

## **A COMPARATIVE STUDY BETWEEN OSSEO-INTEGRATION SUCCESS RATE OF ONE STAGE AND TWO STAGE PROCEDURE IN IMPLANT SURGERY IN BASRAH PROVINCE.**

**Riad G Altaee**

BDS, FICMS, Lecturer in Oral and Maxilla-Facial Department, College of Dentistry, University of Basrah.

### **Abstract**

This study aimed to evaluate the osseointegration success rate of one stage procedure in comparison with two stage procedure in implant surgery.

Eighty patients (28 males, 52 females) received 128 implants, 36 in the mandible and 92 in the maxilla. Fifty nine implants were inserted in the one stage procedure & 69 implants in the two stage procedure. All implants were followed-up for 6 months according to the success criteria (Albrektssons criteria).

Total success rate was 97.6%. In the one stage procedure it was 96.6% and 98.5% in the two stage procedure. There was no statistical significant difference between the two procedures.

In conclusion, the one stage procedure can be employed as successful alternative to two stage procedure when there is good primary stability and no bone augmentation at the time of implant placement.

### **Introduction**

Tooth restorations using implant-supported prostheses for functional and esthetic rehabilitation of patients has become an established and widely used treatment modality in modern dentistry<sup>1</sup>. The integration and healing processes of dental implant were first described by Brånemark and Schroeder<sup>2&3</sup>.

The original Brånemark concept prescribed a two-stage surgery with a submerged healing phase of at least<sup>3</sup> months in the mandible and six months in the maxilla, this approach is considered the gold standard method. At the present time, clinical research is focusing on shorter and less invasive measures<sup>4</sup>.

Different placement and loading protocols are presently used to decrease the treatment sessions and lessen the amount of surgical interventions, enabling clinicians to select between a one stage (non- submerged) and a two stage (submerged) approach<sup>5</sup>. In the two-stage surgical approach the implant is enclosed

during the healing phase by soft tissue. After bone healing, a second surgery is achieved to connect a healing abutment. In the one-stage surgical approach, transmucosal healing abutments are positioned directly. Literature revealed that osseointegration can be unsurprisingly achieved also with one-stage implants in both jaws, but conflicting results have been existing<sup>6</sup>.

In regard to a Cochrane systematic review, the one- stage approach appears to be preferable in partially edentulous patients because it avoids one surgical intervention and decrease treatment sessions. In addition to that, the use of one-stage placement reduces patient distress, and allows for a healed peri-implant mucosa at the time of prosthetic rehabilitation<sup>7</sup>.

From a clinical outlook, the non-submerged placement of implants offers numerous advantages like; lack of secondary surgical intervention to connect

the implant body and transgingival constituent, more mature soft tissue healing due to avoiding the second stage surgery, lack of an interface / micro gap between the implant and the abutment at or beneath the alveolar crest level, healed peri-implant mucosa is not troubled with second stage procedure for abutment placement or abutment exchanges and during the osseointegration period the implants are easily reached for clinical monitoring, cost and time benefit advantage<sup>8</sup>.

However, two-stage implants have advantages as well: in combination with a bone augmentation procedure or guided bone regeneration the wound can be closed tightly to prevent bone or membrane exposure, undesirable loading of the implants is prevented during the osseointegration period when the temporary super-structure cannot be adjusted effectively, the coronal part of the implant is located at crestal level, giving the possibility for a more flexible emergence profile of the transmucosal part. It has been stated that marginal bone loss is more extended around two-stage implants than around one-stage implants<sup>9</sup>. The microgap between the implant and the abutment at the crestal level has been recommended as play outstanding role in the development of this loss<sup>10</sup>. Probably the microflora colonizing in the microgap or their products is conscientious for the happening of this bone loss<sup>11</sup>. The adverse effect of the microgap could also have an influence on the healing of the peri-implant mucosa during the osseointegration period<sup>12</sup>.

The aim of this study is to compare the stability and osseointegration of one-stage procedure and two-stage procedure.

## Materials and Methods

This prospective study was conducted at a private specialized dental center, Basarh,

Iraq. The study subjects were randomly selected and were between the age of 18-62 years. All participating patients were informed about the treatment procedure and their consent obtained. They were free of systemic diseases which could affect the soft tissue and bone healing.

Cases of implants placed in smokers or implants placed with bone augmentation procedure or implants that having a shortage of primary stability were excluded. A total of 128 implants (Friadent system) were inserted for 80 patients (28 Males, 52 Females) during the period 2010-2013, 92 implants were placed in the maxilla, 36 implants in the mandible, 59 implants were placed in the one-stage and 69 implants in the two-stage procedure. All surgeries were performed by the same operator according the standard protocol. Postoperative systemic antibiotic, analgesic and chlorhexidine 0.2% mouth rinse were prescribed. After healing time all implants were evaluated according to osseointegration success criteria (Albrektsson's criteria)<sup>13</sup> which include the following:-

1. Absence of pain, infection or paresthesia at site of surgery.
2. No mobility of implant.
3. No persistent radiolucency on radiographs.

The cases were followed until final restoration (6 months). The follow-up appointments were scheduled as follow: 10 days, 1 month interval for 6 months after implant placement, until final prosthetic treatment.

## Result

A total of 80 patients were evaluated in this study. Age of patients ranged from 18 to 62 years. Most of the patients were in the age group (41-50 y) which include 27 patient, representing 33.75%. Distribution of the patients according to the age is shown in Table I.

**Table I: Age distribution of patients included in this study.**

Age (year)	Frequency	Percent
<20	1	1.25
21-30	20	25
31-40	23	28.75
41-50	27	33.75
51-60	8	10
>60	1	1.25
Total	80	100.0

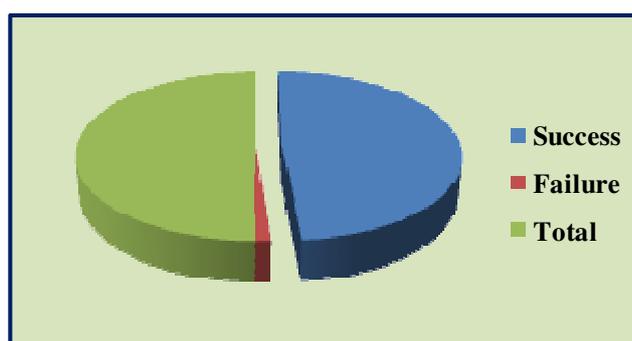
Patients received 128 implants during the period from January 2010 to September 2013. Fifty nine (46.1%) implants were placed in the one-stage and sixty nine (53.9%) in the two-stage method. After healing time all implants were assessed according to osseointegration success criteria (Albrektsson's criteria)<sup>13</sup>. Out of 59 implants placed in the one-stage

surgery, two (3.4%) were lost, resulting in a success rate of 96.6%. One patient in the two-stage group experienced failure resulting in a success rate of 98.5%. According to the present research there was no significant difference between success rate of the one and the two-stage procedures. The total success rate was 97.6% as shown in table II & figure 1.

**Table II: Outcome of the results**

Procedure	Outcome		Total
	Success	Failure	
One-stage implant	57	2	59
	96.6%	3.4%	100.0%
Two-stage implant	68	1	69
	98.5%	1.5%	100.0%
Total	125	3	128
	97.6%	2.4%	100.0%

Fisher's Exact Test P-value= 0.595

**Figure 1: Outcome of the results**

## Discussion

Treatment with dental implant supported restoration has changed over the last few decades from a classic two stage approach which required long healing time to faster treatment models that include one stage surgery, extraction with immediate placement and immediate loading. Such

treatment concepts increase the demand upon clinician, both from a surgical and prosthetic perspective<sup>9</sup>.

This study showed that there is no difference between one and two stage implantation success rate. A one-stage procedure might be preferable; as

additional surgical intervention is avoided and healing period is reduced. However in some cases, when implant lack primary stability or are placed with bone augmentation procedures, two stage procedures might be more preferable. In site with esthetic priority, the two-stage modality will be preferred since it results in a predictable esthetic outcome<sup>14</sup>.

The result of this study suggests that insertion of two- stage implant in one-stage approach is at least as anticipated as conventional two stage approach. The results of the present study was similar to what was reported in several studies evaluating two stage implant inserted in the two stage procedure (Cox & Zarb 1987<sup>15</sup>, Batenburg et al. 1998<sup>16</sup>, Heydenrijk et al.1998<sup>17</sup>) and in one stage procedure which show success rate 94%

(Ericsson et al.1994<sup>18</sup>, Bernared et al.1996<sup>19</sup>). The results of this study also agree with what was reported by (Garg et al. 2011) who have stated that dental implants which are designed for two stage procedure can be inserted in one stage procedure as a successful alternative<sup>20</sup>.

Results of this study disagree with (Tallarico et al., 2011) who mentioned that the difference between one -stage and two stage implant success rate was 94.7% in one stage and 100% in the two stage<sup>21</sup>.This disagreement could be related to the difference in selected sample and exclusion criteria.

In summary, when there is a good bone quality and quantity, one-stage procedure can be used instead of two-stage procedure with no difference in success rate and it might be preferable

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