Original Research

Clinical and radiographic evaluation of single unit implant-retained prosthesis with immediate and delayed loading

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ABSTRACT

Aim: The aim of the study was to evaluate the soft tissue around the implant using clinical measurements for marginal gingival level and standardized radiographs for marginal bone level around the implant.

Materials and methods : Five subjects were selected within the age group of 20 to 35 years. Subjects were selected with Kennedy's class 3 modification 1 in mandibular arch with molars missing in both quadrants. The patient restored by immediate loading of suprastructure on one side and other side delayed loading of suprastructure was performed after three months of osseointegration period. Adjacent hard and soft tissues of immediate loading and delayed loading were evaluated and compared using bleeding index, sulcus depths analysis and Digital Radiographic examination.

Results : The P and Z value for Marginal Gingival Index of Immediate and delayed loading at different time intervals of H2,H4,H6,H12,H14,H20 were 0 and 1. The P and Z value for Bone level Index of Immediate and delayed loading at different time intervals of H2,H4,H6,H12,H14,H20 were <1. The results were not statistically significant.

Conclusion: Within the limitations of this study, immediate and delayed loading of single unit implant retained prosthesis showed no significant clinical and radiographic difference.

Keywords: Implants, prosthetic loading,

INTRODUCTION

Most of the currently used endosseous implant systems require either immediate or delayed loading surgical protocol. It is well documented that long-term clinical studies have revealed that both immediate and delayed loading of implant have high success rate. The choice of immediate and delayed loading is the concern of both the surgeon and the prosthodontist because advantages and disadvantages affect the working fields of both.

The conditions of the soft and hard tissue around dental implants play a major role in its success. Among the proposed clinical signs, the operator usually evaluates the success of dental implants by studying the radiographic image of each implant to determine signs of marginal bone loss. Peri implant bone loss is frequently preceded by inflammation of peri-implant soft tissue and is thought to be plaque induced. Two main factors are thought to be responsible for the occurrence of peri implantitis: bacterial infection (plaque theory) and mechanical over load (load theory). The frequency of the peri implant bone loss has been reported to be in range of 1% to 19%.

The present study of peri-implant topography around single tooth implant with immediate loading and delayed loading was undertaken by evaluating the soft tissue around the implant using clinical measurements for marginal gingival level and standardized radiographs for marginal bone level around the implant.

MATERIALS AND METHOD

Five subjects were selected including male and female with the age group of 20 to 35 years. All the subjects were selected without systemic diseases. Subjects were selected with Kennedy's class 3 modification 1 in mandibular arch with molars missing in both quadrants. Minimum of

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three months of edentulism was undertaken with available bone width minimum of 8 mm mesio-distally and 15 mm above the mandibular canal.

One side was loaded with immediate loading of suprastructure (ie. Loading done within 4 days of implant placement) and other side delayed loading of suprastructure was performed after three months of osseointegration period. Adjacent hard and soft tissues of immediate loading and delayed loading were evaluated and compared .Clinical topographic analysis was done by the gingival index using modified Loe and Sillness index, Mombelli's bleeding index and sulcus depths analysis. Loe and Sillness index is a simple and practical method of evaluating the peri-implant gingival tissue. Gingival index, bleeding index and sulcus depths were also scored. Bleeding and sulcus depths were not measured for delayed loading side at H2, H6, and H12 intervals to avoid disturbing the soft tissue attachment formation during healing period. The depth of the peri-implant sulcus was measured mesial and distal of implant to the nearest millimeter by using a pressure indicating periodontal probe. The distance between the marginal border of the gingival and the tip of the pocket probe was scored as the probing pocket depth. The deepest pocket per implant was used for data analysis.

The radiographic examination was done using digital radiography with long cone technique and standardized with positioning device. The planmeca prostyle intra oral X-ray machine was used. A paralleling cone technique was used to make the radiograph.' A' size 'A' adult CCD (planmeca) sensor was used, with exposure parameters kept standardized at 60 kvp, 10 ma and 0.4 seconds. Following the exposure, image capture was achieved through the XVa3® software and stored in the jpeg format.

RESULTS:

Time points	Immediate loading	Delayed loading	Difference	Z	P value	Significance
	Mean ± SD	Mean ± SD	Mean ± SD			
H2	0.6±0.6	0.6±0.6	0 ± 0	0	1.00	Not significant
H6	0.4±0.6	0.4±0.6	0± 0	0	1.00	Not significant
H12	0.2±0.4	0.2±0.4	0 ± 0	0	1.00	Not significant
H14	0.2±0.4	0.2±0.4	0 ± 0	0	1.00	Not significant
H20	0.2±0.4	0.2±0.4	0 ± 0	0	1.00	Not significant

Table -1 : Marginal Gingival Index of Immediate and delayed loading at different time intervals

The z and P values for marginal gingival index of immediate and delay loading (table 1) during the period of H2, H4, H6, H12, H14, H20 were 0 and 1. It proved to be statistically insignificant.

Time points	Immediate loading	Delayed loading	Difference	Z	P value	Significance
	Mean ± SD	Mean ± SD	Mean ± SD			
H2	2.01±0.38	2.26±0.44	0.25 ± 0.54	0.94	0.34	Not significant
H6	1.79±0.32	1.94±0.38	0.15± 0.52	0.40	0.69	Not significant
H12	1.52±0.39	1.59±0.39	0 .07± 0.54	0.40	0.69	Not significant
H14	1.15±0.29	1.27±0.38	0.13 ± 0.51	0.67	0.50	Not significant
H20	0.92±0.32	0.93±0.37	0.01 ± 0.56	0.14	0.89	Not significant

Table -2 : Bone levels of Immediate and delayed loading at different time intervals

The z and P values for Bone level index for immediate and delay loading during the period of H2, H4, H6, H12, H14, H20 were statistically insignificant (table.2)

DISCUSSION

The present study was done to evaluate the clinical and radiographical changes around titanium endosteal transmucosal screw type two piece implants placed in single stage surgical protocol and two stage surgical protocal with the objectives of evaluating the peri implant clinical parameters of marginal gingival level and radiographic parameters of marginal bone level for immediately loading of supra structure for one stage implant placement and delayed loading of the supra structure for two stage implant placement[1,2]. The aim of the present study was to evaluate marginal peri implant bone and soft tissue behaved in different way around immediately loading and delayed loading implant of single unit implant supported prosthesis.

In the present study, implant survival rates, stability, peri-implant and radiographic parameters were compared in a direct way within the same patient, between immediate functionally loaded implants and implants that were loaded after 3-month healing[3,4,5]. Two piece implants were used for both immediate loading and delayed loading technique. It was attempted to standardize factors that influence osseointegration success such as implant material, surgical technique and host bone quantity and quality to evaluate the effect of load time and occlusion on the survival rate of dental implants[6,7]. For this reason, all patients received the same treatment protocol by the same surgeon and restorative team so that the immediate and conventional full occlusal loading protocols could be studied uniformly and objectively.

Data collection was performed five times during the study. One investigator made the measurements on all

patients to avoid inter observer differences. In all the study subjects there was no peri-implant radiolucency at any of the period intervals (table 3) implant complications like loss of implants, loss of healing abutment, peri-implant mucosal abnormalities were absent in all the study sample for immediate loading and delayed loading[1,4].

In the present study, it was demonstrated that immediate and full functional loading of single-tooth implants in soft bone regions seems to lead to sufficient primer stability. The study design allowed for direct comparison of implant survival and clinical results within the same patient, between IL and DL implants. However, further studies with larger population will be necessary to evaluate marginal bone resorption and the marginal gingival changes in single-tooth implant retained prosthesis that loaded immediately in the mandibular molar region.

The results of this study are in accordance with the findings of Meijer et al[8].zarb[9], Aparcio et al [10], Pennarocha et al[11]. It has been demonstrated by authors in the literature that immediate functional loading of implants shows no significant clinical and radiographic differences[12-20].

CONCLUSION

Within the limitations of this study, immediate and delayed loading of single unit implant retained prosthesis showed no clinical and radiographically significant difference**.**

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INTER DENTAL COLLEGIATE PRIZE EXAMINATION IN PHARMACOLOGY

The Department of Pharmacology SRM Dental College, Ramapuram, Chennai headed by Dr. Nafeesa Iqbal conducted the Inter Dental Collegiate Prize Examination consecutively for the fifth year on 19th June 2010, SRMDC is the only college conducting academic competitive examination in pharmacology.