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Comprehensive Evaluation of Esthetic Outcomes of Maxillary Anterior Implant Retained Prosthesis using Two Different Gingival Masks: An Original Research Study

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Abstract

Background & Aim: Optimal esthetics is one of the major requirements and prerequisite of anterior teeth restoration. There are several ways of restoring missing teeth in anterior region. In implant therapy, laboratory procedures and application of right kind of gingival mask is highly imperative. Therefore, this study was planned, outlined and conducted to evaluate the esthetic outcomes of maxillary anterior implant retained prosthesis using two different gingival masks

Materials and Methods: This study was performed with two different gingival masks used during prosthetic phase of implant therapy. After one week of placement, healing abutments were removed and impressions were attempted using open tray technique by elastomeric impression material polyether. Total 18 patients were studied in detail and 2 different commercially available gingival masks were used to replicate the topography, position and consistency of gingiva. All 18 patients were subdivided in to 2 groups of 9 patients each. Group 1 utilized Waldent FlexiGum while Group 2 utilized Detax Esthetic Mask Automix. All ceramic crowns were fabricated and cemented. All patients were recalled after 1 week of their final crown placement. Esthetic outcomes were noted as Satisfactory, Non-satisfactory and Questionable. Visual Analogue Scale (VAS) was used to quantify the responses.

Statistical Analysis and Results: Statistical analysis was completed with SPSS software (statistical package for the Social Sciences version 22 for Windows). Out of 18 studied patients, 10 were males and 8 were females. P-value was highly significant for age group 30-33 years. In Group 1 after 48 hours of cementation of crown, total 5 patients were found to be Satisfactory while 3 patients were not satisfied. Here, the p value was highly significant (0.02). After 72 hours of cementation of crown, total 6 patients were found to be Satisfactory while 2 patients were not satisfied. In Group 2 after 48 hours of cementation of crown, total 6 patients were found to be Satisfactory while 2 patients were not satisfied. Evaluation amongst all studied Groups using one-way ANOVA confirmed highly significant P value for the measurements done between Groups. It was 0.001.

Conclusion: It was concluded that both of the gingival masks showed acceptable esthetic outcomes however, number of satisfied patients were higher with Detax Esthetic Mask Automix as compared to Waldent FlexiGum. So, Detax Esthetic Mask Automix is better than other tested gingival mask. Authors also expect other similar future studies with larger sample size and wider parameter to authenticate results of present study.

Keywords: Esthetic, Detax Esthetic Mask Automix, Waldent Flexigum, Oral Implants, Visual Analog Scale, Gingival Masks

Introduction

Literature has well evidenced that the gingival mask is a type of replica of the peri-implant tissue. Gingival mask plays a significant role in the construction of an optimal restoration. Now days, implant therapy has become a routine clinical practice. Accordingly the esthetic demands have also terrifically increased, particularly in the rehabilitation of anterior teeth in younger patients. This esthetic demand is more critical with high lip line situations. An acceptable esthetic outcome in oral restoration involving dental implants always poses a clinical challenge. The use of gingival mask is highly required in cases of gingival alterations. These could be peri-implant soft-tissue recession in the anterior maxilla. Gingival defects corrected with surgical or prosthetic methods also necessitate application and use of gingival mask.[1] Numerous techniques have been demonstrated in the literature to overcome gingival esthetic problems. These are guided bone redevelopment, onlay block grafts, distraction osteogenesis and titanium netting. Among all these aids, gingival mask is clinically achievable chair-side technique. Gingival mask also allows the supervision and accurate seating of the crown on implant. Gingival mask also plays a central key role in the construction of a crown with best fit.[2] Therefore this study was

planned, outlined and conducted to evaluate the esthetic outcomes of maxillary anterior implant retained prosthesis using two different gingival masks.

Materials and Methods

This study was performed primarily to assess and compare the esthetic outcomes and acceptability of two different gingival masks used during prosthetic phase of implant therapy. This was a clinical study wherein patients were selected for the study. Patients those requiring rehabilitation of their missing anterior teeth by implant supported prosthesis, were selected carefully. Precisely, patients those reported for missing maxillary central incisors (of either side) were entertained and included. The study procedure and purpose of study was explained in detail to the patients. Accordingly, informed consent was obtained from each participating patient. Sample random sampling process was finalized for accurate sample selection ans. Total 18 patients were studied in detail for their esthetic outcomes. Surgical placement procedure and other steps were completed in standard ways. For all 18 subjects or implants, identical implant system and kit was employed with single operatory team. Patients were recalled after three months of implant placement for prosthetic procedures. Incision was made and cover screws were exposed and removed. Accordingly, healing abutments of suitable size was placed for one week. After one week, healing abutments were removed and impressions were attempted using open tray technique by elastomeric impression material polyether (Impregum, 3M ESPE). Laboratory analogs were placed and impressions were poured in die stone. Here, 2 different commercially available gingival masks were used to replicate the topography, position and consistency of gingiva. All 18 patients were subdivided in to 2 groups of 9 patients each based on the gingival masks used. Group 1 utilized Waldent FlexiGum while Group 2 utilized Detax Esthetic Mask Automix. Waldent FlexiGum is an advanced addition-curing silicone which is methodically crafted for precise reproduction of gingival morphology. Detax Esthetic Mask Automix is also called as Silicone-Based gingival Mask. It is flexible silicone-based product to produce dental technological master casts. Detax Esthetic Mask Automix is cold-curing dimensionally stable, tear-resistant and very elastic. It is easy and comfortable to handle. It is usually indicated for natural and aesthetic production of gingival aspect. All ceramic crowns were fabricated and cemented. All patients were recalled after 1 week of their final crown placement. Esthetic outcomes were noted as Satisfactory, Non-satisfactory and Questionable. Visual Analogue Scale (VAS) was used efficiently to formulate the assessments. P value less than 0.05 was taken as significant.

Statistical Analysis and Results

All the predictable data were arranged at initial stages. This was done for presence of any obvious integrated confounders. Post hoc analysis was avoided and not attempted so as to ascertain data quality with minor errors. Later, data was sent for basic statistical analysis with SPSS statistical package for the Social Sciences version 22 for Windows. Nonparametric test, namely, chi-square test, was used for further data analysis; p-value. Out of 18 studied patients, 10 were males and 8 were females [Table 1, Graph 1]. P-value was highly significant for age group 30-33 years. Here p value was 0.02. All the other age groups showed non-significant p values for their estimations. Maximum 12 patients were observed in age group 34-38 and 30-33 years. Table 2 expressed about the essential statistical explanation with level of significance assessment using “Pearson Chi-Square” test (Group 1; n=09 patients wherein Waldent FlexiGum used and interpreted as satisfactory or non-satisfactory or questionable after 48 hours and 72 hours of cementation of final crowns). After 48 hours of cementation of crown, total 5 patients

were found to be Satisfactory while 3 patients were not satisfied. Here, the p value was highly significant (0.02). 1 patient was noted as questionable. After 72 hours of cementation of crown, total 6 patients were found to be Satisfactory while 2 patients were not satisfied. Here, the p value was highly significant (0.01). 1 patient was noted as questionable. Table 3 expressed about the essential statistical explanation with level of significance assessment using "Pearson Chi-Square" test (Group 2; n=09 patients wherein Detax Esthetic Mask Automix used and interpreted as satisfactory or non-satisfactory or questionable after 48 hours and 72 hours of cementation of final crowns). After 48 hours of cementation of crown, total 6 patients were found to be Satisfactory while 2 patients were not satisfied. Here, the p value was highly significant (0.01). 1 patient was noted as questionable. After 72 hours of cementation of crown, total 8 patients were found to be Satisfactory while 1 patient was not satisfied. Here, the p value was not significant (0.10). No patient was noted as questionable. Table 4 illustrated about the evaluation amongst all studied Groups using one-way ANOVA. P value was highly significant for the measurements done between Groups. It was 0.001.

Table 1: Age & Gender based statistical explanation of contributing patients

Age Group (Yrs)	Male	Female	Total	P value
30-33	03	03	06	0.02*
34-38	04	02	06	0.20
39-42	02	02	04	0.40
43-45	01	01	02	0.80
Total	10	8	18	*p<0.05 Significant

Graph 1: Patients Demographic Presentation and Related Details

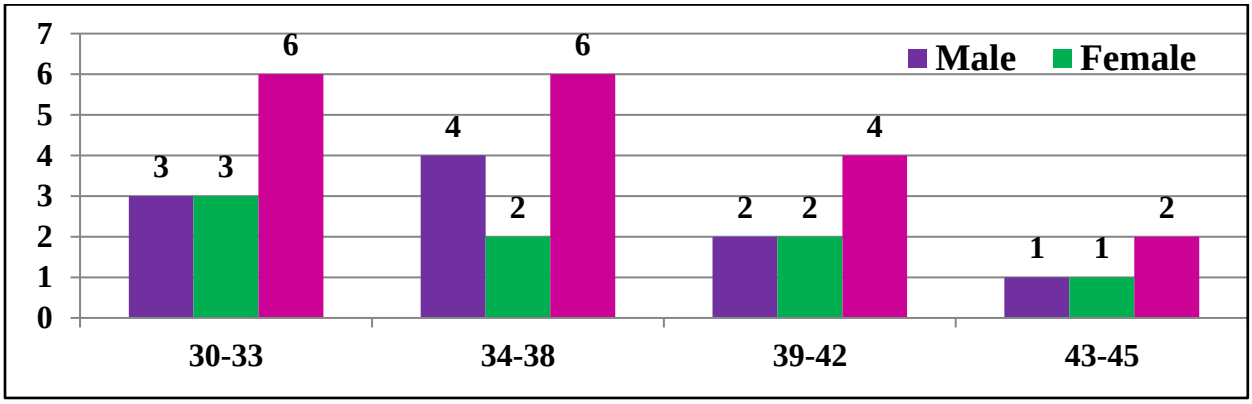

Table 2: Essential statistical explanation with level of significance assessment using "Pearson Chi-Square" test (Group 1; n=09 patients wherein Waldent FlexiGum used and interpreted as satisfactory or non-satisfactory or questionable after 48 hours and 72 hours of cementation of final crowns)

Status	n	Stat. Mean	Std. Dev.	Std. Error	95% CI	Pearson Chi-Square	df	p value
After 48 hours								
Satisfactory	5	1.91	0.940	0.376	1.96	1.549	1.0	0.07
Non-satisfactory	3	1.08	0.230	0.940	1.12	1.904	2.0	0.02*
Questionable	1	1.02	0.695	0.042	1.23	1.131	1.0	0.10

After 72 hours								
Satisfactory	6	1.96	0.390	0.436	1.66	1.349	1.0	0.06
Non-satisfactory	2	1.04	0.912	0.126	1.22	1.047	2.0	0.01*****
Questionable	1	1.02	0.695	0.042	1.23	1.131	1.0	0.10
***p<0.05 significant**								

Table 3: Essential statistical explanation with level of significance assessment using "Pearson Chi-Square" test (Group 2; n=09 patients wherein Detax Esthetic Mask Automix used and interpreted as satisfactory or non-satisfactory or questionable after 48 hours and 72 hours of cementation of final crowns)

Status	**n**	**Stat. Mean**	**Std. Dev.**	**Std. Error**	**95% CI**	**Pearson Chi-Square**	**df**	**p value**
After 48 hours								
Satisfactory	6	1.96	0.390	0.436	1.66	1.349	1.0	0.06
Non-satisfactory	2	1.04	0.912	0.126	1.22	1.047	2.0	0.01*****
Questionable	1	1.02	0.695	0.042	1.23	1.131	1.0	0.10
After 72 hours								
Satisfactory	8	1.98	0.840	0.392	1.91	1.368	1.0	0.06
Non-satisfactory	1	1.02	0.695	0.042	1.23	1.131	1.0	0.10
Questionable	-	-	-	-	-	-	-	-
***p<0.05 significant**								

Table 4: Evaluation amongst all studied Groups using one-way ANOVA

Variables	**Degree of Freedom**	**Sum of Squares ∑**	**Mean Sum of Squares m∑**	**F**	**Level of Sig. (p)**
Between Groups	3	2.054	1.238	1.1	0.001*****
Within Groups	18	2.039	0.125	-	
Cumulative	121.42	12.577	***p<0.05 significant**		

Discussion

Barzilay and other researchers have studied about the gingival masks in oral implantology in the year 2003. They recommended the clinical use of gingival masks for optimal esthetic outcomes in implant supported prostehsis.[3] Mahajan and colleagues studied in 2007 about evaluation of acellular dermal matrix graft in the treatment of gingival recession defects. Their study was particularly a patient-centered clinical evaluation in which they stated highly significant outcomes and recommendations. Their results were highly comparable with our results and outclomes.[4] Reddy MS in 2003 initially experimented gingival mask for maximum achieving gingival esthetics in patients rehabilitated with implant therapy in the maxillary anteriors.[5] Greene PR in 1998 introduced and recommended flexible gingival mask. He presented it as an aesthetic solution in periodontal practice of implantology. Their outcomes were n accordance with our results and recommendations.[6] Priest and other researchers used Gingival-colored

porcelain for implant-supported prostheses in the aesthetic zone. This was an attempt to explore other viable option of gingival mask.[7] Blair and other clinicians also experimented for increasing the esthetic outcomes in implant patient by using the flange prosthesis. They stated that this flange prosthesis can also be utilized as an alternative of gingival mask as and when required in clinical scenarios.[8] Other recent researches and clinical trails also recommend use of gingival mask for optimal esthetics and maximum patient satisfaction. [9-13]

Conclusion

Within the limitations of the study authors concluded extremely crucial outcomes. They stated that both of the experimented gingival masks showed somewhat similar esthetic outcomes however, number of satisfied patients were higher with Detax Esthetic Mask Automix as compared to Waldent FlexiGum. Additionally, no questionable patients were seen with Detax Esthetic Mask Automix after 72 hours of service. Therefore, Detax Esthetic Mask Automix is appearing superior gingival mask than Waldent FlexiGum. Moreover, both of the studied gingival masks have their own limitations with known and established precautions.

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