Materials and Methods

1) Patients Selection:

In the present study, 12 adult patients was selected from the out patient clinic of oral and maxillofacial surgery department faculty of oral and dental medicine cairo university. Their ages ranged between 31and 43 years.Male patients were selected according to the following inclusion criteria:

1-The patient should be free from any systemic debilitating disease that contra indicate the use of L.A or complicate the planned surgery or may affect the bone healing mechanism such as uncontrolled diabetes and autoimmune disorders or uncontrolled cardiovascular diseases, blood coagulation disorders or severe anaemia .

2- The patient should not taking chemotherapy or radiation therapy t0 the head and neck region.

3- The patient should not be taking any drugs which would place him in risk for surgery or affect healing process such as corticosteroids or anticoagulants.

 4- The patient should not be smoking or drinking alcohol.

5- The patient should be willing to co operat in this study and ready for coming regularly for follow up.

6- the patient should be free from severe psychological or mental diseases.

7- The patient should have good oral hygiene and ready to co operate in maintaining their oral hygiene.

Exclusion criteria were as follow:

- Poor oral hygiene with no possibility of improvement.
- Chronic or acute systemic disorders (uncontrolled diabetes, hemorrhage.
- Poor interest and cooperation from the patient.
- Existence of non treated generalized progressive periodontal diseases
- Acute peri apical abscess.
- Pathological change at receptor site(cysts, tumors, or osteomylitis).
- Irradiation in implant area.
- Patient still growing (child or adolescent).
- Smoking, alcohol, or drugs abuse.
- Presence of inter-arch discrepancies such as cross bite or deep bite, or para functional habits.

Patient that full filled all the criteria for the study were informed of all surgical procedure, then, a full mouth scaling was performed and oral hygiene was given to the patient , impression was taken for construction of temporary prosthetic restoration.

<u>Preoperative evaluation:</u>

- Personal data: Patient`s full name, gender, age, address, phone number, and occupation were recorded for every case.
- Medical history: Complete medical history of each patient was taken to reveal any medical problems thus avoding any complication either during or after the surgery.
- Dental history: Dental history was recorded to explain any previous dental treatment and patient attitude toward these previous treatments with special attention to the cause of tooth loss. This

information will help to design the most proper treatment plane for each patient.

- Oral habits: teeth grinding,cheek biting, thumb sucking, and mouth breathing, and tongue thrusting.
- Oral hygiene habits: Frequency of tooth brushing.

Clinical Examination:

- Extra oral examination: was done inspection and palpation to detect the presence of problems such as swelling, lymph node enlargement......etc.
- Intra oral examination: was done by inspection, bidigital palpation and percussion to evaluate teeth and surrounding tissues.
- Radiographic examination: radiographic examination for each patient, every patient was instructed to have cone Beam C.T to determine if there are any pathological conditions also to determine the exact bone height and defect at the site of implant placement and the relation with vital anatomical structures.

Instrument used in surgery:

- Sterile surgical towels for drapping the patient .
- Local anesthetic syring mepecaine carpules and needles.
- Bard –parker handl no.3 and blade no.15.
- Mucoperiostealelevator.
- Minnisota cheek retractor.
- Implant kit and motor.
- 3-0 black silk suture.
- Needle holder.

Materials used:

- Tapered Screw -Vent$^{®:}$ Tow piece implant (Figure5).
- Bio-Gide (bio absorbable membrane)(Figure 2).
- Bio-oss(Figure 3).

2) Grouping:

This study includes 12 adult patients divided into two groups A & B both groups are prepared for pre-operative:

- Oral hygiene measure (mouth wash and scalling).
- Cone Beam C.T examination (CBCT).
- In this study use local anesthesia.

3) Surgical procedure:

Impression with Alginate was taken in both upper and lower jaws, study casts were made to study occlusion state.

Adequate aseptic technique: mouth rinse with Betadine mouth wash[*] for 30 seconds immediately before surgery, the surgeon and assistant followed a sound ste rile technique.

Surgical procedure according to submerged technique (two stages surgical steps):

1-Local anesthesia was used for all patients (mepivacaineHcl 2% with levonordefrin 1:20 000)[**].

2-Full thickness mucoperiosteal flap was incised with two oblique releasing incisions.

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*Oraldene by Hikma-Egypt

**mepeciane by Alexandria Co for Pharmaceuticals.

3-Soft tissue flaps were carefully raised using mucoperiosteal elevator exposing the underlying bone.

4- By following the surgical protocol of the manufacture the drilling was done with sequence using new sharp drills that was supplied Legacy implant system kit until the desired depth and width was reached (figure 4).

5- Irrigation   of the implant bed with saline.

6- The implant is inserted in the prepared site and blocks or particles of deproteinized bovine bone mineral (DBBM/ Bio-ss®) were placed in the defect area. A collagenous membrane (BioGide®) was applied to cover the DBBM and was fixed to the surrounding bone using poly-lactic acid pins or bone tacks. No flap dehiscences and no exposures of membranes were observed(figure 8,9).

7-The flap was repositioned and secured in its proper position and sutured with 3/0 black silk (figure10).

Post surgically assessment

1-The patient was instructed to apply gentle pressure with sterile gauze pack to enhance reattachment of the flap to underlying bone ,ice pack extra orally was applied for 15 minutes per hour for 8hour postoperative followed by hot fomentation for the next few days to minimize postoperative edema and pain.

2-The patient advised to avoid any forceful chewing in the vicinity of the implant

3-broad spectrum antibiotic drug (1 gram amoxicillinc and calvinolic acid)* was prescribed , beside (paracetamol)** as analgesic , vit c 500 mg tab to enhance wound healing (alphentern)*** to prevend hematoma formation and (Chlorhexidine) mouth wash one day after the surgery.

4- The patient were recalled after seven days to remove the suture .

5-All patients were motivated for oral hygiene measures in form of tooth brushing and dental flossing.

6-All patients evaluated after one month, three, six months

7- This technique include the complete submerging of the dental implant for proper healing period 3-4 months in the mandible and up to 6 months in maxilla.

8-The second stage of surgery is to uncover the imbedded implant to start the prosthetic procedure. Fixation of abutment and impression was taken for construction of crown (Figure12,13,14).

Follow up and post- operative evaluation:

- **Post-operative clinical evaluation:**

The surgical area was assessed to detect any sever pain, swelling,wound dehiscence,or any sign of purulent infection .

- **Peri-implant probing depth :**

The measurement from the base of the sulcus till the gingival margin was recorded using periodontal probe at six different sits around the

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*augmentin by galxosmithkline-Cairo,Egypt

**Panadol extra by GSK(Ireland)

***alphentern by amounpharmaccuticalCo,Cairo-Egypt

implant (mid buccal, mesio-buccal,mid-palatal, mesio-palatal and disto-palatal) and the mean value the score was recorded.

- **Bleeding index:**

This index was used to measure the level of patient's gingival inflammation. It was assessd at 1,3 and 6 months post-operatively according to the scale of the bleeding index(BI)as follows:

- Grade 0 means that there is no bleeding on probing, normal tissue color.
- Grade 1 means slightly erythematous, no bleeding on probing.
- Grade 2 means tissue redness, bleeding on probing.
- Grade 3 means tissue is markedly red and edematous, bleed on finger pressure or spontaneously.

The score of the gingival bleeding index for each implant was calculated as the mean of the scores of the 4 surface (buccal, lingual, mesial and distal).

- **Mobility test:**

This test done by holding the implant by the end of two hand instruments and moving it in bucco-lingual direction. The implant mobility was evaluated intra-operatively and 6 months post-operatively. The mobility was graded using the following grading system:

- Grade 0 if there is no mobility.
- Grade 1 if there is slight detectable horizontal movement.
- Grade 2 if there is moderate visible horizontal mobility up to 0.5 mm.
- Grade 3 severe horizontal mobility greater than 0.5 mm.

- Grade 4 visible moderate to severe horizontal and vertical movement.

Post-operative radiographic evaluation

Periapical radiographic images were recorded for each implant immediately post-operative and after loading.

(Figure 1) Photograph shows Salvin Titanium Bone Tack Kit

Stabilize Barrier Membranes Onto Cortical Plate Bone Complete Tack Kit Includes: 25 Tacks, Autoclavable Tack Block, Tack Placement Instrument, Tack Mallet, Drill For Dense Cortical Bone
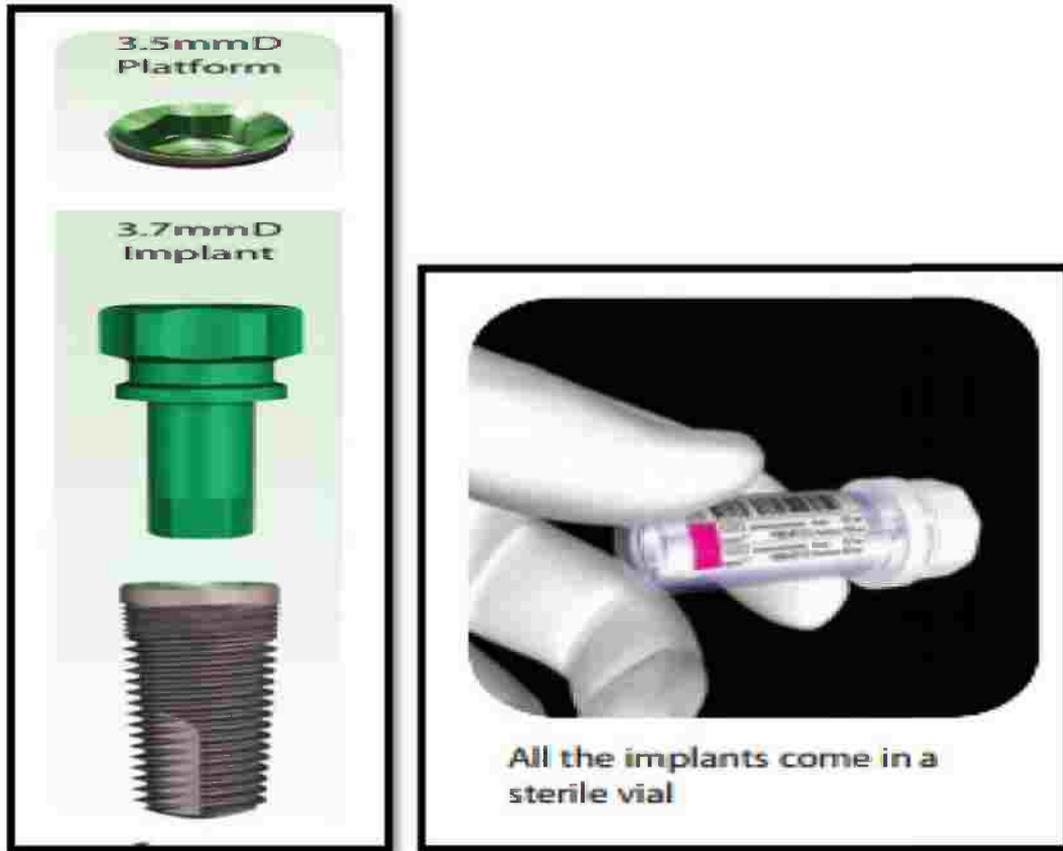

(Figure 2) Geistlich Bio-Gide®

(Figure 3) Geistlich Bio-Oss®

(Figure 4) Complete Surgical Tray Contents Spectra& Legacy TM

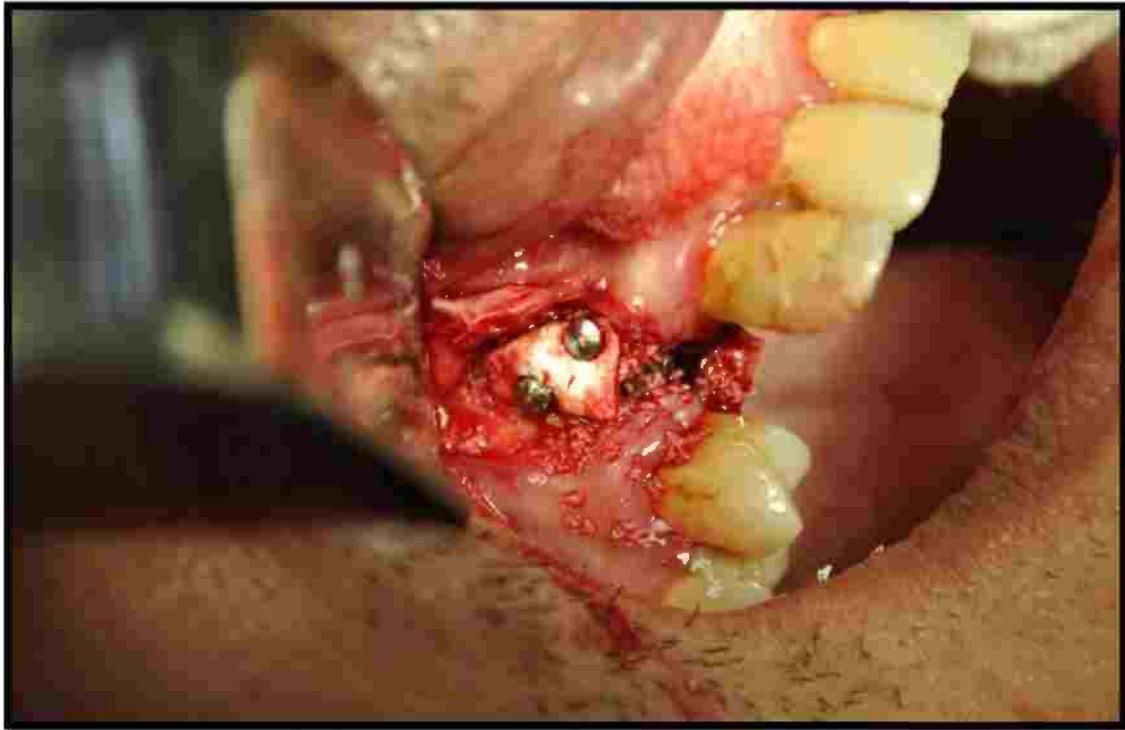**(Figure 5) photograph shows Legacy 1 Implant**

(Figure 6) photograph shows Preoperative Cone Beam (CBCT)

(Figure 7) photograph shows Preoperative Photograph for case NO3

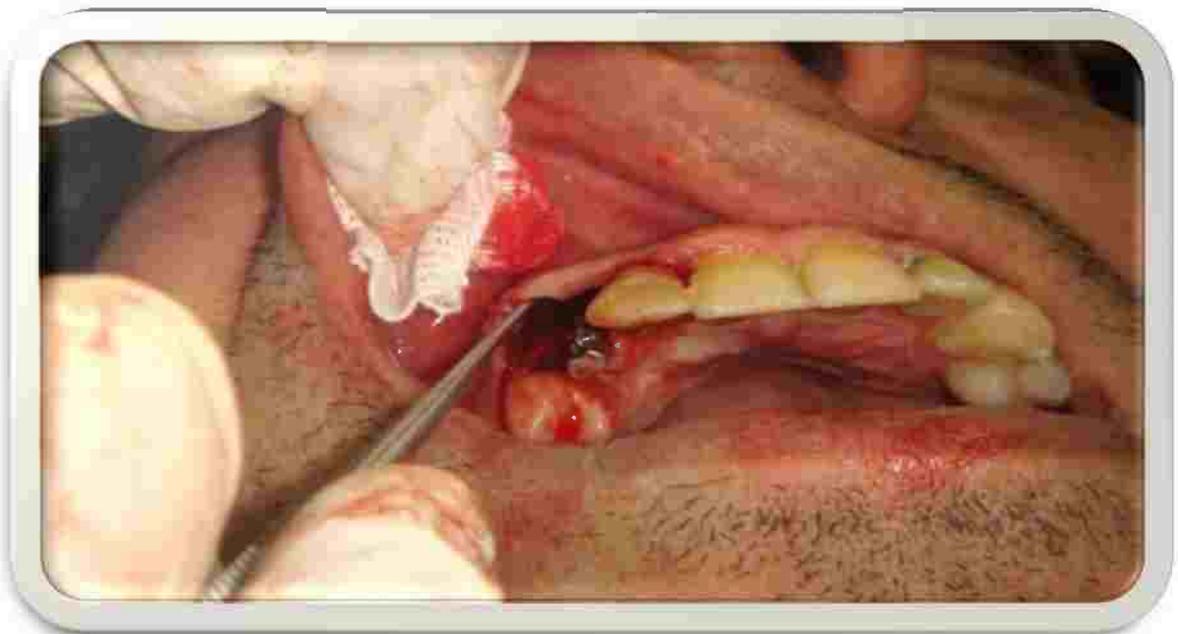**(Figure 8) photograph shows Placement of bone graft (Bio-Oss) over surgical defect.**

(Figure 9) photograph shows Placement of a membrane fixed by bone tacks over the defect.

(Figure 10) photograph shows Suturing back the mucoperiosteal flap of the same case.

(Figure 11) photograph shows Sutural removal of the same case after one week.

(Figure 12) photograph shows Removal of the healing cap.

(Figure 13) photograph shows Abutment in place.

(Figure 14) photograph shows Restoration of crown.