



Comprehensive Evaluation of Early Stability of Dental Implants Placed with and Without Platform Switching Philosophy at Different Intervals: An Original Research Study

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KEYWORDS

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ABSTRACT:

Background and Aim: Dental implant is common dental replacement modality nowadays. Cases need to be planned meticulously to avoid post operative complications. Various clinical experiments have been tried over years in this regard. This study was planned to evaluate the stability of dental implants placed with and without platform switching philosophy at different intervals.

Materials and Method: 24 patients who need to receive prosthesis for missing right maxillary central incisor were chosen and after adequate dental and general examination single standard size (4.2*10 mm) implant was placed in all of them. Informed consent was taken from each of them as to be a part of this study.

Patients were categorized in two groups:

Group 1: Received conventional abutments

Group2: Received abutments with platform switching concept.

They were assessed at interval of 3 months, 6 months and 9 months interval consequently.

Statistical Analysis & Result: Data was statistically analyzed using SPSS software. P value less than 0.05 was considered as significant. In post operative phase, in Group 1, four implants showed highly significant P value

Conclusion: Authors concluded that implants placed with platform-switching concept showed fairly less incidences of early stability. Likewise, implants placed without platform-switching concept showed higher incidences of early stability. The results were highly imperative and having clinical correlations as well.

Introduction

Dental implants have been used worldwide for the replacements and rehabilitations of single or multiple teeth. It has become the treatment of choice for both patients and dentist. This is mainly due to the preservation of the tooth structure and other interrelated benefits.^{1,2} Despite of these facts, few complications & failures can occur. Since it's a surgical procedure, multiple blood related and other

factors play significant role in its relative success. Literature has well demonstrated that crestal bone loss is one of the major issue which leads to instability of newly placed implants. Instability is primarily due to loss of bony attachments.^{3,4} This osseous problem may become worse in presence of superadded microbial activities. Researchers have confronted that these microbial activities are centered near the implant abutment junctions. Therefore this region is of critical



importance. Platform Switching is one of the popular concept which is clinically used to minimize the infectious and inflammatory activities at the implant abutment junction by special dimensional design concept.^{5,6} Many researchers have proved that implant therapy with Platform Switching show higher success rate. However, this concept cannot be applied blindly in every clinical circumstance.^{7,8} Therefore in view of all these facts, this study was planned to evaluate the stability of dental implants placed with and without platform switching philosophy at different intervals.

Materials and Methods

This study was basically designed on prospective model in which the data was recorded from cause to effect. Also, the study was comprehensively designed and abstracted to outline some crucial outcomes. Both male and female patients were selected in the age range of 29 to 48 years with simple random sampling procedure. Total 24 patients were studied for preset study objectives. Inclusion criteria were mentioned age range and patient presented with missing right maxillary incisor. Exclusion criteria was patient with any possible future follow up issue, smoking, patient with any systemic condition which may interfere data quality, severely complicated diseased situations. For study purpose, patients had been explained about the study design. Informed consent was obtained from all willing participants. Single threaded osseointegrated standard sized implant was finalized for rehabilitation of the missing right maxillary incisor. All required sterilization protocols were followed strictly. Osteotomy was performed by standards steps with minimum trauma concept. In the stage two surgeries, patients were recalled and gingival former was placed according to their respective sizes. Here, patients were divided into two studied groups based on the diameter of their respective abutments. Group 1 patients received conventional sized abutments. Group 2 patients received abutment with platform switching concept. Each group had equal number of patients (n=12). Patients were recalled after 3 months, 6 months and 9 months intervals and accordingly evaluated for

their early stability. Human rights and privacy of patients was kept fully confidential. Data was sent for statistical analysis using SPSS software. P value less than 0.05 was considered as significant.

Statistical Analysis and Results

All applicable data was identified and entered into master spread sheet for analysis by SPSS software. Proper tests were then utilized to test significant implications. Table 1 & Graph 1 demonstrate about age & gender based allocation of all participating patients. Total 24 patients were grouped into 13 male and 7 females in the age range of 29 to 48 years. In 29-33 years, total 3 patients were seen. P value was highly significant for this group (0.02). In the next age range of 34-38 years, 9 patients were found. P value was not significant for this group (0.50). Likewise, in age group of 39-43 years, total 6 patients were seen. P value was not significant for this group (0.18). Table 2 demonstrate about fundamental statistical analysis and explanations for early stability of Group 1 patients without platform switching (n=12). +ve sign was used for presence and -ve sign was used for absence of Early Stability in implants. In 3 month post operative phase, only 1 implant showed clinical sign of early Stability. P value was highly significant for this group (0.01). In 6 month post operative phase, 3 implant showed clinical sign of early Stability. In 9 month post operative phase, 4 implant showed clinical sign of early Stability. Table 3 demonstrate about fundamental statistical analysis and explanations for early stability of Group 2 patients with platform switching (n=12). +ve sign was used for presence and -ve sign was used for absence of Early Stability in implants. In 3 month post operative phase, only 1 implant showed clinical sign of early Stability. P value was highly significant for this group (0.02). In 6 month post operative phase, 1 implant showed clinical sign of early Stability. In 9 month post operative phase, 2 implant showed clinical sign of early Stability. Table 4 showed estimation amongst the 2 study groups using one-way ANOVA [for Group 1 & 2]. The P value was highly significant for this group (0.001)

Table 1: Age & gender based statistical description of contributing patients

Age Group (Yrs)	Male	Female	Total	P value
29-33	2	1	3	0.02*



34-38	5	4	9	0.50
39-43	5	1	6	0.18
44-48	3	3	6	0.70
Total	15	9	24	*Significant
*p<0.05 significant				

Table 2: Fundamental statistical analysis and explanations for early stability of Group 1 patients without platform switching (n=12) (+ve for presence and –ve for absence of Early Stability)

Time	+	-	Stat. Mean for +	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	p value
3 months	1	11	1.94	0.129	0.467	1.32	1.726	2.0	0.01*
6 months	3	10	1.43	0.647	0.103	1.64	1.293	1.0	0.20
9 months	4	9	1.65	0.103	0.142	1.03	1.625	2.0	0.50
*p<0.05 significant									

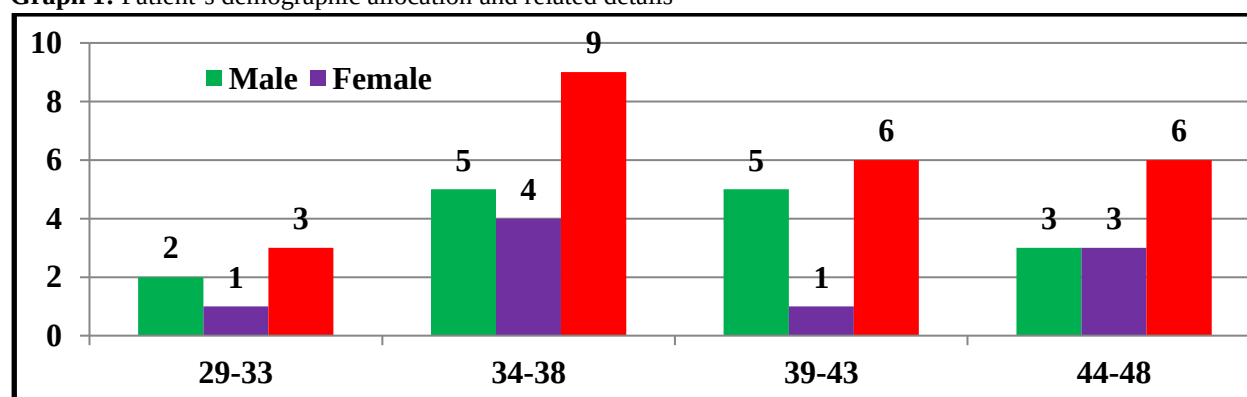
Table 3: Fundamental statistical analysis and explanations for early stability of Group 2 patients with platform switching (n=12) (+ve for presence and –ve for absence of Early Stability)

Time	+	-	Stat. Mean for +	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	p value
3 months	1	11	1.63	0.901	0.493	1.12	1.246	2.0	0.02*
6 months	1	11	1.10	0.673	0.142	1.44	1.133	1.0	0.70
9 months	2	10	1.21	0.112	0.102	1.23	1.545	2.0	0.30
*p<0.05 significant									

Table 4: Estimation amongst the 2 study groups using one-way ANOVA [for Group 1 & 2]

Variables	Degree of Freedom	Sum of Squares Σ	Mean Sum of Squares $m\Sigma$	F	Level of Significance (p)
Between Groups	2	1.032	1.237	1.3	0.001*
Within Groups	13	1.183	0.122	-	-
Cumulative	110.10	4.303	*p<0.05 significant		

Graph 1: Patient's demographic allocation and related details





Discussion

Literature has well evidenced about experiments and clinical trial of platform switching in oral implantology. Several researchers have various opinions and views about platform switching.⁹⁻¹¹ Desai and others were the initial researchers who actually explored the ideology and concept of platform switching. They presented the actual role of platform switching in reducing the bone loss.¹² Macedo and other researchers had studies about the morse taper dental implants and platform switching concept.¹³ They also favored the platform switching concept in reducing microbial activity near implant abutment interface. Iezzi and colleagues presented a case report on histological and histo-morphometrical analysis on a loaded implant with platform-switching and conical connection. They explained histological basis of reduction of crestal bone loss by platform switching.¹⁴ Tabata and coworkers have studied platform switching in relation to biomechanical evaluation using three-dimensional finite element analysis. They showed clear correlation of bacterial ingress at implant abutment junctions. They also emphasized about usage of platform switching concept for better clinical outcomes.¹⁵ Sanz-Esporrin and colleagues have studied about differences in the progression of experimental peri-implantitis depending on the implant to abutment connection. Their study results also explained about beneficial effects of platform switching.¹⁶ These inferences were in agreement with our study results. Gupta and associates have presented first of its own kind systematic review which explained most of the unclear points and concepts of Platform switching.¹⁷ They primarily explained the factual basis of platform switching technique and its correlation with crestal bone loss around the dental implants. They explained how platform switching reduced the crestal bone loss and the possible mechanism of action behind it. This study along with some other studies is therefore considered as the pioneer studies of implant performances and its clinical implications.¹⁸⁻²²

Conclusion

Within the limitations of the study authors concluded that platform-switching concept is highly beneficial for the relative longevity of the implants and implant prostheses. Here in this study, implants placed with platform-switching concept showed fairly less

incidences of early stability. Moreover, implants placed without platform-switching concept showed higher incidences of early stability. The results were significant also. Author recommend other long term studied to be conducted which can establish other significant norms in these prospects.

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