# Evaluation of Outcomes Associated with the Use of Screwable Basal and Compressive Immediately Loaded Dental Implants (Comparative Study).

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# **ABSTRACT:**

# BACKGROUND

The use of immediately loaded basal dental implants in the treatment of partial or completely edentulous patients is one of the new methods; this method was invented to avoid pre-implant surgical procedures to decrease treatment time, cost, and surgical morbidity.

### **AIM OF THE STUDY:**

This study aimed to evaluate the primary stability of basal and compressive dental implants by the use of periotest M and the evaluation of complications of these implants.

### **MATERIAL AND METHODS:**

A total of (158) dental implants were used in (31) patients, basal and compressive DI was sued and the primary stability of each implant was determined by the use of periotest M. the entire DI was loaded immediately and followed up for six months.

### **RESULTS:**

There was a significant correlation between the primary stability and DI dimension, (p>0.05), a significant increase in bone resorption in correlation to time of implant insertion. **CONCLUSION:** 

Within the limitation of this study, the use of a greater dimension of basal DI increases the primary stability, and the survival of basal and compressive immediately loaded DI was accepted (98.11%). **KEYWORDS:** Complications, Screwable, Basal, Compressive, Immediately loaded dental implants

### **INTRODUCTION:**

Restoring the edentulous maxilla or mandible with implants has become a normal predictable treatment today. For trouble-free and successful implant placement it becomes imperative that sufficient bone be available at least 7-9mm length and 5-7 mm width, <sup>(1)</sup> in case this criterion is not sufficed then the treatment planning for placing implants becomes robust, i.e.; restoring the lost alveolar dimensions needs to be considered to have a predictable successful outcome of the treatment. Such procedures would involve inlay or onlay alveolar grafts, nerve repositioning, sinus lift and even nasal lift, without which treatment with conventional implants might not be very successful.<sup>(2)</sup> One of the treatment modalities used to treat complicated cases was single piece, root form, intraosseous basal and compressive dental implants.

Basal bone is defined as the osseous tissue of the mandible or maxilla underlying the alveolar processes it is reactively fixed bone. unchangeable framework of basal bone gives the ability to insert implants in an area within bone resorption areas without using bone graft, or sinuous lifting, or difficult procedure like nerve repositioning, and also give a good opportunity to succeed immediate loading of implants. <sup>(3)</sup>

measurements ranging from -8 to +50 and are interpreted as  $(-\Lambda$  to 0) represent good osseointegration and the implant loading is possible, (+1 to +9) additional clinical examination is required and in most cases, loading is not possible, and (+10 to +50) Osseointegration is inadequate and implant loading cannot be attained. <sup>(4,5,6,7)</sup>.

In this study the assessment of the primary stability of basal and compressive implant was done with periotest M and the assessment of some complications like neurological complication, bone resorption and survival was evaluated.

### **MATERIAL AND METHODS:**

Thirty one patients, (9) males and (22) females mean age was 49.77 age range was (23-75) year's old that fulfilled the inclusion and exclusion criteria. each patient received at least 3 dental immediately loaded within 48 hours, evaluation of primary stability by periotest m

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(Philips /Germany) and early complication, then follow up the patient for 6 months.

# **Inclusion criteria:**

1. The patient's age is above 18 years old including both genders.

2. Patients with multiple missing teeth or indicated for extraction at least (three teeth not separate from each other).

# **Exclusion criteria:**

1. History of head & neck radiotherapy or history of chemotherapy.

2. Patients with a history of HIV, HCV, HBV infection.

- 3. Patient with a history of bisphosphonate use.
- 4. Pregnant women.

5. Presence of local pathological condition in the area of the implant site.

# Implant systems:

A total of 158 titanium screw-shaped basal and compressive implants (Idhedental / Switzerland) and (Roottimplant/ Switzerland). The diameter and lengths of dental implants used were ranged

(3.0mm -5.5 mm), (6-16 mm) were placed in the patients' jaws, who are selected in this study. **Pre-surgical examination:** 

The patients were pre-surgically evaluated for any conditions that are implicated in implant therapy.

OPG was taken and CBCT in some patients to determine the proper implant length and diameter.

# Surgical procedure:

The patient was asked to rinse his/her mouth with a chlorhexidine mouth rinse, the surgical site was anesthetized by local infiltration and/or block. All implants were inserted with flapless technique so the surgical drilling was done starting with the pilot drill, reaching to the length of the dental implant, the parallel pins were inserted inside the prepared holes to assess the correct position and alignment of planned dental implants, then the drilling continued until the final drill reached, then the implant was inserted by manual non-calibrated dental implant ratchet. As shown in (Fig1)



Figure 1: (Occlusal view) Insertion of eleven basal and compressive implants

After insertion of all implants that were planned to be inserted measurement of primary stability by the use of periotest M (Fig 2) in the

buccolingual direction three times was done in each implant and the mean of the records was obtained.



Figure 2: Measuring primary stability by the use of periotest m.

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Then the patient was asked to close gently, the intermaxillary occlusion is reassessed the occlusion of the abutment and apposing teeth, an implant was assessed and if any preparation of the abutment site of implant was needed remeasuring of primary stability was done. then an impression recorded with silicone impression material was used heavy body and light body with closed impression technique, the patient was advised to eat semisolid cold food for 2 weeks and post-operative prophylactic antibiotic and analgesic prescribed, the patient was asked to come back 2 days later for the insertion of the prostheses.

2 days after surgery:

On the 2nd day after surgery re-assessment of the patient was done, including an assessment of the neurological deficits. Checking the prosthesis and assessment of the occlusion and then cementation. The patient was advised to stay on semisolid food for 2 weeks and asked to come back for follow-upw up.

Follow up:

All the patients included in this research were followed up after 6 months, some patients were re-followed one year after the surgical procedure. During follow up examination of the patient extra intraorally were done, and then radiological exam by orthopantomography (OPG) was doon to all patients to measure the height of the bone around the implants and in comparison with the post-insertion, as in (Fig 3) (inability to remove the prosthesis and measured final stabile by the periotest m devise impossible so manual checking of any mobility, any exudate or exposure of implants was noted.



Figure 3: OPG after 6 months of follow up

### Statistical analysis:

Data description, analysis were performed by two types computer software Programs (Statistical Package for Social Sciences (SPSS version 18 & Microsoft Office Excel 2007).

# **RESULTS:**

Thirty-one patients joined this study (158) dental implants were inserted, 120 were (Ihdedental) and 38 (Roott implant) were used. Female to the male ratio was: 22:9. The mean age was 49.77 years that ranged from 23 to 75 years. Fifteen (48.4%) of candidates are either smoker or

diabetic or both. 107(67.7%)DI were inserted after more than 3 months of dental extraction, the minority were inserted in delayed timing after extraction in about 14-45 days 20(12.7%) and 31(19.6%) dental implants inserted immediately after extraction.

Correlations of dental implants dimensions and primary stability:

The correlation between implant dimensions and periotest M values was negative and the correlation was significant as shown in table (1)

lable	1:	Correla	tions of	dental	implants	dimensions	and	primary	stability.
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Type of implant	Correlation of primary stability and implant length and significances	P-value	Correlation of primary stability and implant diameter and significance	P-value
Basal Ihde	insignificant	0.303	insignificant	0.810
Basal implant Roott	insignificant	0.087	insignificant	0.675
Compressive Ihde	insignificant	0.12	Significant*	0.036
Compressive (Roott)	Significant*	0.01	insignificant	0.222
All implants	Significant*	0.013	Significant*	0.037

## Distribution of neurological complication

All the neurological complications were happened on the lower jaw and in the premolar and molar regions (numbness on the lower lip) and all the neurological complications were transient and disappear within several dayes.as shown in Fig (4).



Figure 4: Distribution of neurological complication

Correlations of bone resorption and time of extraction in different types of implants: The result shows a significant correlation between bone lost and timing of extraction after six months of implant insertion as shown in table (2).

	Correlation of Time of	Significance
	extraction and bone loss.	
Basal Ihde	-0.222	0.157 insignificant
Basal Roott	-0.519	0.519 insignificant
Compressive Ihde	-0.412	0.002 Significant
Compressive Roott	-0.298	0.158 insignificant
total	-0.348	0.029 Significant

### Table 2: Correlation of time of extraction and bone loss.

Survival and early failure rate of different types of dental implants:

During six months follow up, three implants was early failed (1.89%) in one diabetic patient with



survived dental implants 98..11% failed dental implants 1.89%

Figure 5: Survival and early failure rate of different types of dental implants.

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### **DISCUSSION:**

In this study a statistically insignificant (p-value > 0.05) correlation between the primary stability and dental implant length in case of the basal implant in both systems, the p-value was (0.303 in Ihde system and 0.087 in Roott system) and in the case of compressive dental implant it was insignificant p-value = 0.12 in case of Ihde system and significant p-value =0.01 in case of Roott system .when comparing the total implant PTV with the length the result was statistically significant p-value = 0.03 this is compatible with other stady where the authors found that primary stability seems to be increased with increasing the implant length<sup>(8)</sup>.

The correlation between dental implant diameter and primary stability of basal implant was insignificantly positive (p-value was 0.810 in case of basal implant Ihde system and p-value = 0.675 in case of basal implant Roott system. While in the compressive implant (Ihde system) the correlation was significant P-value = 0.036and (Roott system the correlation was insignificant P-value = 0.22. when comparing the total implant PTV and the diameter the correlation was statistically significant P-value =0.037, and this is following some studies in which the researchers found a significant correlation between the increase in the implant diameter and the primary stability <sup>(9,10,11)</sup>.

All the neurological complication was sensory loss (numbness) on the lip and mental area of the affected side, and all were transient (disappear within less than six months). The number and percentage of the complication were 5(16.1%) of the thirty-one case treated. This result is compatible within the range of the conventional dental implant  $(0.6\%-39\%)^{(12)}$ .

although the correlation between the amount of bone resorption and the timing of implant insertion after extraction was positive and statistically significant when comparing the total dental implants in general and the p-value was (0.029), this correlation shows deference's between different types of dental implants, it was highly significant with (compressive Ihde system) type, the p-value was (0.008), and not significant in case of and (basal dental implant Ihde system). In general, this result was compatible with the result of that Faridus in 2009 that suggest that the bone resorption was 2.36mm at the 1st year after extraction  $^{(13)}$ . And this result could be due to decrease of blood supply due to compression on the socket.

In this research and due to short time only survival of dental implants assessed, three dental

implants early failed and the failure happened within the first six months of insertion, the case was unilateral three compressive (Ihde dental system), the patient was female 49 years old. The failure rate of compressive type was 4%, on other types of dental the survival rate was 100 %, and the general survival rate was 98.1%,(sins the patient was female and diabetic) this is compatible with another study which found that the result for implant survival in diabetics is 100 to 96.4 % which does not differ from the healthy control <sup>(14)</sup>.

### **REFERENCES:**

- 1. Yadav R. S, Sangur R, Mahajan T, Rajanikant A. V, Singh N, Singh R: An Alternative to Conventional Dental Implants: Basal Implants. Rama Univ J DentSci, 2015;2:22-28.
- 2. Sharma Rahul, Prakash Jai, Anand Dhruv, Hasti Anurag : Basal Implants- An Alternate Treatment Modality for Atrophied Ridges. IJRID 2016;6:60-72.
- **3.** Ihde K.A.Stefan, Ihde A.Antonian(2014): introduction in to the work with a strategic implant 2014;2:13-15.
- **4.** Sim, C. P., & Lang, N. P. : Factors influencing resonance frequency analysis assessed by Osstell<sup>™</sup> mentor during implant tissue integration: I. Instrument positioning, bone structure, implant length. Clinical Oral Implants Res 2010; 21: 598-604.
- Mistry, G., Shetty, O., Shetty, S., & Singh, R. D.: Measuring implant stability: A review of different methods. J Dent Implant,2014; 4: 165-69.
- Satwalekar, P., Nalla, S., Reddy, R., &Chowdary, S. G.: Clinical evaluation of osseointegration using resonance frequency analysis. J Indian Prosthodont Soc.2015; 15:192-99.
- Swami, V., Vijayaraghavan, V., & Swami, V.: Current trends to measure implant stability. J Indian Prosthodont Soc. 2016;16:124-30.
- 8. Guncu, M.,Demiralp, B.,Muhtarogullari, M., Guncu, G.. Comparison of implant stability values measured by resonance frequencanalysis between short and long dental implants. Clin Oral Implants Res, 2014; 25.
- Bilhan H., Geckili O., Mumcu E., Bozdag E., Sünbüloğlu E., & Kutay O. Influence of surgical technique, implant shape and diameter on the primary stability in cancellous bone. J Oral Rehabil, 2010; 37:900-7.

- **10.** Ostman P, Hellman M, Wendelhag I, Sennerby L. Resonance frequency analysis measurements of implants at placement surgery. Int J Prosthodont. 2006; 19:77–83.
- Gehrke, S. A., Neto, S., Tavares, U., Rossetti, P. H. O., Watinaga, S. E., Giro, G., &Shibli, J. A. Stability of implants placed in fresh sockets versus healed alveolar sites: Early findings. Clin Oral Implants Res. 2015; 27:577-82.
- **12.** Su-Gwan Kim:: Clinical Complications of Dental Implants, 2011; 467-88.
- **13.** Fridus Van der Weijden, Federico Dell'Acqua, Dagmar Else Slot: Alveolar bone dimensional changes of post-extraction sockets in humans: a systematic review,j 2009;36: 1048-58.
- 14. Hendrik Naujokat, Burkhard Kunzendorf and Jörg Wiltfang: Dental implants and diabetes mellitus-a systematic review International Journal of Implant Dentistry2016 2:5.

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