

# SUCCESS & EVALUATION OF DENTAL IMPLANT PATIENTS AT ISLAMIC INTERNATIONAL DENTAL COLLEGE & HOSPITAL

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## ABSTRACT

*Dental implant is a permanent metal fixture anchored into the jaw bone topped with individual replacement of a tooth, teeth or a bridge that screws or cements into the implant fixture. The successful outcome of implant procedure depends on a series of patient-related and procedure-dependent parameters. Predictors of success or failure are related to quality and quantity of the bone at the intended site, length of implant, axial loading, operator skills, patient's overall general health, age, habits and oral hygiene. Although long-term studies continue to show improving success rates for implants, failures occur unavoidably. Successful provision of dental implants to patients who have lost tooth/teeth and the surrounding bone, relies on careful gathering of clinical and radiological information, interdisciplinary communication and input, a detailed treatment planning and regular evaluation of the patients. Under proper conditions and diligent patient maintenance, implants can last for lifetime. The objective of this study is to assess and evaluate patients reporting to Islamic International Dental College & Hospital receiving implant therapy. We, very carefully conducted an evaluation of patients in order to find out our success rate. From August 2010 to December 2011, 31 patients received 68 implants. Vast majority of implants (63) were of Bio-Horizon of USA and rest (5) were Straumann implants of Switzerland. Out of these 68 implants, we had 3 failed cases. Furthermore, we looked in detail the likely reasons of these failures.*

**Key words:** Dental implant, evaluation, success rate

## INTRODUCTION

Dental implants are nearest equivalent replacement to the natural teeth. The use of dental implants has become a predictably successful procedure for the treatment of complete and partial edentulism.<sup>1</sup> Successful outcome of the implant therapy is dependent upon various factors including the quantity and quality of bone, patient's age, general and oral health status, the dentist's experience, site of implant placement, length and width of the implant, axial loading, and oral hygiene maintenance.<sup>2</sup>

Gender, hypertension, coronary artery disease, steroid therapy, chemotherapy, and not being on hormone replacement therapy for postmenopausal women are not associated with a significant increase in implant failure.<sup>3</sup> Whereas, smoking, diabetes, head and neck radiation, and postmenopausal estrogen therapy are correlated with a significantly increased failure rate.<sup>3</sup> For patient who has had radiation to the jaws or been taking potent bisphosphonate is prone to develop osteoradionecrosis or bisphosphonate induced osteonecrosis and subsequently implant failure.<sup>4,5</sup> Taking into

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account the uncertainty with regard to the likely consequences, the conditions which relate to an increased risk of failure should be considered during the treatment planning and factored into the informed consent process.<sup>6</sup>

The analysis of 31 patients who received 68 implants reporting to Oral & Maxillofacial Surgery Department at Islamic international dental hospital was carried out. All these patients were evaluated both clinically and radiographically on each follow up visit. Radiographic assessment was done 2 weeks after implant placement and after 6 weeks, if clinically indicated. At 3 months post-op radiograph was taken before starting supra structure and immediately after it was fitted. After completion of supra structure, periodic radiographs for each implant placed were taken at 3 months, 6 months, 1 year follow up visit and then on yearly basis. The purpose of this clinical study was to evaluate implant success among these patients and identify possible causes in the failed cases within follow up period.

## METHODOLOGY

An analysis was conducted on all patients who received dental implant therapy from Islamic International Dental College and Hospital from August 2010 to December 2011, with a follow up period of 3 to 18 months (mean 10.5 months). A proforma, based on patient's demographics, medical and drugs history, habits and surgical details of the procedure was filled for each implant placed (Index - 1). Our success criterion included; absence of pain, mobility, infection, peri-implant radiolucency, neuropathy, paraesthesia and peri-implantitis. Soft tissue concerns as mild gingival inflammation or mucosal irritation were also observed and resolved by oral hygiene maintenance by the patients.

Most patients were medically fit, while some had contributory medical history. One female patient had a history of osteoporosis, three patients were diabetic, and one patient was asthmatic. Number of patients and number of implants in different categories on the basis of reason for loss of teeth is shown in (Table- 1).

Present study includes both smokers and non-smoker subjects. Amongst all these patients, 4 were receiving medication for hypertension, 2 patients were on oral hypoglycaemic and one was taking insulin for type II diabetes. Moreover, amongst 31 patients, 10

Reason For Tooth Loss	Number of Patients	Number of Implants
Caries/ Periodontal Problems	23	54
Dental trauma	6	10
Trauma case (iliacgraft)	1	2
Tumor Case (free iliac graft)	1	2

were males and 21 females, with an age range of 13–57 years and mean age of 38.54 years. Females received 43 (63.23%) implants and men received 25 (36.76%) (Figure 1).

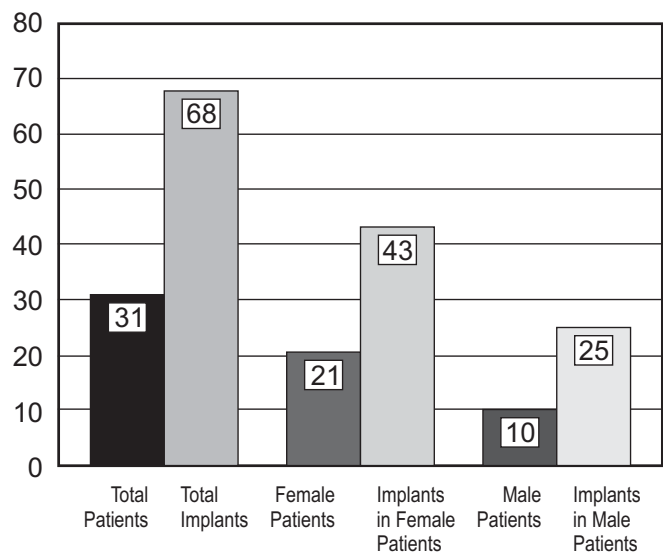


Fig 1: Implant distribution according to Gender

The breakdown of implants distribution as per site is shown in (Figure 2). Among the 63 Bio Horizon implants, 55 were laser lock and 8 were of internal type. Rest of the 5 implants were Straumann (Fig. 3).

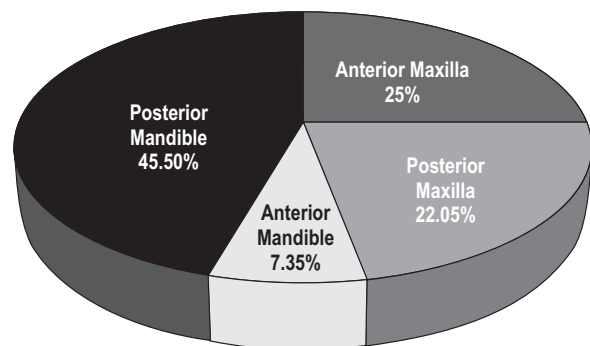


Fig 2: Pie chart showing distribution of Implant according to Site

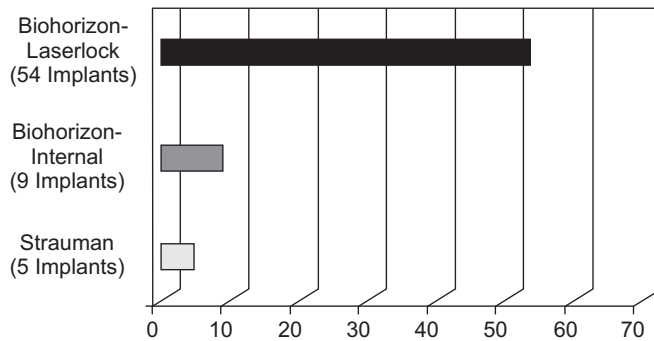


Fig 3: Distribution according to Implant types used in this study

Both standard and flapless surgical procedures were carried out. In some cases simultaneous bone augmentation and/or closed sinus elevation was performed, when bone height and width was found insufficient. 6 implants (8.82%) required sinus uplift, 5 (7.35%) receiving closed sinus lift and 1(1.47%) with open sinus lift. Guided Bone Regeneration (Picture 1 & 2) was done in 24(35.29%) cases, 3(4.4%) cases of combined sinus uplift and bone augmentation. Rest of the 16 (23.5%) implants did not require any additional procedure. 4(5.88%) implants received immediate provisional restoration. (Figure 4)



Picture 1: Labial fenestraion due to very thin buccal plate (pre guided bone regeneration)

Definitive restorations (supra structure) were placed after healing period of 3 months in cases, where no guided bone regeneration or bone grafting was done and 4-6 months where sinus uplift and bone augmentation procedures were carried out.

Clinical and radiographic assessment was done prior to implant placement. Radiographs were also taken 2 weeks post implant placement, and in 3 months just prior to loading. Patients were followed up at every 3 months for a year and then yearly basis for life.



Picture 2: Same case in picture 1 after guided bone regeneration - use of Minneross.

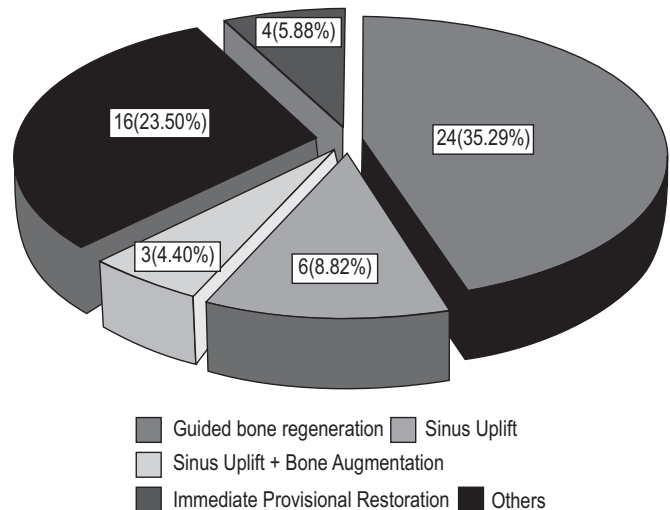


Fig 4: Explaining numbers and percentages according to bone manipulation procedures

At every recall, condition of restoration/prosthesis, implant stability, and adjacent mucosa were evaluated.

## RESULTS

According to this study, the cumulative success rate of these 68 implants is 95.5% (96.36% for laserlock and 87.5% internal) for all sites. None of the Straumann implants has failed up to date. The implants were followed for 3 to 18 months (mean 10.5 months) and exhibited adequate results. Soft tissue inflammation such as mild gingivitis and mucosal irritation was observed in few cases. These conditions improved with oral health improvement, during this observation period.

There were 65 successful cases (95.5%) while in two female patients and one male patient one implant failed making it total 3 (4.4%). Amongst the 3 failed implants 2 were placed in posterior maxillary region and one implant in posterior mandible in a male patient.

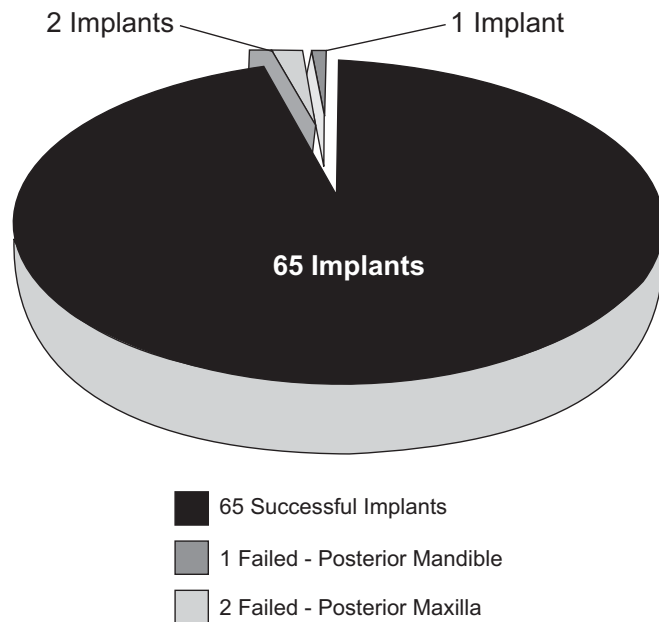


Fig 5: Success vs Failure

## DISCUSSION

Results of this study demonstrate that 68 implants were placed on 31 patients with mean age of 38.54 years. Three cases of implant failure were observed. However, no clinical or radiographic signs of morbidity were noticed in any other patient till date. Primary predictors of implant failure are poor bone quality, chronic periodontitis, systemic diseases, habits as smoking, presence of infection, advanced age, implant location within oral cavity, short implants, acentric loading, an inadequate number of implants, parafunctional habits and absence/loss of implant integration with hard and soft tissues. Inappropriate prosthesis design also may contribute to implant failure.

There are no absolute contraindications to implant dentistry however there are some systemic, behavioral and anatomic considerations that should be considered. Uncontrolled diabetes causes concern as healing following any type of surgical procedure is delayed due to poor peripheral blood circulation.<sup>7</sup>

Systemic osteoporosis has also been mentioned as a possible risk factor for osseointegration failure. Prevalence of osteoporosis increases among the elderly and after menopause but it appears that osteoporosis as diagnosed at one particular site of the skeleton is not necessarily seen at another distant site. In studies conducted by Roberts et al; (1992) and Dao et al; (1993) local rather than systemic bone density seemed to be the predominant factor.<sup>8,9</sup>

Bruxism is another consideration which, may reduce the prognosis for treatment especially in partially dentate patients. Forces generated during bruxism are particularly detrimental to implants while bone is healing and micromovements in the implant positioning are associated with increased rates of implant failure. Hence, it continues to pose a threat to implants throughout the life of the recipient.<sup>10</sup>

Anatomic considerations include the volume and height of bone available. Often an ancillary procedure known as a block graft or sinus augmentation are needed to provide sufficient bone for successful implant placement. Previous studies indicate a higher failure rates when implants were placed in maxilla or type IV bone<sup>11</sup>. Implants placed in the mandible (particularly anterior to the mental foramina) enjoy a higher success rate than the maxilla (approximately 95% success for implants in the mandible compared with 85 to 90% for the maxilla) 5 years after loading.<sup>12,13</sup>

The area surrounding the implant can become infected and inflamed leading to a loss of supporting bone and resultant loosening of the implant. This is likely to happen with smokers and those whose oral hygiene is deficient. Smoking may adversely affect wound healing thus jeopardize the success of bone grafting and dental implantation. A few studies have now shown that cigarette smoking is associated with significantly higher levels of marginal bone loss and the effect of the overall mean failure rate in smokers is about twice that in non-smokers.<sup>14,15</sup> Lemons et al; (1997) further showed that smoking reduced bone density in the femur and vertebrae as well as in the jawbone.<sup>16</sup> Smokers should thus be warned of this association and encouraged to quit the habit.

One of the most essential factors that determine implant success is the achievement and maintenance



of implant stability presented as an ISQ (Implant Stability Quotient) value.<sup>17</sup> Its an essential feature that permits the transfer of stress from the implant to the bone without any appreciable relative motion. Use of angulated abutments may aggravate loading of implant assembly as greater bending movements are produced which increases bone stress and resulting in resorption.

Flapless implant placement is well practiced procedure and has many advantages for the patient as well as for the surgeon. The procedure is less time consuming, bleeding is minimal, implant placement is expedited, and there is no requirement of suture placement. However, it is a blind technique so care must be taken to avoid perforating bone when placing implants.<sup>18</sup>

Implant failure may occur because of poor positioning at the time of surgery. Angulation of the implants affected by drilling is critical to avoid perforation of the buccal and lingual cortical plates, especially on the lingual in the mandibular molar area and the buccal in anterior maxilla. The increase in failure rate occurs during the first year following prosthetic loading. Success is highly dependent upon a surgical technique, which avoids heating the bone. Slow drilling speeds, the use of successive incrementally larger sharp drills under copious saline irrigation aim to keep the temperature below that at which bone tissue damage occurs (around 47°C for 1 minute).<sup>19</sup>

The success rate for implant surgery is very good provided the patient has been appropriately selected with adequate width of bone is available for implant placement and surgical protocols are followed. In this study period of one and half year, a favourable success rate has been demonstrated. Moreover, more implants are being placed lately and the patients are still under observation. We would like to analyse the failed cases in greater detail.

**Case 1:** A post menopausal female patient had four implants placed in one procedure. She also had 3 mandibular implants with open flap technique and one maxillary premolar area implant with flapless surgery at the same time. At two weeks follow up period, mandibular implants were doing fine. However, maxillary premolar area implant was very loose

and came out without any effort. There was no infection and bone was surrounding the implant all around. After removal of implant, the socket was packed with Minneross and primary closure was achieved. Now she is due for another implant in near future.

**Case 2:** A 55 years old female has had left maxillary 1<sup>st</sup> molar implant carried out by open flap surgery. She also received another immediate implant for right maxillary premolar at the same time. Patient had no contributory systemic medical history. There was good primary stability in both the implants. However, the implant for left maxillary 1<sup>st</sup> molar never got integrated and remained tender to percussion and slightly mobile with no clinical infection. Therefore, it was removed after 6 months of wait and area was grafted with Minneross. We are planning to redo the case in near future. Right maxillary implant is doing well.

**Case 3:** A 49 years old male who had undergone cholecystectomy in the past. He was a non-smoker and had no history of medication. Patient had 4 implants placed in one procedure; 2 in anterior mandible and 2 in posterior mandible. All implants integrated well but implant for right mandibular second premolar failed to integrate. According to our judgement, it was a technical error. Implant site was prepared up to 4.5mm wide and a 5mm wide implant was placed in that site. Primary stability was poor and there was not less than 1 mm bone between implant and adjacent teeth. After 2 months wait, as there was still mobility so implant was removed and socket was grafted with Minneross. We are hoping to replace implant in few months time.

## CONCLUSION

Implants will last many years and require the same maintenance as natural teeth, including brushing, flossing and regular dental check-ups. Treatment involves multidisciplinary cooperation, and many complications are related to communication errors. Tolman and Laney in 2002 stressed, that many failures are the result of misdiagnosis, poor treatment techniques, and lack of communication between members of the treatment team.<sup>20</sup>

Within the limits of this retrospective study, the overall success rate of 68 implants was 95.5%. There

are three cases of implant failure and no significant difference regarding gender, arch of placement or patient's age. Further follow-up is needed to evaluate the long-term success rates among these patients. A comprehensive health history with attention given to fundamental systemic problems as well as factors influencing implant failure is integral to effective treatment planning, in the long run to the success of implant therapy.

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