

## Evaluate The Effects Of Implant On Alveolar Crest

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### Abstract:

In this study thirteen implants were placed in the freshly extracted socket to evaluate the effect of implant on the alveolar crest. One piece with abutment non-submerged tapered at apical 5mm, sand-blasted and acid etched surfaced implants (HI-TEC TRX-OP of Life Care Company) were used. Dentascan was made to assess the status of alveolar bone pre-operatively and 12 weeks post-operatively. Crestal bone height changes on different surfaces showed that the mean bone loss on buccal surface was maximum and on mesial surface was minimum. It is also observed that bone gain also taken place but overall bone loss occurred.

**Keywords :** Dental implants, Alveolar Crest, Osseointegration

### Introduction:

Missing teeth and supporting oral tissues have traditionally been replaced with dentures or bridges, permitting restoration of chewing function, speech, and aesthetics. Dental implants offer an alternative to the natural tooth. However, in many clinical situations compromised teeth or roots may still be present in the patient's mouth. Traditionally, before placing dental implants, compromised teeth/tooth were removed and the extraction sockets were left to heal for several months. However, the great majority of patients are interested in shortening the treatment time between tooth extraction and implant placement, or even better in having the implants inserted during the same session as the teeth are extracted.

Generally tooth extraction often results in alveolar ridge resorption or collapse. Insertion of implants at the time of extraction initiate preservation of alveolar bone<sup>1</sup>. The primary advantage of immediate implant placement is the reduction of the healing time and

preservation of the bone tissue which generally occurs within the extraction site and around the implant<sup>2,3</sup>. This bone forming activity may enhance the bone-to-implant contact as compared with an implant placed in a less osteogenically active site. Early implantation could lead to favourable implant/crown ratio, better esthetics and a favourable interarch relationship<sup>4</sup> and may preserve the alveolar anatomy, and the placement of a fixture in a fresh extraction socket helps to maintain the bony crest.

### Material And Method:

A total of 7 patients (5 male and 2 female) ranging in the age group from 20 to 44 years evaluated for immediate implant placement into 13 fresh extraction sites. One piece with abutment non-submerged tapered at apical 5mm, sand-blasted and acid etched surfaced implants (HI-TEC TRX-OP of Life Care Company) were used. These are one stage screw type single implants, made of commercially pure titanium. Immediate implants placed only in those sites which

are indicated for extraction (Fig 1a,1b). Radiographic assessment were performed before putting the above implants (Fig 1b,1c,1d) and second time radiographic observation was recorded after 3 months (Fig 3b,3c). Dentascan was made to assess the status of alveolar bone preoperatively (Fig 1d) and 12 weeks post-operatively (Fig 3c). The assessment by dentascan was made for crestal bone.

The implants were placed immediately after extraction of tooth/root (Fig 2a). Access was gained through extraction socket. Bone drilling was performed with sharp instruments in progressively increasing diameters throughout the drilling process and with maximum use of bone apical to the extraction sockets (Fig 2b). During bone drilling a finger was placed over the thin buccal mucosa, enabling close contact with the labial bony plate, thus preventing bone perforation. The 2.0 mm twist drill was used first in the sequence and later on progressively increasing diameter of twist drills were used

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**Table I:** Radiographic Assessment of Crestal bone Height (in mm) of Buccal/Lingual/Mesial and Distal Surfaces on Tooth Pre-operatively and Implant Post-operatively.

No. of Cases	Preoperative (On Tooth)				Post operative (On Implant)			
	Buccal	Lingual	Mesial	Distal	Buccal	Lingual	Mesial	Distal
1	13	14	18	18	13	14	19	18
2	14	15	20	18	14	14	18	16
3	10	16	14	16	9	16	14	15
4	9	14	12	14	9	14	12	13
5	13	19	19	22	17	15	20	22
6	14	15	16	13	18	15	14	17
7	15	15	14	16	13	16	16	16
8	14	14	15	18	13	14	14	16
9	14	16	19	17	13	16	18	16
10	16	18	16	19	15	17	15	18
11	15	14	16	16	14	14	15	16
12	15	15	16	17	10	16	16	16
13	17	17	16	18	7	16	17	19

according to the length and diameter of implant to be placed. The depth and angulation was checked continuously with the help of depth gauge paralleling pins which has depth markings of 8 to 14 mm. The markings corresponding with the selected implant length had to disappear just below the bone level and it was of great importance to drill gently, in a straight, precise, up and down motion with low pressure, low speed with sufficient internal irrigation, to avoid overheating and thus necrosis of alveolar bone. The socket was thoroughly irrigated with sterile saline solution. Before implant placement, a bone curet was used to palpate and reassure the integrity of the labial plate. The implant was then placed into the prepared socket (Fig 2c) with implant head parallel to the incisal edge of the adjacent tooth and implant was inclined palatally, after that implant holder was pulled out and the fixture insertion tool was engaged to the implant and with the gentle pressure (5-55 Newton per cm) by hand or Hex ratched the implant was tightly screwed into the bone till the side of the implant came in alignment with the crest of

alveolar bone and snug fitting was ensured to prevent any mobility. Implants were determined to be clinically stable by palpation and percussion. A distance of no less than 3 mm from the adjacent cemento-enamel junction was maintained to achieve a normal emergence profile. After implant placement, the mucosa (the buccal and lingual soft tissue edges) was adapted to

the abutment and sutured with 3-0 black silk to enable maximal approximation<sup>5</sup>.

Patients were then advised to follow post-operative instructions, which include soft high nutrient diet, post-operative medications which consisted of Amoxicillin 1.5 g/day for 5 to 7 days, Ibuprofen 600 mg three times a day for 3 days. Mouth wash, chlorhexidine gluconate (0.2%) was advised for daily rinse for 7 days. The patients were called for the post-operative checkup after 24 hours. The sutures were removed seven days after the surgery. The patients were then called for follow-up post-operatively at 1<sup>st</sup> day, 1<sup>st</sup> week, 4<sup>th</sup> week and 12<sup>th</sup> week (Fig 3a,3b,3c).

**Statistical Analysis:**

Statistical analysis was performed using paired 't' test to test the significance of change in crestal bone height.

**Results:**

Radiographic assessment of alveolar crest bone height on buccal, palatal/lingual, mesial and distal surfaces of tooth/root/implant was made pre-operatively and 12<sup>th</sup> week post-operatively (Table I).

It was observed that 30.8% of mesial surfaces showed bone gain, 46.1% of mesial surfaces showed bone loss and

Variables	Bone Gain		Bone Loss		No change		Total	
	No. of surfaces	%	No. of surfaces	%	No. of surfaces	%	No. of surfaces	%
Buccal	2	15.4	8	61.5	3	23.1	13	100.00
Lingual	3	23.1	3	23.1	7	53.8	13	100.00
Mesial	4	30.8	6	46.1	3	23.1	13	100.00
Distal	2	15.4	7	53.8	4	30.8	13	100.00

**Table II:** Distribution of Crestal Bone Height Changes on Different Surfaces Post-operatively.

23.1% of mesial surfaces showed no changes in crestal bone height. 23.1% of lingual surfaces showed bone gain, 23.1% of lingual surfaces showed bone loss and 53.8% of lingual surfaces showed no changes in crestal bone height. The results also showed that 61.5% buccal surfaces showed bone loss

followed by distal surfaces (53.8%), mesial surfaces (46.15%) and lingual surfaces (23.1%) respectively. It is also observed that bone gain also taken place on different surfaces. Mesial surfaces were the maximum which showed bone gain followed by lingual surfaces (23.10%), and 15.40% each of buccal

and distal surfaces showed bone gain (Table II).

The 'p' value for the bone loss on buccal, lingual, mesial and distal surfaces was 0.30, 0.30, 0.50 and 0.50 respectively. This 'p' value showed that crestal bone loss at different surfaces was non-significant<sup>67</sup>.

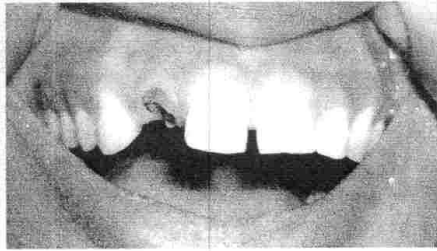


Fig 1 a - Pre-operative view of tooth root of maxillary right lateral incisor.



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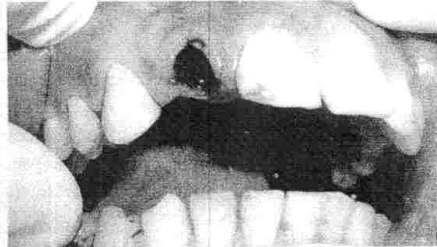


Fig 2 a - View of socket after root extraction

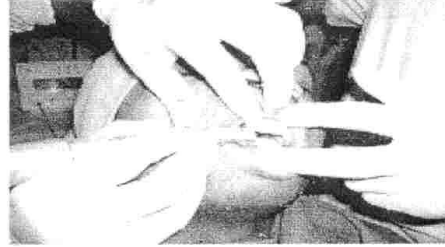


Fig 2 b - Bone drilling through extraction socket.

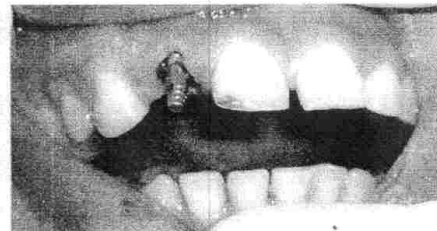


Fig 2 c Implant in socket at final position.

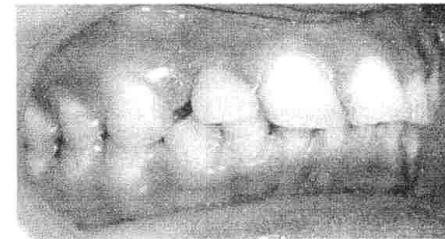


Fig 3 a- Post-operative view of implant supported crown of maxillary right lateral incisor.

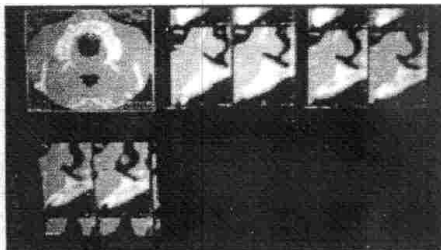


Fig 1 d- Pre-operative dentascans showing Maxillary right lateral incisor.

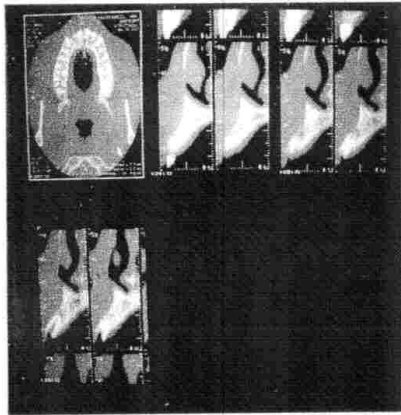


Fig 3 c- Post operative dentascan after three Months showing implant at maxillary right Lateral incisor.

**Discussion:**

In this study total of 13 non-submerged, one piece, single stage implants were placed in 7 patients (5 male and 2 female). Assessment of alveolar bone (crestal bone height) was done in millimeter based on measurements made from dentascan. It has been observed that dentascan provides an outstanding view of jaws with or without implants and it has a better edge enhancement for the assessment of bone changes and peri-implant radiolucency. Dentascan usually provides a complete and comprehensive report commenting on the bone density. Three-dimensional reconstruction images are available with most dentascan protocols. It is the most permanent and the most reliable technique in the peri-implant evaluation. It allows a precise anatomical study without any distortion.

It positions anatomical obstacles (nasal cavities, sinus, mandibular canal), and allows a lifesize morphological study of the jaw, available bone height, labio-lingual thickness, and jaw obliquity.

In this study lingual surfaces were the minimum and buccal surfaces were maximum which showed the bone loss post-operatively after three months<sup>8</sup> (Table II). Similar results were obtained by Cardaropoli G. et. al. who observed that following implant surgery bone remodeling takes place which is manifested in diminished bone dimensions, both horizontally and vertically, at the facial aspect of the implant. It is observed in this study that bone gain also taken place on different surfaces (Table II). These findings are comparable to the study of stentz et.al.<sup>9,10</sup>.

The results of crestal bone height changes on different surfaces showed

that the mean bone loss post-operatively on buccal surfaces was maximum and on mesial surfaces mean bone loss was minimum<sup>11</sup>. From the results it is clear that bone loss and bone formation both taken place after placement of implants in freshly extracted tooth sockets<sup>12</sup>. Similar results were observed by Ugo Covani et.al<sup>13</sup>.

There was no evidence of peri-implant radiolucency in any case at 1<sup>st</sup> week, 4<sup>th</sup> week and 12<sup>th</sup> week after implant placement (Fig 3b). Dale E Smith proposed that there should be no peri-implant radiolucency on undistorted radiograph for success of implant.

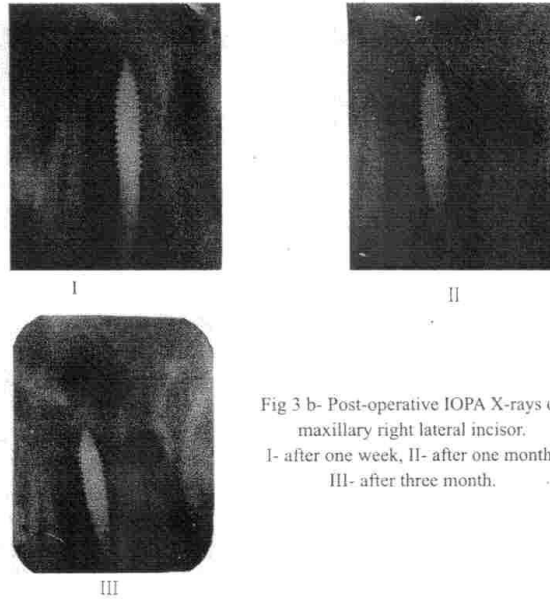


Fig 3 b- Post-operative IOPA X-rays of maxillary right lateral incisor. I- after one week, II- after one month, III- after three month.

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