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Immediate Versus Delayed Loading of Dental Implants: A Comparative Study.

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ABSTRACT

Background: For single tooth gaps, implants serve as a valuable replacement option as shown by large number of studies. Various advantages offered by this technique include better cosmetic, functional and psychologic outcome for the patient. The aim of the present study was to compare the bone loss and the soft tissue condition of the conventionally loaded dental implants with those loaded immediately. **Methods**: The present prospective study was conducted was conducted in department of dentistry, in our hospital. The study included 40 subjects reporting for the replacement of single missing tooth. Stent was prepared for appropriate placement of the implants. Subjects were kept on an antibiotic regimen prior to implant placement and under complete aseptic conditions and using standard surgical procedures implants were placed. After 6 months, IOPA radiographs were taken to estimate the bone level and regarded as Time 1 and same was repeated after 12 months, regarded as time 2. Peri implant soft tissue evaluation was done at 6 months and 12 months. All the data was arranged in a tabulated form and analysed using SPSS software. **Results**: There were 62.5% (n=25) males and 37.5% (n=15) females in the study. There was 1 case of implant failure amongst both males and females. The mean periodontal index amongst Group B subjects at 6 months and 12 months was 0.52+/-0.65 and 0.71+/-0.42 respectively. **Conclusion**: The present study compared immediate and delayed loading of the implants. Immediate loading demonstrated a highly successful clinical outcome at the end of 1 year.

Keywords: Implant, Loading, Outcome.

INTRODUCTION

A proven solution for rehabilitation of partial or complete edentulism is dental implants and the survival rate of implant supported restrorations is relatively high.[1,2] Due to this fact more and more people are opting for dental implants for rehabilitation. For single tooth gaps, implants serve as a valuable replacement option as shown by large number of studies.[3-6] In today's implantology an increasingly accepted concept is that of immediate loading for single tooth replacements.[6,7] It implies to placing the prosthetic restrorative material within 48 to 72 hours of implant placement.[6,7] Various advantages offered by this technique include better cosmetic, functional and psychologic outcome for the patient.[6-8] As per a Cochrane systematic review of the RCTs to evaluate the loading timing for implants showed that immediate loading of mandibular implants in selected areas can be as useful as the conventional implants during the healing period.[8] While some of the studies have shown no significant difference in failure rates when immediate loading and delayed loading were compared, but few other studies suggest that implant failures were significantly more in cases where immediate loading was done compared to conventional loaded dental implants.9-14 The aim of the present study was to compare the bone loss and the soft tissue condition of the conventionally loaded dental implants with those loaded immediately.

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MATERIALS AND METHODS

The present prospective study was conducted in department of dentistry at our hospital. The study included 40 subjects reporting for the replacement of single missing tooth. Subjects between age of 25-50 years were enrolled in the study. Patients with inadequate mouth opening, interarch distance, poor oral hygiene, retained roots or pathological conditions were excluded from the study. Subjects with contraindication to implant surgery were also not included in the study. The study was divided into two groups- Group A consisted of subjects in whom immediate loading of dental implant was

done and Group B consisted of subjects who were managed by conventional loading of dental implants. The diameter and length of implants were based on the clinical and radiographic evaluation of the available bone. All the subjects were informed about the study and a written consent was obtained from them in their vernacular language. Stent was prepared for appropriate placement of the implants. Subjects were kept on an antibiotic regimen prior to implant placement and under complete aseptic conditions and using standard surgical procedures implants were placed. After implant placement soft tissue flap was closed using resorbable sutures and the radiographs were taken to assess the bone levels at time 0. Subjects were prescribed antibiotics and told to maintain good oral hygiene. Loading was performed after 48 hours in group a subjects with provisional crowns. Occlusion was adjusted to maintain lateral excursive and intercuspal distance. Light contact with opposing tooth was made after 2 months. After 6 months final restoration was fabricated and kept at maximum inter cuspal position. In group B, 6 months were given for osseointegration and after impression, casts were fabricated and mounted for crown fabrication. After 6 months, IOPA radiographs were taken to estimate the bone level and regarded as Time 1 and same was repeated after 12 months, regarded as Time 2. Peri implant soft tissue evaluation was done at 6 months and 12 months. All the data was arranged in a tabulated form and analysed using SPSS software.

RESULTS

[Table 1] shows the distribution of the subjects. There were 62.5% (n=25) males and 37.5% (n=15) females in the study. There was 1 case of implant failure amongst both males and females. There were 40% (n=16) subjects between 16-30 years of age. There were 18 (45%) subjects between 31-40 years of age. There were 15% subjects between 41-50 years of age. There was 1 case of failure between 41-50 years of age group. There were 32.5% (n=13) smokers and 67.5% (n=27) non-smokers. There were 2 cases of implant failures amongst the smokers. Majority of the implants were placed in the mandible (70%).

[Table 2] shows the mean values of peri implant bone loss amongst the subjects. The mean bone levels on mesial and distal side amongst Group A subjects at 6 months were 0.72+/-0.22 and 0.65+/-0.23 respectively. The mean bone levels on mesial and distal side amongst Group A subjects at 12 months were 1.13+/-0.34 and 1.04+/-0.35 respectively. The mean bone levels on mesial and distal side amongst Group B subjects at 6 months were 0.78+/-0.18 and 0.72+/-0.53 respectively. The mean bone levels on mesial and distal side amongst Group B subjects at 12 months were 1.16+/-0.15 and 1.14+/-0.34 respectively.

[Table 2] shows the soft tissue condition amongst both the groups. The mean gingival index amongst Group A subjects at 6 months and 12 months were 0.56+/-0.23 and 0.89+/-0.34 respectively. The mean periodontal index amongst Group A subjects at 6 months and 12 months was 0.45+/- 0.32 and 0.67+/-0.48 respectively. The mean gingival index amongst Group B subjects at 6 months and 12 months were 0.61+/-0.52 and 0.92+/-0.31 respectively. The mean periodontal index amongst Group B subjects at 6 months and 12 months was 0.52+/-0.65 and 0.71+/-0.42 respectively.

Table 1: Distribution of the subjects in the study

Variable	No. of patients	Failure rate
Gender		
Male	25(62.5%)	1
Female	15(37.5%)	1
Age group		
16-30	16(40%)	0
31-40	18(45%)	0
41-50	6(15%)	1
Smoking habit		
Smokers	13(32.5%)	2
Non-smokers	27(67.5%)	0
Site		
Maxilla	12(30%)	1
Mandible	28(70%)	1

Table 2: Mean values of peri implant bone loss

Follow up duration	Group A		Group B	
	Mesial	Distal	Mesial	Distal
6 months	0.72+/-0.22	0.65+/-0.23	0.78+/-0.18	0.72+/-0.53
12 months	1.13+/-0.34	1.04+/-0.35	1.16+/-0.15	1.14+/-0.34

Table 3: Soft tissue condition

Follow up duration	Group A		Group B	
	Gingival index	Periodontal Index	Gingival index	Periodontal Index
6 months	0.56+/-0.23	0.45+/-0.32	0.61+/-0.52	0.52+/-0.65
12 months	0.89+/-0.34	0.67+/-0.48	0.92+/-0.31	0.71+/-0.42

DISCUSSION

The clinical auxiliary of lost teeth by Osseo integrated dental implants has been regarded as one of the major advances in the prosthetic dentistry. Implant dentistry has been the far most innovative and progressive developments in advanced years especially in the development of new implant management protocols, the development of new and advanced diagnostic procedures and the production of useful surgical techniques. Establishment of bone to Implant interface is the major factor for the success of implant dentistry. Placement of implant is normally a 2 stage

protocol.[9] After placement implants are left to heal for a duration of 3-4 months in the mandible and for 6-8 months in the maxilla for osseointegration. Due to this subjects have to wait for a considerable time for the placement of prosthesis and have to wear provisional prosthesis during that period and that is not esthetic. It was in the year 1990 that the first study was published on the early or immediate loading of the implant in the mandible of selected patients.[15] Immediate loading is a commonly performed surgical procedure especially in the mandible with good quality of bone.[16]

In the present study, group A consisted of subjects in whom immediate loading of dental implant was done and group B consisted of subjects who were managed by conventional loading of dental implants and the results showed a comparative mean values both groups. Crespi R et al,[17] carried a study to clinically assess crestal bone level change around single implants in fresh extraction sockets in the esthetic zone of the maxilla either immediately loaded or loaded after a delay and the success rate and radiographic results of immediate restorations of dental implants placed in fresh extraction sockets were comparable to those obtained in delayed loading group. Similarly, Ebenezer V et al,[18] reported that most of the immediate implants showed excellent osseointegration.

The rationale behind failure of immediate loading of the implants is that there is continuous micromovement of the implant due to the functional forces at the bone implant interface leading to formation of fibrous tissue rather than the required bone to implant contact leading to its failure.[17] This lag period duration between the placement of implant and loading has been under investigations since many years and different authors have different prospective towards this.[20-23] A final conclusion is yet to be established amongst the authors regarding the ideal healing time between the placement of implant and its healing. It is also dependent on various factors.

CONCLUSION

The present study compared immediate and delayed loading of the implants. Immediate loading demonstrated a highly successful clinical outcome at the end of 1 year. But the survival rate of the implant that were loaded immediately was inferior to those loaded by conventional technique. Therefore, immediate loading should be opted for subjects with good bone quality.

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