

Prosthetic Replacement VS Space Closure for Missing Maxillary Laterals: Aesthetic Perceptions of Young Orthodontic Patients

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ABSTRACT

Objective: To find out the opinions of young orthodontic patients regarding aesthetic outcomes of prosthetic replacement of missing maxillary lateral incisors in comparison with the orthodontic space closure.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted at the Orthodontics department and Prosthodontics department of De Mont Dental College, Lahore, Pakistan, from June 2018 to June 2019.

Materials and Methods: After selection of 10 intraoral photographs (5 prosthetic replacement images, 5 orthodontic space closure images) by 4 experts (2 orthodontists and 2 prosthodontics), images were presented to 100 young orthodontic patients for judgments of aesthetic outcome. Initially patients were asked to evaluate the attractiveness of 10 randomly arranged isolated photographs. Following this, 5 prosthetic replacement images were paired with 5 orthodontic space closure images, and patients were asked to evaluate these paired photographs by asking them to choose which of the two photographs they preferred.

Results: The proportions of answers that reported the photographs attractive or very attractive were higher for orthodontic space closure photographs. The mean scores for orthodontic space closure photographs were high and difference between the mean scores for both sets of photographs was statistically significant. On most of the occasions while evaluating paired photographs, the patients reported a preference for the orthodontic space closure photographs.

Conclusion: Orthodontic space closure was reported to be more attractive than prosthetic replacement images by young orthodontic patients and most of the patients preferred orthodontic space closure images compared with prosthetic replacement for missing maxillary lateral incisors.

Key Words: Lateral incisors; Orthodontics; Prosthodontics.

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INTRODUCTION

Agensis of lateral incisors in the maxillary arch is a common orthodontic condition.^{1,2} Missing laterals affect smile esthetics and there are several factors that can affect dental smile aesthetics and it includes dental and facial midlines, incisal show, gingival show, buccal corridors, golden proportions, front to back progression, Size shape color of adjacent teeth, connectors and

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Contact points, embrasures, black triangles and many others.^{3,4}

There are usually two management options for missing lateral incisors i.e. orthodontic space closure and prosthetic replacement.^{5,6} Several factors should be considered while selecting the best plan such as esthetics, age, gender, growth, vertical growth, facial profile, smile line, size color and shape of adjacent teeth, socio-economic status, desire of patients, and treatment time.^{7,8}

The main advantage of orthodontic space closure option is avoidance of any prosthetic teeth in the upper anterior region but main disadvantage is need of reshaping of canine to mimic the lateral incisor and reshaping of premolar to mimic the canine.⁹ On the other hand, main advantage of prosthetic replacement is short treatment duration and avoidance of fixed orthodontic appliances while main disadvantage is prosthesis associated alveolar bone loss, loss of dental papilla and gingival discoloration.¹⁰

The discussion on best treatment of choice is still continues regarding function, esthetics and long term

maintenance.¹¹⁻¹⁴ one of the main goals of orthodontic treatment is improvement of esthetics, and establishment of normal occlusion. Studies are there regarding perceptions of orthodontists or dental professional for orthodontic space closure versus prosthetic replacement.¹¹⁻¹⁴ but very few studies have been conducted so far in Pakistan, to find out the opinions of orthodontic patients regarding aesthetic results of prosthetic replacement of missing maxillary lateral incisors in comparison with orthodontic space closure. By finding these judgments and perceptions, management of orthodontic patients with missing maxillary lateral can be done with more pleasing outcomes. Following this rationale the objective of present study was to find out the opinions of young orthodontic patients regarding aesthetic results of prosthetic replacement of missing maxillary lateral incisors in comparison with the orthodontic space closure.

MATERIALS AND METHODS

After taking informed consent and ethics approval, present cross-sectional study was conducted from June 2018 to June 2019. Inclusion criteria for the selected images were intraoral photographs having missing lateral incisor in the upper arch, treated by either prosthetic replacement or by orthodontic space closure, and good quality photographs. Inclusion criteria for the selected patients who were requested to rate the images were orthodontic patients, age range 18 to 25, both the genders, and having no prior knowledge of dentistry or dental esthetics.

The 4 experts (2 orthodontists and 2 prosthodontics), were initially requested to grade 20 standardized photographs (10 prosthetic replacement images, 10 orthodontic space closure images) in order of their attractiveness, and out of them 10 intraoral photographs (5 prosthetic replacement images, 5 orthodontic space closure images) were selected and included in the present study on basis of highest attractiveness scores.¹⁵ One repeat photograph each of space closing and of prosthetic replacement was included to assess intra-examiner reliability. Later, 10 intraoral photographs (5 prosthetic replacement images, 5 orthodontic space closure images) were paired with each other to judge the preferences.¹⁵ One repeat paired photograph was again included to assess the intra-examiner reliability and reproducibility.

Total 100 young orthodontic patients were included in the present study to rate the attractiveness of selected images. Initially patients were asked to evaluate the attractiveness of 10 randomly arranged isolated photographs using a 5-point Likert scale. 5-point Likert scale consisted of rating the images from most attractive (score 5) to least attractive (score 0). Following this, patients were also asked to evaluate the

paired photographs by asking them to select which of the two photographs they preferred.

The score of patients for each of the 5 prosthetic replacement photographs were summed up and divided by 5 to get the mean score of attractiveness similarly score of patients for each of the 5 orthodontic space closure photographs were summed up and divided by 5 to get the mean score of attractiveness. The neutral responses were excluded. The data distribution was normal thus paired t test was used for comparing the difference in attractiveness score between the two sets of photographs. The descriptive statistics was used for reporting the preferences for paired images. Data analysis was done using S.P.S.S version 20.0.

RESULTS

Response rate was 100%. Total 100 patients participated in the study as per inclusion criteria. Out of 100 patients (mean age 22.0±2.45), 56 were female (mean age 22.2±2.34) and 44 were male (mean age 22.4±2.65)

Table No. 1: Attractiveness ratings (N 100)

	Orthodontic space closure (%)	Prosthetic replacement (%)
Very unattractive	2	6
Unattractive	17	25
Neither	30	21
Attractive	39	29
Very Attractive	12	9

The frequency of attractiveness answers are presented in Table I. The proportions of answers that reported the photographs attractive or very attractive were 51% for orthodontic space closure photographs and 38% for prosthetic space closure. In comparison proportions of answers that reported the photographs unattractive or very unattractive were 19% for orthodontic space closure photographs and 31% for prosthetic replacement. The mean attractiveness score for both the sets of photographs are shown in Table II. The mean scores for orthodontic space closure photographs were higher and difference between the mean scores for both sets of photographs was statistically significant. Thus photographs of orthodontic space closure were judged to be more aesthetic as compared to the photographs of prosthetic replacement for missing maxillary lateral incisors by orthodontic patients.

On 60% of occasions while accessing paired photographs, the patients reported a preference for the orthodontic space closure photographs and percentage remain same even on second assessment. Thus photographs of orthodontic space closure were preferred as compared to the photographs of prosthetic replacement for missing maxillary lateral incisors by Orthodontic patients in 5 out of 5 paired photographs. The gender differences were insignificant.

Table No.2: Mean attractiveness (N 100) (Paired-t test)

	Mean score	SD	95% CI	Difference	95% CI	P value
Orthodontic space closure	3.53	0.47	3.36-3.74	0.19	0.17-0.22	0.000
Prosthetic replacement	2.97	0.62	2.76-3.15			

DISCUSSION

The discussion on best treatment of choice for missing maxillary laterals is still continues.¹¹⁻¹⁴ the objective of the present study was to find out the opinion of young orthodontic patients regarding aesthetic results. Intraoral good quality photographs having missing lateral incisor in the upper arch treated by either prosthetic replacement or by orthodontic space closure were selected and orthodontic patients having no prior knowledge of dentistry or dental esthetics, were asked to rate them. This methodology is in agreement with the previous study by Qadri et al. where post-treatment images were rated,¹⁵ however, in the present study orthodontic patients were asked to rate the images instead of laypersons. Methodology is in contrast with the other studies where morphed photographs were used for rating the attractiveness. The use of real post-treatment images in the present study allowed better rating of attractiveness.

In the present study 4 experts (2 orthodontists and 2 prosthodontics), were requested to grade 20 standardized photographs (10 prosthetic replacement images, 10 orthodontic space closure images) in order of their attractiveness, and out of them, 10 images were selected. Initially, these 10 intraoral photographs (5 prosthetic replacement images, 5 orthodontic space closure images) were presented to the patients, one by one for rating the attractiveness using a 5-point Likert scale and later, presented in pairs, to judge the preferences. This is again in accordance with the method adopted by Qadri et al.¹⁵ However in the present study, prosthodontics were also added in expert panel while image selection and orthodontic patients were asked to rate the images instead of laypersons. The rating of photographs by orthodontic patients will allow the orthodontists and prosthodontics to select the best aesthetic option keeping in mind the preferences of orthodontic patients.

Results of the present study reported that the proportions of answers that reported the photographs attractive were higher for orthodontic space closure photographs while proportions of answers that reported the photographs unattractive were lower for the orthodontic space closure photographs. This is in accordance with the studies where orthodontic space closure option was considered to be more attractive.¹⁸⁻²⁰ However these results are in contrast with the findings of other studies where prosthetic replacement option was considered to be more attractive.²¹⁻²³ The mean

attractiveness scores for orthodontic space closure photographs were higher in the present studies as reported by orthodontic patients. The different results in the present study can be linked to the fact that orthodontic patients presents most of the time with desire of achieving results in non-prosthetic way and with higher aesthetics.

Results of the present study showed that on most of the occasions while analyzing paired photographs, the patients reported a preference for the orthodontic space closure photographs and photographs of orthodontic space closure were preferred as compared to the photographs of prosthetic replacement for missing maxillary lateral incisors by orthodontic patients. This is in accordance with the studies where orthodontic space closure option was preferred.¹⁶⁻²⁰ however these results are in contrast with the findings of other studies where prosthetic replacement option was preferred or no differences were found between the two treatment options.²¹⁻²⁴ the preference for orthodontic space closure photographs was higher in the present studies as reported by orthodontic patients. The different results in the present study can be linked to the fact that orthodontic patients comes mostly with desire of achieving higher smile aesthetics.

There are few limitations of the present study that includes lack of standardization of photographs for other variables of smile, quality of printed photographs used, and small sample size. However within these limitations, findings showed that orthodontic space closure was reported to be more attractive than prosthetic replacement images by orthodontic patients and most of them preferred orthodontic space closure images compared with prosthetic replacement of missing maxillary lateral incisors. Further large-scale studies are suggested to find out the opinions of orthodontic patients regarding aesthetic results of prosthetic replacement of missing maxillary lateral incisors in comparison with orthodontic space closure.

CONCLUSION

Orthodontic space closure was reported to be more attractive than prosthetic replacement images by young orthodontic patients and most of the patients preferred orthodontic space closure images compared with prosthetic replacement for missing maxillary lateral incisors.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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