

- Proximity of alveolar bone peak to the mandibular nerve: in the majority of the area it is above 13 mm, except in area 45 where it is approximately 3 mm.
- Alveolar bone width: distal area more than 8 mm and mesial area 5-7 mm.



Radiograph upon patient admission

Diagnoses

- Periodontitis
- Caries
- Periapical lesions
- Missing teeth
- Faulty restoration
- Deformed occlusal plane

Restoration type

Cemented implant supported FPD (temporary and fixed)

Materials

I.C.E. implants, Alpha-Bio's Graft bovine bone substitute, Alpha Bio's Graft collagen membrane

TREATMENT PLAN

- In view of the periodontal condition and extensive loss of tooth material, all lower teeth are to be extracted.
- The patient ruled out the option of a removable denture, due to strong gag reflex and a previous bad experience with adjusting to an upper denture.
- The maxilla has a fixed denture, therefore there is a preference for an additional fixed denture in the mandible to achieve maximum stability and effective masticatory capabilities.
- Correction of the upper occlusal plane by selective grinding
- Temporary fixed transition denture with immediate loading
- Cemented FPD on the mandible implants

Implantation and transitional denture planning

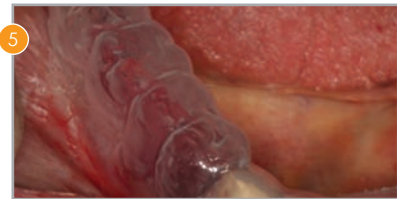
To plan a fitted transitional denture, study models were made with some modifications in the occlusal plane (by carving), completion of missing teeth and additional contact surfaces. (2)



After the diagnostic carving, an Omnivac (Essix C+) plate was prepared to serve as a surgical plate, and as a plate for the temporary restoration. (3)



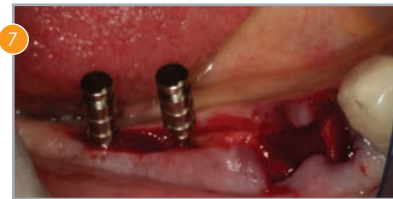
Extraction of the teeth in stages to adhere to the treatment plan, and stabilize the surgical plate supported by the remaining teeth. (4)



Use of Omnivac as a surgical plate, to help determine the location of the implants according to the location of the crowns. (5)



Raising a flap and cleaning the area. No implant was inserted in position 45 due to extensive osseous defect and proximity to the nerve. The alveolar bone in the distal area of 44 is intact. In area 45, alveolar preservation was performed using a bovine bone substitute and collagen membrane. (6)



Paraguides used for examining the direction of the implants. (7)



Completion of the drilling based on bone type 2 protocol and insertion of two Ø3.75/13mm I.C.E. implants in position 46 and 47. (8)



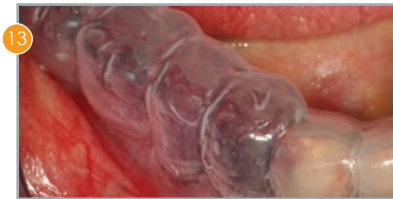
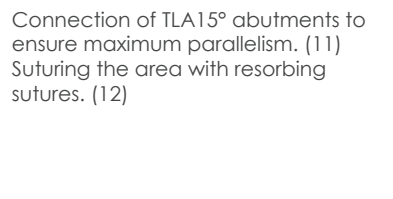
Implants insertion up to the bone height, where the edge of the hexagon faces the buccal, and the final insertion torque for both implants is 40 N/c. (9)



Immediate implantation in area 44, inserted according to the drilling protocol for immediate implantation of Ø4.65/13 mm I.C.E. implant, with bovine bone substitute in the gap between it and the alveolar wall (space of more than 2 mm), and a torque of 35 N/Cm. (10)



Connection of TLA15° abutments to ensure maximum parallelism. (11) Suturing the area with resorbing sutures. (12)



Use of a plate to examine the height and location of the abutments in relation to the planned temporary denture. (13) Extraction of the remaining teeth and use of a plate as a surgical guide for inserting the rest of the implants (Table no. 1). (14)



Connecting the rest of the abutments, then adjusting and preparing them to obtain a uniform insertion path, according to the surgical plate. (15)



Using the plate to build the temporary bridge, while directing the patient to close in CR and acryl cooling (Unifast fast set) during the curing, by spraying cold water and releasing the bridge several times until final curing. After this, the plate is peeled away and the bridge is shaped. (16, 17)



Bridge adaptation, occlusal adjustment and cementing. (18)



Radiograph after the implantation procedure. (19)

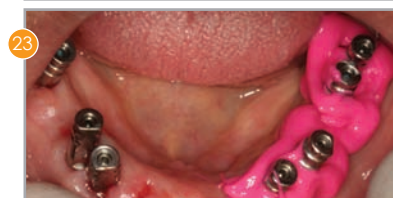


After 3 months - removal of the temporary bridge, implant stability check, and tightening the abutment screws. Performing a lining for the temporary bridge follow up of gingival outline. (20)

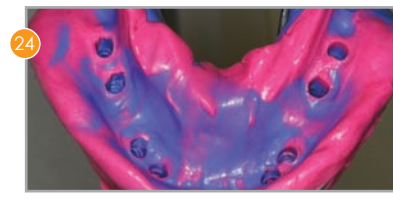
Impressions, work model preparation and transferring the data to the lab



Connecting closed tray transfers to the implants. (21)



Double-mix one stage impression-taking (Zhermack Hydrize fast set). Initially, the wash is run around the transfers while the putty is prepared. The tray is inserted in the mouth until final setting. (22, 23)



The impression is removed. Using a metal tray reduces the degree of deformation during the impression. (24)



Connecting an analog to each transfer and inserting it into the impression according to the corresponding location in the mouth. (25)



Casting a work model in the lab. (26)



Bite registration for the interocclusal relations of the temporary bridge (Zhermack ColorBite). (27)



Transposing of a few abutments from the mouth to install the temporary bridge on the work model. (28)



Assembly of the temporary bridge on the work model. (29)



Installing the upper model antagonist on the temporary bridge using the silicone bite register. (30)



Preparation of buccal silicone index. (31)



Installation of the model on an articulator and fixing the interocclusal relations. (32)



Buccal and occlusal silicone index. (33)

Abutments, metal and porcelain frame preparation



Positioning the model against the opposing jaw at the original interocclusal height. (34)



Preparation of the abutments according to the buccal and occlusal index. (35)



Preparation of the metal frame according to the index. (36)



Abutment preparation, and adjusting height and parallelism. (37)



Carving the metal framework according to the indexes (chrome cobalt metal). (38)



Checking the framework in the mouth. Passive fit is necessary for good denture durability. (39)



Verification of interocclusal relations by registering a central position and the use of silicone material. (40)



Building porcelain crowns according to the intermaxillary relations and the gingival outline. (41)

Abutments connection and delivery of the final denture



Assembling the abutments. The buccal side was marked to facilitate their transfer from the working model to the mouth and back. (42)



Replacing the abutment screws with new ones, and tightening them to a torque of 35 N/cm. (43)



Cementing the bridge using temporary cement (Freegenol GC). (44)



Occlusion: the occlusion that was built after selective upper grinding is mutually protected. (45)



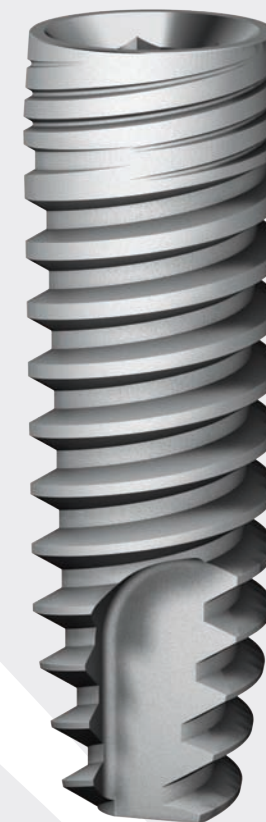
Aesthetic evaluation: The lower incisor arch is parallel to the lower lip with a midline correction. (46)



After the treatment is completed, a Radiograph shows good osseointegration of the implants and a good fit of the lower denture. (47)

SUMMARY

- An implant-supported fixed denture for the edentulous jaw rehabilitation is considered the treatment of choice. In cases where bone availability allows for immediate implantation and immediate loading, the patient enjoys a significant improvement in quality of life and functionality. Additionally, the transitional denture provides important and useful information for building the final denture, which can save precious chair time and laboratorial stages.
- The patient complained about functional difficulty. Immediately after the implantation, full functionality was regained without functional or aesthetic impairment.
- The final result corresponded with the patient's expectations throughout the treatment, and provided him with good functionality and aesthetic appearance. Additionally, throughout the procedure the healthy natural areas were kept, to ensure a durable, stable restoration.
- The I.C.E. implant system provided good initial stability during the transitional restoration, and maintained the bone height around the neck of the implant during the healing period, and for a few months after the implantation. This advantage is possible due to the unique spiral design of the implant, which enables it to be inserted in bone type I or II without increased pressure on the implant neck area. The unique design also provides very good initial stability in immediate loading procedures.



DISCOVER TRUE INNOVATION

Table No. 1

Post type	Insertion torque	Diameter	Length	Implant type	Location
TLA15	40 N/Cm	3.75	10 mm	I.C.E.	47
TLA15	40 N/Cm	3.75	11.5 mm	I.C.E.	46
TLA15	35 N/Cm	4.65	10 mm	I.C.E.	44
TLA25	40 N/Cm	3.75	11.5 mm	I.C.E.	43
TLA15	35 N/Cm	3.75	10 mm	I.C.E.	33
TLA15	40 N/Cm	3.75	11.5 mm	I.C.E.	34
TLA15	40 N/Cm	3.75	10 mm	I.C.E.	36
TLA15	40 N/Cm	4.65	11.5 mm	I.C.E.	37

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