

To Analyze the Outcome of Orthodontic Space Closure and Implant Substitution in Patients Presented with Missing Maxillary Incisors

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ABSTRACT

Aim: To examine the esthetic and functional outcomes of orthodontic space closure versus implant substitution in patients with missing maxillary incisors.

Study Design: Retrospective study.

Place & Duration of Study: Faryal Dental College Sheikhupura during February 2016 to December 2016.

Methods: Total eighteen patients of both genders presents with missing maxillary incisor were included in this study. Patient's ages were ranging from 15 to 24 years. Informed written consent was taken from patients and patients guardians/parents. All the patients were equally divided into two groups i.e., Group A consist of 9 patients and treated with space closure procedure, Group B contains 9 patients and treated with implant substitution. Esthetic, periodontic and functional outcomes were recorded and compare the results by using student t test. Follow-up was taken at 5 years. Data was analyzed by SPSS 20.0. P-value <0.05 was significantly considered.

Results: In Group A, there were 7 female and 2 male patients with mean age of 18±2.15 years and 6 female and 3 male patients with mean age of 20±3.45 years were in Group B. There were no significant difference found regarding demographical detail between both groups p-value >0.05. At final follow up there were no significant difference found regarding patients satisfaction, VAS score, plaque index, tooth mobility and complications p-value >0.05.

Conclusion: Implant and orthodontic space closure procedures in patients with missing maxillary incisors are very effective with good esthetic and functional outcomes.

Keywords: Missing Maxillary Incisor, Orthodontic, Space Closure, Implant, Outcomes

INTRODUCTION

The absence of upper incisors is a serious problem and often needs a challenging treatment. The treatment alternatives of missing upper incisors include orthodontic space closure, resin-bonded bridgework, osseointegrated implants, removable partial dentures, and autotransplantation of developing premolars¹⁻⁷. Although each of these methods is a viable treatment option, implant insertion and space closure are more popular among clinicians.

Implant substitution is considered an optimal solution considering the possibility of obtaining an ideal occlusion and the indisputable advantage of avoiding any damage to the adjacent teeth.^{1,8} Orthodontic space closure, by mesial movement of the adjacent teeth, also provides satisfactory esthetic and functional long-term results^{5,9,10}. One of the major advantages of space closure is that treatment is finished immediately after orthodontics and, in the case of adolescents, there is no necessity of waiting years until the 'end of growth' to replace the missing tooth. Moreover, the result is natural and all the changes in the long term will also be natural, unlike what could happen in the presence of a foreign body¹¹.

Recent evidence also suggests that good function, pleasing esthetics, and long-term stability of implant-

supported crowns in the anterior maxilla can be achieved with accurate three-dimensional, prosthodontic-driven implant placement and hard- and soft-tissue enhancement procedures.¹²⁻¹³ Implant placement in the esthetic zone risks the development of infraocclusion, however, because of natural dentofacial changes over time. Consequent problems with dental esthetics and periodontal health can be resolved only with complex interdisciplinary approaches such as corticotomy and distraction followed by crown replacement¹⁴.

Present study was conducted aimed to examine the esthetic, periodontal and functional outcomes of orthodontic space closure versus implant substitution in missing maxillary incisors patients.

MATERIALS AND METHODS

This retrospective study was conducted at Faryal Dental College Sheikhupura during from the period Feb 2016 to Dec 2016. A total 18 patients of both genders presents with missing maxillary incisor were included in this study. Patients ages were ranging from 15 to 24 years. Informed written consent was taken from patients and patients guardians/parents. Patients demographical detail including age, sex, residence and comorbidities were examined. Patients with uncontrolled diabetes, poor oral hygiene, smoking habits and patients with thin scalloped gingival biotype were excluded from the study. All the patients were equally divided into two groups i.e., Group A consist of 9

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patients and treated with space closure procedure, Group B contains 9 patients and treated with implant substitution. Esthetic outcomes were analyzed by using VAS scoring system, patient's satisfaction was recorded, periodontic and functional outcomes were recorded and compare the results by using students t test. Follow-up was taken at 5 years. Data was analyzed by SPSS 20.0. Mean SD was used. P-value <0.05 was significantly considered.

RESULTS

Out of 18 patients 13 (72.22%) patients were females (7 in Group A, 6 in Group B) with mean age of 18±2.15 years, 5(27.78%) patients were males (Group A 2, Group B 3) with mean age of 20±3.45 years. In Group B (Implant) there were 12 teeth inserted in which 7 were lateral and 5 central missing maxillary incisors. In Group A(OSC) there were 13 missing maxillary incisors, in which 7 central and 6 lateral teeth. The mean treatment time in Group A was 30±2 months and in Group B it was 20±2 months respectively (Table 1).

According to the tooth mobility, In Group A (OSC) increase mobility was found in 1 tooth and in Group B (Implant) it was found in 1 tooth. Probing depth >3mm was found in 10 teeth in Group B while in Group A, there were 2 teeth had probing depth >3mm. More than 1mm infraocclusion was found in 11 teeth in Group B while no one In Group B. The mean value Plaque index in Group A was 3.2±0.9 and in Group B it was 3.5±1.4 p-value >0.05. The mean temporomandibular joint dysfunction value in Group A was 1.70±1.52 and in Group B it was 1.33±1.14 respectively p-value 0.721. (Table 2)

No complications regarding pain, mouth opening, mouth closing, locking and tooth clenching and itching were recorded in both groups. According to the VAS scoring system, In Group A, 3 patients were highly satisfies. 5 patients were satisfied, 1 patient was little satisfied. In Group B, 2 patients were highly satisfied, 6 patients were satisfied and 1 patient was little satisfied. There were no significant difference observed regarding patient satisfaction between both groups p-value >0.05 (Table 3).

Table 1: Baseline findings of all the patients

Variable	Group A	Group B	P value
Mean age (years)	18±2.15	20±3.45	>0.05
Gender			
Male	2	3	>0.05
Female	7	6	>0.05
Incisors site			
Central	7	5	>0.05
Lateral	6	7	>0.05
Mean treatment time (months)	30±2	20±2	>0.05

Table 2: Periodontal and functional outcome between both groups at follow up

Variable	Group	Group B	P value
Tooth Mobilty	1	1	>0.05
Probing Depth	2	10	<0.05
Infraocclusion	0	11	<0.05
Mean Plaque Index	3.2±0.9	3.5±1.4	N>0.05
Mean Temporomendibular	1.70±1.52	1.33±1.14	>0.05

Table 3: Patients satisfaction according to VAS at final follow-up.

Variable	Group A	Group B	P value
Highly Satisfied	3	2	>0.05
Satisfied	5	6	>0.05
Little Satisfied	1	1	>0.05
Unsatisfied	0	0	>0.05

DISCUSSION

Evidence regarding which treatment option to choose for patients affected by maxillary lateral incisor agenesis must be considered incomplete. In one systematic review of the literature, the esthetic and periodontal outcome was seen as more favorable after OSC than after space opening and insertion of implant-borne crowns.¹⁵The present study was conducted to analyze the esthetic, periodontal and functional outcomes of orthodontic space closure procedure and implant procedure. Many of studies conducted aimed to examine the OSC and implant substitution in patients with missing maxillary incisors.¹⁶⁻¹⁷In our study total 18 patients were included in which 72.22% patients were females and 27.78% patients were males. These results showed similar to some other studies in which female patients were high in numbers as compared to males¹⁸⁻¹⁹.

In this study, patients were equally divided into two groups, 13 (72.22%) patients were females (7 in Group A, 6 in Group B) with mean age of 18±2.15 years, 5 (27.78%) patients were males (Group A 2, Group B 3) with mean age of 20±3.45 years. We found that In Group B (Implant) there were 12 teeth inserted in which 7 were lateral and 5 central missing maxillary incisors. In Group A (OSC) there were 13 missing maxillary incisors, in which 7 central and 6 lateral teeth. A study conducted by Abdulreza et al²⁰ showed similarity to our study baseline results in which Fourteen teeth including four lateral and ten central maxillary incisors were totally missing in the implant group. The average treatment time of these patients was 18±4 months. The orthodontic space closure (OSC) group consisted of ten patients (six males, four females, mean age 19±2.1 years at the completion of treatment). Seventeen teeth including seven lateral and ten central maxillary incisors were totally missing in the OSC group. The average treatment time of these patients was 29±7 months.

In present study we observed that in Group A (OSC) increase mobility was found in 1 tooth and in Group B (Implant) it was found in 1 tooth. Probing depth >3mm was found in 10 teeth in Group B while in Group A, there were 2 teeth had probing depth >3mm, the difference was statistically significant between both groups p-value 0.002. There were no significant difference found in both groups regarding tooth mobility p-value >0.05. We found that more than 1mm infraocclusion was found in 11 teeth in Group B while no one In Group B the difference was statistically significant. The mean value Plaque index in Group A was 3.2±0.9 and in Group B it was 3.5±1.4 p-value >0.05. The mean temporomandibular joint dysfunction value in Group A was 1.70±1.52 and in Group B it was 1.33±1.14 respectively p-value 0.721. These results showed similarity to the study in which there were no significant difference observed in between both procedure regarding tooth mobility, plaque index and TMD²¹⁻²².

In our study no complications regarding pain, mouth opening, mouth closing, locking and tooth clenching and itching were recorded in both groups at final follow-up. According to the VAS scoring system, In Group A, 3 patients were highly satisfied, 5 patients were satisfied, 1 patient was little satisfied. In Group B, 2 patients were highly satisfied, 6 patients were satisfied and 1 patient was little satisfied. There were no significant difference observed regarding patient satisfaction between both groups p-value >0.05. The satisfaction percentage in OSCC group was 97.9% and in Implant group it was 97.2%. There were no statistical significant difference regarding patient satisfaction was observed. Many of previous studies demonstrated that both procedures showed better outcomes with lesser complications²³⁻²⁴.

CONCLUSION

Implant and orthodontic space closure procedures in patients with missing maxillary incisors are very effective with good esthetic and functional outcomes. It is also concluded that we should have to do more work on large scale to examine long-term outcomes so that better treatment could be provided to patients with missing maxillary incisors.

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