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Psychosocial impacts of fixed orthodontic treatment in Lahore, Pakistan

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Abstract

Background: The aim of this study is to assess psychosocial impacts on oral health-related quality of life between individuals currently undergoing orthodontic treatment and those who have completed treatment. **Methods**: A total of 135 individuals were selected from the Orthodontic Department at Rashid Latif Dental Hospital, Lahore, Pakistan. Current and previous orthodontic treatments were recorded. A questionnaire on oral impacts on daily performance was used to assess functional, psychological, and social limitations. **Results**: The most prevalent psychosocial impact was difficulty in smiling/laughing (26.6%). Logistic regression analysis showed that individuals currently undergoing orthodontic treatment are 2.9 times more likely to experience difficulty in eating compared with individuals with completed orthodontic treatments, and the difference between groups was significant ($p < 0.001$). Furthermore, difficulty speaking was 6.7 times more likely to occur in individuals currently undergoing orthodontic treatment than in individuals with completed orthodontic treatment; the difference between groups was also significant. **Conclusion**: Besides the normal and expected difficulties in eating, cleaning teeth, and speaking (i.e., functional impacts), individuals undergoing orthodontic treatment are prone to experience severe difficulties in smiling and going out. These issues are related to the psychosocial impacts and limitations of orthodontic treatment and demonstrate that the latter does not grant patients a higher status in society if they refrain from social settings and have difficulty smiling.

Keywords: fixed appliance orthodontic, oral health, psychosocial impacts, quality of life

Introduction

Individuals often pursue orthodontic treatment not to address dental irregularities but to improve aesthetics. Aesthetics plays an important role in facial appearance because it influences personal attractiveness and self-esteem.[1] Orthodontic treatment is also responsible for enhancements in psychosocial well-being.[2] Many patients seek orthodontic treatment to overcorrect their existing place in society, and a few patients undergo treatment believing that their deformity is a barrier to social situations.[3] Although orthodontic treatment is necessary and beneficial in most malocclusion cases, many patients hesitate to obtain the appropriate orthodontic treatments because of the high cost of fixed orthodontic appliances.[4] Government facilities provide orthodontic treatment but are usually hindered by long waiting lists; moreover, priority treatment is often given to patients with severe malocclusion.[5] Therefore, orthodontic treatment is considered an elective luxury or a symbol of financial success on account of its high cost.[6] The high cost of braces confers a certain social status among teenagers.[5] Given the prestige obtained from orthodontic treatment, dental jewelry has been introduced, and fake braces may now be installed at inexpensive rates.[6] Past studies showed that individuals with braces are considered more confident than those without. Teenagers are the usual customers for fixation of fake braces.[7] The dot-com boom has also made the availability of fashion braces easy and convenient.[8]

Optimum oral health is an essential aspect of the overall health of an individual. Poor oral health can significantly lower one's quality of life by negatively affecting their functions, such as eating and speaking, and social life.[9] Subjective measures have been acknowledged to be an effective indicator of service needs and intervention outcomes in research and practice.[10] Oral health-related quality of life (OHRQoL) refers to the extent to which oral disorders affect normal oral functioning and psychosocial well-being.[11] This subjective measure allow healthcare professionals to evaluate the efficacy of treatment provided while addressing requirements from the patients' perspective.[12] Therefore, assessing a patient's OHRQoL during and after orthodontic treatment is necessary.[13]

Several instruments are currently used to assess subjective oral health issues.[14] These tools help improve the understanding on the influence of oral health and clinical interventions on patients' well-being.[15] Several variables, such as socioeconomic and demographic factors, dental care use, and clinical oral health status, may affect the subjective perceptions of OHRQoL.[14] The impact of OHRQoL on an individual's well-being has recently gained attention because oral disorders, including dental caries, dental trauma and fluorosis, are highly likely to have a negative effect on the physical, psychological, and social functions of patients.[16] Patients are more concerned about aesthetics and dental problems that are visible compared with dental problems that are not as visible. Because non-visible dental problems predominantly affect oral health,[17] obtaining information on what patients say and how they feel about their oral health status is necessary to create suitable health strategies and provide adequate treatment.[18] According to previous case–control studies, children with fixed orthodontic appliances show significantly poorer OHRQoL compared with patients using removable appliances. Orthodontic treatment leads to poorer oral health and limited functional activities. However, orthodontics also exerts a positive impact on the psychological and emotional well-being of patients.[19]

The increased availability of fake braces and uptake of orthodontic treatment beyond functional limitations reveal that the expectations of patients differ from the perceptions of an orthodontist.[17] Assessments of patients' perception of orthodontic treatment have been reported throughout the world. Research in Pakistan showed a strong association between perceived orthodontic treatment need and the psychosocial well-being of patients.[20] However, such studies did not include specific psychosocial impacts during treatment. Thus, the objective of the present study is to assess the psychosocial impacts (i.e., difficulty smiling/laughing/enjoying contact with others, poor emotional stability) of patients undergoing fixed orthodontic treatment and those who have completed fixed orthodontic treatment in Lahore, Pakistan.

Methods

This cross-sectional research was conducted at the Orthodontics Department of Rashid Latif Dental Hospital, Lahore, Pakistan, and completed over a period of 5 months from November 2019 to March 2020. Ethical permission was granted by the Rashid Latif Dental College Research Department. Verbal consent was obtained from each participant prior to the questionnaire survey. Participants were informed about the benefits of the study, confirmed their voluntary participation, and ensured of data protection.

The sample size was calculated using the data of a previous study examining the association between orthodontic treatment and quality of life.[21] This previous study found that a sample size of 42 subjects is needed to establish a significant change in impacts, with an 80% probability power at the 5% significance level. Thus, a minimum sample size of 84 participants was selected for the present work. The final sample size was increased to allow for losses, such as non-response, prestige, or recall bias.

The inclusion criteria comprised all patients currently undergoing orthodontic treatment and those that had completed orthodontic treatment. Only participants with orthodontic appliances and traditional metallic brackets were included in this study as none of the participants had lingual or ceramic brackets. The completed orthodontic treatment group included participants who had undergone bracket or appliance debonding at least 1 year beforehand. Participants who did not provide consent were excluded from this study. Participants who had only recently undergone orthodontic appliance debonding were also excluded because they may still be experiencing the effects of debonding and unable to differentiate between initial and regular impacts. Two examiners were selected to distribute the questionnaires to all eligible individuals visiting the department. As this research is a self-administered questionnaire-based study and no clinical intervention was involved, no training or calibration was required.

The respondents were asked about the oral impacts of orthodontic treatment on their daily life within the last 6 months. The oral impacts on daily performance (OIDP) questionnaire was used; this questionnaire is based on Locker's models of the World Health Organization's classification of impairments, disabilities, and handicaps.[22] The OIDP is a self-reported measurement tool that reports the impact of oral conditions on the performance of everyday activities.[22] Both the English and Urdu versions of the OIDP were made available to the participants. Responses were coded from 0 (no effect) to 5 (severe effect) and dichotomized by a strict cut-off point (individual impact score ≥ 3) to determine the prevalence and impact of each oral condition. As this research seeks to observe individual impacts, total OIDP score calculation was not required.

Other demographic variables, including age and gender, were collected. Age was divided into three groups, i.e., 12 – 15, 16 – 24, and 24 – 38 years, corresponding to young students, older students, and employed personnel, respectively. Education was classified into four groups: Primary, Secondary, University, and No Education. Occupations were classified into four groups: Manager, Employed, Manual Labor, and Unemployed.

The collected data were entered into the STATA-14 statistical software package (STATA Corp., College Station, Texas, USA) for analysis via the chi-squared test and logistic regression analysis. A 95% significance level ($p < 0.05$) was selected to indicate statistical significance.

Results

The final sample size consisted of 135 participants and included more females (69.6%) than males. The mean age of the participants was 21.7 years (95% CI 20.7–22.7). Approximately 60% of the sample consisted of older students (age, 16–24 years). Most of the patients who received orthodontic treatment (currently or previously) were educated. Approximately 4.4% of the sample had not received any form of formal education, and students made up 85% of the sample. Moreover, 67% of the sample was currently undergoing orthodontic treatment while the rest (33%) had completed orthodontic treatment (Table 1).

Participants undergoing orthodontic treatment reported the highest prevalence of difficulty eating and cleaning teeth, followed by difficulty smiling/laughing and speaking (Table 2). Emotional impacts were quite evident among patients with ongoing orthodontic treatment. A marked difference in impacts was noted between individuals who had completed orthodontic treatment and those currently undergoing treatment, and the increased prevalence of difficulty eating and cleaning teeth was noted in the latter (Table 3). Marked increases in difficulty speaking, going out, and smiling/laughing were also reported, but the impact of these conditions on the OHRQoL of patients who had completed treatment was much less than that on the OHRQoL of patients currently undergoing treatment.

Besides difficulty eating and cleaning teeth, the chi-squared test also showed significant results for difficulty speaking, going out, and smiling/laughing. After adjusting for age, gender, education, and occupation, logistic regression analysis showed that individuals currently undergoing orthodontic treatment are 2.9 times more likely to experience difficulty eating than individuals who had completed their orthodontic treatment. The difference between groups was significant ($p < 0.001$). Individuals currently undergoing orthodontic treatment were also 6.7 times more likely to experience difficulty speaking than individuals who had completed their orthodontic treatment; the difference between groups was also significant. Similar higher impacts on the former group compared with the latter group were observed for difficulty cleaning teeth, going out, and smiling/laughing (Table 4). Difficulty eating, speaking, and cleaning teeth cover the functional impacts of orthodontic treatment. Difficulty going out covers the social limitations expressed by OIDP. Difficulty smiling/laughing is an extension of the psychological impacts of treatment.

Table 1. Sociodemographic characteristics of the study sample (N = 135)

Variables	N (%)
Sex	
Male	41 (30.3)
Female	94 (69.6)
Age	
12–15	19 (14.1)
16–24	81 (60.0)
25–38	35 (25.9)
Education level	
Primary	10 (7.4)
Secondary	57 (42.2)
University	62 (45.9)
No Education	6 (4.4)
Occupation	
Manager	1 (0.74)
Employed	16 (12.6)
Manual Labour	3 (2.2)
Unemployed	115 (85.1)
Orthodontic Treatment	
Current	90 (67.0)
Previous	44 (33.0)

Table 2. Prevalence and mean OIDP scores reported for severity of impact ≥ 3 (N = 135)

Items	OIDP ≥3
Difficulty eating	41.4%
Difficulty speaking	17.7%
Difficulty cleaning teeth	36.3%
Difficulty going out	14.8%
Difficulty relaxing	9.6%
Difficulty carrying out work	2.9%
Difficulty smiling/laughing	26.6%
Difficulty with emotional stability	8.1%
Difficulty enjoying contact with others	13.3%
Overall Mean Score (95% CI)	21.2 (95% CI 18.4–24.0)

Table 3. Comparison of the prevalence of each impact (≥3) and the results of the chi-squared test with p-values (N = 135)

Items	Without braces	With braces	*p*
Difficulty eating	25.0%	50.0%	0.006*
Difficulty speaking	4.5%	24.4%	0.005*
Difficulty cleaning teeth	9.0%	50.0%	< 0.001*
Difficulty going out	4.5%	20.0%	0.010*
Difficulty relaxing	11.3%	7.7%	0.490
Difficulty carrying out work	4.5%	2.2%	0.400
Difficulty smiling/laughing	13.6%	33.3%	0.010*
Difficulty with emotional stability	11.3%	6.6%	0.350
Difficulty enjoying contact with others	6.8%	16.6%	0.110

*$p < 0.05$

Table 4. Logistic regression analysis of the association between each impact and orthodontic treatment after adjusting for age, gender, education, and occupation: Odds ratio, 95% confidence interval, and *p*-value (N = 135)

Impacts	Impact ≥3		
	Odds Ratio	*p*	95% CI
Functional Impacts			
Difficulty eating	2.90	0.007*	1.35–6.66
Difficulty speaking	6.70	0.010*	1.51–30.30
Difficulty cleaning teeth	10.0	< 0.001*	3.30–30.20
Social Impacts			
Difficulty going out	5.20	0.030*	1.16–23.70
Difficulty relaxing	0.65	0.490	0.19–2.20
Difficulty carrying out work	0.47	0.460	0.06–3.50
Psychological Impacts			
Difficulty smiling/laughing	3.16	0.010*	1.20–8.32
Difficulty with emotional stability	0.50	0.350	0.16–1.93
Difficulty enjoying contact with others	2.73	0.120	0.74–9.99

*$p < 0.05$

Discussion

This study showed a definite increase in psychosocial impacts, besides the expected functional limitations, among patients undergoing orthodontic treatment. Regardless of the initial reason behind orthodontic treatment, patients undergoing treatment often encounter problems in the social setting. For example, patients undergoing treatment may not feel confident about smiling and going out to accomplish their regular functions and duties. Because dental aesthetics plays a key role in building self-confidence, the alignment of malocclusions is necessary. Many individuals seek orthodontic treatment to correct aesthetic impairments caused by malocclusion rather than treat anatomic irregularities or prevent damage to tissues within the oral cavity.[23] OHRQoL is an important component of the physical, social, and psychologic functions of well-being.[14] The increase in demand for orthodontic treatment in adults is justified, especially given the growing application of modern preventive dentistry, the appeal of aesthetics in society, greater longevity, increased access to information, technological advances in orthodontics, and psychosocial variations.[24]

Females are more concerned with beauty than males and, thus, have a better perception of treatment needs and aesthetic results.[25] An earlier study demonstrated that orthodontic treatment is more common in females than in males.[26] Similar to this previous report, the present study found that 69.6% of the females had undergone orthodontic treatment whereas only 33.3% of the males had visited the orthodontic department for teeth alignment. The odds ratio between genders supports the interest of women in orthodontic treatment because females are more interested in dental aesthetics and facial structures than males.

In the United Kingdom's General Dental Services, 97% of the patients experienced orthodontic treatment between the ages of 5 and 15 years.[26] However, according to the data collected in this study, adolescents are more worried and concerned about their dental appearance than younger children and often visit dental clinics to acquire treatment. This concern may be attributed to their aesthetic self-evaluation or societal pressure. This study found that 60% of the participants aged 16–24 years visited the dental clinic for orthodontic treatment.

Previous studies demonstrated that less-educated or working-class patients are rarely motivated to treat malocclusions.[27] The present study found that only 4.4% of the patients visiting the Orthodontics Department had no formal education. All other patients had attended some educational program. The present study was conducted at a teaching hospital, which means many of the patients are likely to be students. The drastic difference in the motivations of educated and non-educated patients in seeking orthodontic treatment may be attributed to the fact that the former are more aware of the long-term consequences of irregular teeth than the latter. Educated individuals may also face more societal pressure to maintain a pleasing appearance.[28] The perception of malocclusions differs between employed and unemployed patients, with the former showing more concern and care for their dental treatment than the latter.[28] The perception of facial appearance can affect an individual's health, social behavior, and happiness, and those with well-balanced smiles are often considered to be more intelligent and have a greater chance of being employed than those without.[29]

Developments in orthodontic treatment have resulted in several innovations, many of which are grounded on the well-being of patients and, thus, exert minimal damage to the surrounding oral tissues and help maintain patients' OHRQoL.[30] Patients are prone to develop temporomandibular joint dysfunction, oral lesions, and gingivitis during treatment to correct malaligned teeth. Fewer oral health problems are observed when orthodontic treatment is completed.[31] The impacts of these complications on OHRQoL can be minimized by prioritizing oral hygiene. In this study, 67% of the patients were currently undergoing orthodontic treatment while the rest (33%) had previously completed orthodontic treatment. Thus, the latter had better oral health compared with the former. Another study suggested an extreme drop in OHRQoL in the early treatment phase; over the course of treatment, however, the harmful effects of treatment on OHRQoL were reduced.[21] Oral impacts after orthodontic treatment are quite clear and may affect patients' comfort level. A previous study revealed that orthodontic treatment significantly affects OHRQoL.[17] The present study also found that ongoing orthodontic treatment causes difficulties in eating, cleaning, and smiling. The installation of orthodontic brackets and wires, which hinder the maintenance of adequate oral health and result in discomfort, is believed to contribute to these effects. The present study found that patients undergoing orthodontic treating are 2.9 times more likely to experience oral health impacts than patients who had completed treatment; the difference between groups was significant. Speaking was also greatly affected by orthodontic treatment (6.7 times). The responses suggested that aesthetic improvement generates a significant increase in OHRQoL in patients.[23] Another systematic review illustrated a modest association between malocclusion, orthodontic treatment need, and OHRQoL.[32] Maintaining good oral hygiene even during orthodontic treatment is necessary to minimize these impacts. Difficulties in going out and smiling/laughing showed significantly high odds ratios (5.2 and 3.16, respectively) between patients undergoing orthodontic treatment and those who had completed their treatment. The perceptions of luxury, higher status, and prestige granted to orthodontic treatment clients are invalidated if the patient is unwilling to socialize.

A limitation of this study is that it does not evaluate causal relationships. Other limitations include individual variations in self-reported OHRQoL, subjects' recall bias, and the very harsh dichotomization of OIDP impacts (≥3).

Further research is required to compare the psychosocial impacts of orthodontic treatment on the same individual before and after treatment to obtain a better perspective for needs assessment and determine the thought process behind the acceptance of orthodontic treatment.

Conclusion

Orthodontic treatment, which usually includes brackets, wires, and elastics, causes functional difficulties in eating and speaking. Besides functional limitations, an increase in psychosocial impacts may be observed among patients undergoing orthodontic treatment. The observed psychosocial impacts show that orthodontic treatment does not actually boost one's self-esteem during treatment. In addition, undergoing orthodontic treatment does not grant patients with a higher status in society if they prefer not to be sociable and have difficulty smiling.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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