ORIGINAL ARTICLE

An All-Inclusive Evaluation of Different Pre Surgical Contributors Affecting General Prognosis of Implant Therapy: An Original Research Study

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ABSTRACT:

Aim: With the boom of implant dentistry, practitioners are more concerned about implant related failures which is very common these days. Nevertheless, detailed and accurate treatment planning is advisable to reduce this clinical dilemma. This study was conducted to evaluate different pre surgical factors governing overall prognosis of implant treatment. **Materials & Methods:** This study was conducted on 30 patients those looking for replacement of single teeth by implant therapy. Basic demographic details related to age, gender was also recorded for all selected patients. Before finalizing treatment planning, a comprehensive analysis was done by studying cone beam computed tomography of all patients. Authors particularly have chosen few imperative pre surgical factors to study like precise site of implant placement, quality and quantity of bone at the osteotomy site, orientation of bone, proximity with any vital anatomical structure. Authors compared actual or clinical length and width of osteotomy site (and implant dimension) with dimensions suggested by cone beam computed tomography. Results were subjected to statistical analysis. P value < 0.05 was considered significant. **Results:** All noticeable findings and data were sent for statistical analysis using statistical software Statistical Package for the Social Sciences version 21. Out of 30 patients, males were 18 and females were 12. In group I, cbct suggested dimension and clinical dimensions were identical. This confirms the clinical usefulness of cbct in pre-surgical planning. P value was highly significant here (0.001). In group II, cbct suggested dimension and clinical dimensions were non-identical. P value was not significant here (0.080). In group III, cbct suggested dimension and clinical dimensions were Non-relatable. This could be attributed as faulty and hence not included in the inference. **Conclusion:** Within the limitations of the study author concluded that all pre surgical factors significantly affect the overall success of implant treatment. Our study results must be considered as suggestive for presuming prognosis for similar clinical conditions.

Key Words: Dental implant, Implant planning, Oral Surgery, Prosthodontics

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INTRODUCTION

Completely or partially edentulous patients are a diverse group that consists of those who are anatomically incompetent, medically compromised, economically weaker, geriatric, congenitally malformed, genetically affected. General complications of tooth loss include progressive alveolar bone loss and diminished masticatory efficiency.[1-2] Since decades, complete denture has been the standard therapeutic protocol in partially edentulous patients. However, it is a great challenge to attain acceptable results, particularly in the case of mandibular arch presenting severe resorption of the alveolar ridge.[3-4] Since the introduction of the concept of osseointegration by Branemark, implant therapy have become a standard treatment option for restoring missing teeth. Edentulism limits a patient's ability to perform two essential tasks in life: speaking and eating, and handicap. In the past, the most common treatment for partial edentulism has been to restore function with removable dentures.[5-6] Due to the fact that, partial edentulism causes progressive bone loss, treatment with conventional denture is limited and

detrimental changes continue overtime. Implant therapy have different advantages over conventional partial dentures such as alveolar bone maintenance, preservation of periodontal proprioception, enhanced psychological comfort, and increased masticatory efficiency.[7-8] Bone loss around dental implants is generally measured by monitoring changes in marginal bone level using radiographs. After the first year of implantation, an implant should have <0.2 mm annual loss of marginal bone level to satisfy the criteria of success. However, the process of measuring marginal bone level on radiographs has a precision of 0.2 mm owing to variations in exposure geometry, exposure time and observer perception. Therefore keeping all these factors in mind, this study was conducted to evaluate different pre surgical factors governing overall prognosis of implant treatment.

MATERIALS & METHODS

This study was conducted in the department of oral surgery and prosthodontics of the institute in which total 30 patients studied those looking for replacement of single teeth by implant therapy. Initial and

preliminary examinations including implant placement were attempted in the department of oral and maxillofacial surgery. For prosthetic rehabilitations, patients were referred to the department of Prosthodontics. Basic demographic details related to age, gender was also recorded for all selected patients. All participating patients were informed in detail about the study. Informed consents were obtained from all participating patients. Before finalizing treatment planning, a comprehensive analysis was done by studying cone beam computed tomography of all patients. All relevant findings of cone beam computed tomography reports were noted and tabulated logically. Authors particularly have chosen few imperative pre surgical factors to study like precise site of implant placement, quality and quantity of bone at the osteotomy site, orientation of bone, proximity with any vital anatomical structure. Authors compared actual or clinical length and width of osteotomy site (and implant dimension) with dimensions suggested by cone beam computed tomography. In cone beam computed tomography, three dimensional cross sectional images were developed at cross sectional interval of 1.0 mm with motion set at standard levels. Qualitative and quantitative measurements were noted for available bone height, bone width in the areas of interest. Three dimensional reconstructions of cone beam computed tomography allows clinician to predict the bony morphology, nerve patterns, joint structures, position and extent of maxillary sinuses. To avoid any inter-observer variation, the comprehensive expressions of cone beam computed tomography images were completed by two different and independent experienced observers. Results were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

In a joint estimate of different dental implant companies, more than three million implants are placed each year and this number will increase yearly. Implant treatment is now considered a common method of rehabilitation of partially edentulous jaws. In this study, all noticeable findings and data were sent for statistical analysis using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). The finalized data was subjected to appropriate statistical tests to obtain p values, mean, standard deviation, chi- square test, standard error and 95% CI. Table 1 and Graph I showed that out of 30 patients, males were 18 and females were 12. All selected and studied patients were segregated into 4 age groups. 12 patients were noticed in the age range of 26-30 years. Hence we can presume that majority of the studied patients were of younger age groups. P value was found to be significant in group I & III of age range 26-30 and 36-40 years. The measured value was 0.01 and 0.02 respectively. Table 2 demonstrates comparison of implant dimension at osteotomy stages. Participants were studied in three subgroups based on the dimensional similarities at clinical stage and CBCT recommendations. In group I, cbct suggested dimension and clinical dimensions were identical. This confirms the clinical usefulness of cbct in pre-surgical planning. P value was highly significant here (0.001). In group II, cbct suggested dimension and clinical dimensions were non-identical. This could be due to patient related limitations and instrumental factors. P value was not significant here (0.080). In group III, cbct suggested dimension and clinical dimensions were Non-relatable. This could be attributed as faulty and hence not included in the inference. P value was not significant here (0.500).

TABLE 1: AGE & GENDER WISE DISTRIBUTION OF PATIENTS

Age Group (Yrs)	Male	Female	Total	P value
26-30	7	5	12	0.01*
31-35	5	3	8	0.50
36-40	3	2	5	0.02*
41-45	3	2	5	0.80
Total	18	12	30	*p<0.05 significant

GRAPH 1: AGE & GENDER WISE DISTRIBUTION OF PATIENTS
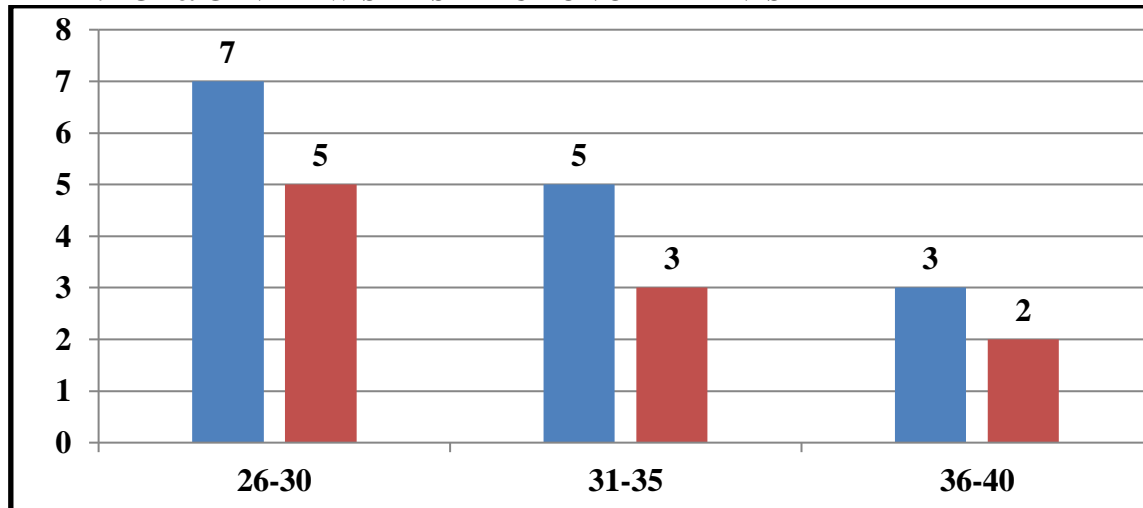
TABLE 2: COMPARISON OF IMPLANT DIMENSION AT OSTEOTOMY STAGES (CBCT Vs CLINICAL: n=30)

Group	CBCT Vs Clinical	n	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	Level of Significance (p value)
Group I	Identical	28 (94%)	0.387	0.229	1.96	1.245	0.001*
Group II	Dissimilar	1 (3%)	0.536	0.346	1.60	2.732	0.080
Group III	Non-relatable	1 (3%)	0.741	0.099	1.12	2.626	0.500
*p<0.05 significant							

DISCUSSION

In the recent past, three-dimensional (3D) imaging technique Cone beam computed tomography (CBCT) has established many landmarks in the field of dental radiology. Presently, CBCT is mostly advised by oral radiologist (for head & neck diagnosis) and by prosthodontists (for implantology).[4,7] Edentulism is a chronic condition for which the palliative therapy is a set of removable complete dentures. Given the global increase in the life expectancy, and the increase in the elderly population, the seekers for this treatment among the elderly edentulous population will be increased.[8-9] With the advance of the dental implants, the retention and stability of mandibular complete denture have been improved to a large extent. According to recent UN data, the increasing number of elderly patients in the population, especially in Western countries, is a certain reality for the future. In Portugal, it has been predicted that the percentage of the population over 60 years old could rise from 24% in 2011 to 40% by 2050.[10-11] Few of the pioneer workers had assessed the placement location, length, diameter of implant, over a period of 2 years under load. They also evaluated the local and systemic risk factors for implant failure. Overall survival rate of 96.8% (2.84% and 0.38% early and late implant failures, respectively) was observed. The patient-based survival rate was 91.8%. Bone grafting seems to be a risk factor for implant failure.[12-15] Edentulous patients are a diverse group comprised of those who are anatomically deficient, medically compromised, economically depressed, geriatric, congenitally deformed, genetically affected as well as general population for a number of other reasons have been rendered edentulous. The use of implants has dramatically improved treatment choices for most edentulous patients, but it may not be suitable for all patients particularly in less prosperous countries or for patients who are unable to afford costs associated with this treatment option. Evidence of biomechanical success and psychosocial satisfaction has led to an emerging consensus that a two implant overdenture should be recommended treatment in the management of an edentulous mandible. In the last two decades, the use of prosthetic retention systems in dental implants has achieved good results in edentulous patients, significantly increasing their satisfaction and prosthetic rehabilitation results. The criteria proposed by many pioneer researchers included immobility, absence of peri-implant radiolucencies, absence of pain, absence of infections and <0.2 mm vertical bone loss per year (except the first year).

CONCLUSION

Within the limitations of the study author concluded very significant inferences. Moreover, CBCT demonstrated real condition of various pre surgical factors including bone quality and quantity with accurate dimensional presumptions. Hence, these inferences could be used for precise pre-surgical planning of implant therapy. It was also concluded that all these pre surgical factors significantly affect the overall success of implant treatment. Our study results must be considered as suggestive for

presuming prognosis for similar clinical conditions. However, we expect some other large scale studies to be performed that might further establish certain standard and concrete guidelines in these perspectives.

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