Changes in quality of life during orthodontic correction of midline diastema

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ABSTRACT

Aim: The aim of our study is to evaluate the changes in quality of life among patients treated for maxillary midline diastema by fixed orthodontic appliances. **Materials and Methods:** This prospective longitudinal study consists of 40 patients of age group 20-30 years who underwent orthodontic correction of midline diastema. The patient's quality of life is evaluated using 22-item orthognathic quality of life questionnaire. They were evaluated prior to appliance therapy, 1 month after appliance fixation, 4th and 8th month during treatment and 1 month after treatment. **Results:** Our results showed moderate improvement in quality of life as early as at the start of orthodontic therapy. The response was equal among both sexes. The quality of life experience improved only mildly during the orthodontic treatment. However, the condition specific quality of life at the end of appliance therapy improved by nearly 50% when compared with prior to treatment. **Conclusion:** Our study has concluded that the correction of midline diastema has improved the quality of life among young people by nearly 50%. The acceptance to orthodontic therapy and patient perception toward fixed appliance has demonstrated remarkable improvement in quality of life during the treatment. Our study calls for additional patient counseling and motivation during the course of fixed appliance therapy.

KEY WORDS: Esthetics, fixed appliance, midline diastema, orthodontics, quality of life

Midline diastema refers to space or gap between two central incisors. Maxillary midline diastema is more common than mandibular midline diastema. There are wide variations of perception of midline diastema among different cultures. The teeth on either side of a space are called "dents du bonheur" or "lucky teeth" in France. Diastema in dentistry has been defined as a space >0.5 mm between the proximal surfaces of adjacent teeth. True midline diastema[1] was defined as one without periodontal/periapical involvement and with the presence of all anterior teeth in the arch. The space can be a normal growth characteristic[2] during the primary and mixed dentition and generally is closed by the time the maxillary canines erupt.

Maxillary midline diastemas[3] are a common esthetic problem that dentists must treat. Various factors have been suggested as etiology for midline diastema, of which high labial frenum attachment is considered as the most common one. Other etiologies associated with diastemas[2] include oral habits, muscular imbalances, physical impediments, abnormal maxillary arch structure, and various dental anomalies. The etiology was broadly grouped by Huang and Creath,[2] as: (1) Dentoalveolar diastema associated with normal growth and development, (2) pernicious habits, (3) muscular imbalances in the oral region, (4) physical impediment, (5) abnormal maxillary arch structure, (6) missing teeth, dental anomalies, dental/jaw size discrepancies, and/or excessive overbite and overjet. Midline diastema due to normal growth and development and habits are corrected as early during mixed dentition period by removable appliances; however after age of 18, they are explored for options including fixed orthodontic therapy and restorative dentistry. The higher acceptance of orthodontic treatment over restorative dentistry has been due to motivation and willingness of patient for correction of underlying etiology such as pernicious habits. Presence of high frenum attachment, mesiodens, and underlying pathology requires surgical intervention. The need for treatment[4] is mainly attributed to esthetic and psychological reasons, rather than functional ones.

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Patient's perceptions and expectations regarding their appearance[5] play a significant role in treatment planning. Kumar *et al*. study[5] has shown that threshold for unattractiveness for midline diastema was found to be less in orthodontists and dentists compared with laypersons. Facial esthetic perception differs among individuals and is often influenced by their own experiences and society and culture. What is unacceptable to professionals may be acceptable to layman; hence, quality of life assessment plays a vital role in motivation, treatment planning and overall satisfaction of any treatment modality including orthodontic appliances.

In our study, consisting of midline diastema correction, most of the patients had surgical correction including removal of mesiodens and frenectomy. Hence, in order to achieve better quality of life assessment we used orthognathic quality of life questionnaire (OQLQ). Feu[6] study has validated the specificity and sensitivity of OQLQ. They have stressed the great importance of using OQLQ for their sensitivity in capturing impacts[6] related to the individuals' condition and their smaller interaction with confounding factors, such as patients' general health.

Materials and Methods

Our study is a prospective study consisting of 40 patients who visited and treated at three private clinics in Namakkal district of Tamil Nadu, South India. They were diagnosed of true midline diastema. The patients who had posterior occlusal discrepancy and or other malocclusions were not included in the study. The age groups selected were 20-30 years and both sexes were equally included in the study. The patients who had previous orthodontic therapy were excluded in the study, as previous experiences may change the variable of our study. The patients who underwent surgical treatment of mesiodens and high frenum attachment prior to visit were included in our study. Some of our study patients were also motivated for surgical removal of the underlying mesiodens and frenectomy if required. All patients were motivated and treated using same fixed appliances for a minimum of 10 months by the same orthodontist. The treatment duration of longer than 12 months and patients keeping irregular appointments were excluded in this study. The patients were informed about their treatment plan and our study. Approval for this study was given by the Regional Research Ethics Committee. Patients willing to participate in the study were included and their midline space was recorded and given 22-item OQLQ to be filled. The questionnaire consists of 22 questions pertaining to quality of life experiences. The 22 questions were based on four domains attributing to facial esthetics (5 questions), oral function (5 questions), awareness of dentofacial esthetics (4 questions), and social aspects of dentofacial deformity (8 questions). They are asked to give answers rated on a four-point scale, with score ranging from 0 to 3. Score 0 is given for answers "never bothers or not concerned at all," score 1 for answering "bothers you a little or sometimes concerned," and score 2 for answers "bothers you a lot or often concerned" and score 3 for answer "always concerned or bothers always." Higher score indicates lower quality of life and vice versa. All the patients were asked to fill the questionnaire on the day of appliance fixation and 1 month after appliance fixation, 4th and 8th month during the treatment. They were also asked to fill the questionnaire 1 month after fixed appliance therapy. The scores were compared and analyzed.

Table 1: 22-item orthognathic questionnaire score summary

Scores	Prior to treatment (baseline score)	One month after appliance fixation	4th months after appliance fixation	8th months after appliance fixation	After removal of appliance (final score)
Minimum	20	14	14	10	5
Maximum	46	42	39	42	36
Mean/average	32.85	29.01	27.62	27.51	15.50

Results

Our study included 40 patients of age group 20-30 years with a mean age of 23 years. The average mean score for 22-item OQLQ [Table 1] prior to the orthodontic therapy was 32.8. The highest score was 46, while lowest was 20. One month after fixation of appliance the highest score dropped to 42, while least was 14 as shown in Table 1. The mean score has also dropped from 32.85 to 29. However, the average mean score remained near constant at 27-28 during the 4th and 8th month of treatment. There was a huge improvement in quality of life noted after the treatment. The minimum score was five, while the maximum was 36. The average score was 15.50.

Discussion

Patient perception of esthetic plays a vital role in their quality of life. Facial esthetic is regarded as an important factor determining their social interactions and quality of life. Young adolescents quality of life are more influenced by facial esthetics. Various studies have shown that midline diastema of <1 mm is acceptable to patients. In our study, most of patients seeking the treatment had a mean average of 1.23 mm spacing. Huang and Creath, stated that effective diastema treatment requires correct diagnosis of its etiology[2] includes medical and dental histories, radiographic and clinical examinations, and possibly tooth-size evaluations. We motivated the patient for surgical corrections of underlying etiology prior to therapy. While comparing the baseline score (prior to treatment) to the end result score (after treatment) there is a huge improvement in quality of life. Only one patient had provided same basal and the final score, stating the treatment and correction of midline diastema had no effect on his quality of life.

Our study has brought out mild decrease in quality of life experience during 4th and 8 month of fixed therapy; hence, we put forth the option of motivation and patient counseling during this period of orthodontic treatment.

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