

## Assessment of Self-Reported Periodontal Aesthetic, Quality of Life and Dental Anxiety after Free Gingival Graft Procedures

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### ABSTRACT

**Introduction:** Gingival recessions, which are very common mucogingival deformities, affect the function as well as the esthetic appearance of the patients, especially when localized or common in the anterior teeth.

**Aims:** The aim of this study was to investigate self-reported periodontal aesthetics, quality of life and anxiety after the free gingival graft.

**Materials and Methods:** Thirty-nine subjects with gingival recession were treated surgically and followed up for 6 months. Vertical recession and keratinized tissue width were assessed before and after treatment. Patients were asked to answer the Oral Health Impact Profile (OHIP) -14, the Dental Anxiety Scale (DAS), and the Periodontal Aesthetic Perception Scale (PAPS) at the baseline, at 1 and 6 months.

**Results:** Average keratinized tissue width significantly increased from baseline to 1 and 6 months ( $p<0.05$ ). At the same time, vertical recession significantly decreased from baseline to 1 and 6 months ( $p<0.05$ ). In addition, PAPS scores and "Psychological effect and aesthetic effect" subscales, OHIP-14 and DAS scores showed a statistically significant difference between at baseline to 6 months ( $p<0.05$ ).

**Conclusion:** Free gingival graft operation can improve patients' self-reported periodontal aesthetic and quality of life, as well as reduce patients' dental anxiety.

**Key words:** Anxiety, Esthetic, Free gingival graft, PAPS, Quality of life

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### INTRODUCTION

The gingival recession is described as an apical shift of the gingival tissue margin with reference to the cemento-enamel junction and teeth with thin gingival phenotypes are more prone to recession [1]. Treatment of gingival recession is generally applied for root sensitivity, cervical abrasion, and esthetic concerns in patients [2]. Meta-analyses and systematic reviews have appraised the influence of surgical procedures for the treatment of gingival recessions. Different surgical techniques used for the gingival recession were evaluated by various reproducible and objective parameters but mostly disregarded patient's perceptions [2]. There is limited

periodontal literature on patients' aesthetic perception in professional practice [3-5]. The European Federation of Periodontology has underlined the requirement for clinical essays with patient-centered outcomes as well as objective clinical outcomes. Because patients' esthetic perceptions can be different from the professional decision. Patients take care of color harmony and contour of and, the appearance of gingiva rather than on the amount of root coverage accomplished. It creates a magnificent smile with dental and gingival factors, position, size, shape, and color [6]. However, the evaluation of patients' dentofacial appearance and aesthetics is challenging because aesthetics perception is neither measurable nor observable and several factors also influence patient's perceptions.

Patients' self-reported dentofacial esthetics have happened a popular topic. Wolfart et al. noticed that general well-being with self-reported correlated with the dental appearance of prosthodontic patients [7]. Good dentofacial aesthetics is suggested to have a useful effect on appearance-related self-confidence and oral health in individuals [8]. Furthermore, the gingival recessions

in the anterior teeth which are an important esthetic problem, causes a non-esthetic appearance when the patient smiles. However, there is only one study about a self-reporting scale that measures the direct aspects of gingival esthetics in patients with gingival problems [9].

Dental anxiety is a general status that prohibits an important part of the community from visiting the dentist and taking dental therapy. Researchers represent that ~4–7% of adults suffer from dental anxiety and can refrain from varied dental care or dental method and thus there were often disrupted the oral health of patients [10,11]. Berggren recommended that define how dental anxiety preserved and concerned about health over time [12]. In this model, dental anxiety may cause evasion of dental care, which reasons a decrease in oral health that may get about feelings of inferiority and shame. These unfavorable feelings about the person's inability to sustain oral health and dental care further increase the initial anxiety and avoidance attitude and further reduce oral health. Studies have also shown that poor oral health in general is associated with deteriorated quality of life [13,14].

Studies have been conducted with dental anxiety in patients with gingival recession or the effects of the gingival recession on oral health-related quality of life (OHRQoL) [15,16]. However, it is also important to evaluate the dentofacial aesthetics reported by the patients themselves. The purpose of this study is to investigate self-reported periodontal aesthetics, quality of life and anxiety in patients with periodontal aesthetic problems after the free gingival graft.

## MATERIALS AND METHODS

Thirty-nine adult patients were included (aged between 18 and 45 years old) and planned to get free gingival graft operation to treat a lack of keratinized tissue width in the mandibular central incisor region after oral hygiene instructions. The study is based on the assessment of patient-centered outcomes, which is could utility both patients and periodontists. Subjects were recruited from among the patients seeking periodontal therapy in the Department of Periodontology of the Faculty of Dentistry. The Ethics Committee (2019/06) approved the study protocol in accordance with the Helsinki Declaration. Written informed consent was obtained from all participants. The study was approved by the ethical committee was carried out in accordance with the tenets of the Declaration of Helsinki.

To minimize confounders such as illnesses and aging on quality of life, perception of esthetic and dental anxiety, we evaluated young to middle-aged subjects without co-morbid psychiatric or systemic disease. Inclusion criteria for all groups were age 18–45 years with at least 20 remaining teeth. Exclusion criteria were any uncontrolled systemic disease; chronic use of any medication that may affect pain perception; a comorbid malignant disease; an acute dental or periodontal condition and pregnancy/lactation.

## Clinical Assessments

All patients received full-mouth non-surgical periodontal therapy and general oral hygiene instructions. After the initial therapy, gingival recessions were treated with free gingival grafts with placed on prepared recipient sites on the mandibular anterior area.

At baseline, 1 months and 6 months after the surgical treatment, keratinized tissue (KT) (distance between the mucogingival junction and most apical point of the gingival tissue margin) width and vertical recession (VR) (distance between the most apical point of the gingival tissue margin and cemento-enamel junction) were measured with a periodontal probe to the nearest millimeter from the recession sites.

## Evaluation of Patient Centered Outcomes

### Corah's Dental Anxiety Scale (DAS)

Pre-surgical evaluation of subjects' anxiety was performed. Each patient was asked to complete a dental anxiety scale at baseline and 6 months after the surgical treatment. DAS is the most often used dental fear scale for adults in whom adults are asked to rate their fear regarding four dental situations on a 5-point scale [17]. The sum of the scores yields the total score (range from 4 to 20) and higher DAS scores show higher levels of dental anxiety.

### Oral Health Impact Profile Assessment (OHIP-14)

The OHIP-14 questionnaire was used to evaluate OHRQoL at baseline and 6 months after the surgical treatment [18]. The OHIP-14 is a 14-item measurement, by a self-reported oral health assessment index. The OHIP-14 contains seven conceptual domains of OHRQoL; physical pain, psychological discomfort, psychological disability, physical disability, social disability, functional limitation, and handicap. For each subject was asked to complete the questionnaire, with values ranging from 0 to 4. All of the points given to 14 items were collected and the totals of OHIP-14 scores were calculated. The higher OHIP-14 scores describe the poor quality of life. OHIP-14 scale measures had been previously validated through being performed on Turkish dental outpatients [19].

### Periodontal Aesthetic Perception Assessment (PAPS)

The periodontal esthetic perception scale was developed by Gokturk et al. [9] to evaluate periodontal and dental aesthetics perception. PAPS is a 14-item measurement, by a self-reported periodontal and dental aesthetics perception, includes two conceptual domains of periodontal and dental aesthetics; psychological effect (items 2, 5, 6), aesthetic effect (items 1, 3, 4). Subjects with periodontal aesthetic problems have lower satisfaction scores [3]. The test-retest reliability and internal consistency were 0.769 [9]. PAPS questionnaire was performed for assessment of periodontal esthetic perception at baseline, 1 and 6 months after completion of the root coverage procedure.

### Statistical analysis

Statistical analysis was performed using SPSS 21.0 (SPSS

Inc., Chicago, IL, USA). For descriptive analyses, mean values and standard deviations were calculated based on the subject as the unit. The Kolmogorov-Smirnov test was used to test for normality of the distribution. Statistical differences within the subjects were identified with the repeated measures ANOVA test for comparing the differences in PAPS scores between the follow-up visits and Paired sample t test for comparing the differences in DAS and OHIP-14 scores between the follow-up visits. In addition, the repeated measures ANOVA for comparing the differences in vertical recession (in millimeters) and keratinized tissue width (in millimeters) between the follow-up visits after the surgical procedures. Statistical significance was considered at  $p < 0.05$ .

**RESULTS**

The demographic and socioeconomic characteristics of all subjects are summarized in Table 1.

The mean ages of subjects were  $37.90 \pm 9.72$ .

The mean initial keratinized tissue width and vertical recession depth were  $2.41 \pm 1.31$  mm and  $1.23 \pm 0.90$  mm, respectively. After at 1 months for a re-examination, significant intragroup differences in subjects were detected the mean in VR reduction ( $1.43 \pm 1.35$  mm) and KT gain ( $4.94 \pm 1.37$  mm) ( $p < 0.05$ ). After at 6 months for a re-examination VR reduction and KT gain were  $0.94 \pm 1.19$  mm and  $5.25 \pm 1.27$  mm, respectively. In patients, revealed significant improvements from baseline to 6 months ( $p < 0.05$ ) (Table 2).

The mean patient-perceived esthetic outcome according to subjective analysis was  $10.94 \pm 4.21$ . Table 3 indicates the mean PAPS total and sub-scores, PAPS categories, psychological effect and aesthetic effect as indicated

by the study groups during study duration. Total PAPS scores and "Psychological effect and aesthetic effect" subscales showed a statistically significant difference between at baseline and 1 months for a re-examination ( $p < 0.05$ ). After at 6 months for a re-examination total PAPS scores and "Psychological effect and aesthetic effect" subscales were  $17.69 \pm 4.93$ ,  $8.46 \pm 2.76$  and  $9.23 \pm 2.51$ , respectively. In patients, PAPS scores revealed significant improvements from baseline to 6 months ( $p < 0.05$ ) (Table 3). The internal consistency coefficients of the individual subscales and PAPS scores of all patients are shown in Table 3. Cronbach's alpha values in patients were 0.852 and ranged from 0.858 to 0.890 for PAPS subscales (Table 3).

The general distribution of the OHIP-14 items along with the scores of the patients is presented in Table 4. At baseline and 6 months after completion of the root coverage procedure, the effect of oral health on the QoL in patients with suffered gingival recession was

**Table 1: Demographic characteristics of patients.**

Patients	
Age (mean±SD)	37.90±9.72
Gender (n (%))	
Women	37 (95.1)
Men	2 (4.9)
Education Level (n (%))	
Primary school	21 (53.8)
Secondary school	4 (10.3)
High school	6 (15.4)
University	8 (20.5)
Socioeconomic Level (n (%))	
Low	10 (25.6)
Medium	13 (33.3)
High	16 (41.0)

**Table 2: Measurement of Clinical Parameters at Baseline and at 1 and 6 Months.**

	Patients (n=39)			
	Baseline	1 Months	6 Months	p
Vertical Recession (mm)	2.41±1.31	1.43±1.35	0.94±1.19	0.000*
Keratinized Tissue Width (mm)	1.23±0.90	4.94±1.37	5.25±1.27	0.000*

**Table 3: Mean PAPS total and sub-scales scores in patients and Cronbach's Alpha values for PAPS.**

PAPS	Patients (n=39)				
	Baseline	1 Months	6 Months	p	Cronbach's Alpha
PAPS- total	10.94±4.21	20.15±3.58	17.69±4.93	0.000*	0.852
Psychological effect (items 1,3,4)	4.12±2.55	9.17±2.82	8.46±2.76	0.000*	0.858
Aesthetic effect (items 2,5,6)	6.82±2.30	10.89±1.63	9.23±2.51	0.000*	0.89

**Table 4: Mean Oral Health Impact Profile-14 total and sub-scales scores in patients and Cronbach's Alpha values for OHIP-14.**

OHIP	Patients (n=39)			
	Baseline	6 Months	p	Cronbach's Alpha
OHIP-14- total	20.48±10.25	10.92±9.70	0.000*	0.828
Functional limitation (OHIP-1 + 2)	2.69±2.20	1.48±1.69	0.004*	0.756
Physical pain (OHIP-3 + 4)	4.51±2.10	2.12±2.31	0.000*	0.737
Psychological discomfort (OHIP-5 + 6)	3.64±2.00	2.58±2.23	0.014*	0.759
Physical disability (OHIP-7 + 8)	3.00±1.86	1.53±2.16	0.000*	0.737
Psychological disability (OHIP-9 + 10)	2.25±1.99	1.25±1.46	0.008*	0.748
Social disability (OHIP-11 + 12)	2.46±2.39	0.87±1.37	0.000*	0.734
Handicap (OHIP-13 + 14)	1.92±2.01	1.05±1.57	0.010*	0.755

20.48±10.25 and 10.92±9.70, respectively. Total OHIP-14 scores and subscales showed a statistically significant difference between at baseline and 6 months for a re-examination ( $p<0.05$ ). In patients, OHIP-14 scores revealed significant improvements from baseline to 6 months ( $p<0.05$ ) (Table 4). The internal consistency coefficients of the individual total OHIP-14 and subscales scores of all patients are shown in Table 4. Cronbach's alpha values in patients were 0.828 and ranged from 0.734 to 0.759 for OHIP-14 subscales (Table 4).

The mean total DAS scores at baseline and 6 months after completion of the root coverage procedure were 9.76±2.87 and 8.64±2.83, respectively. In patients, DAS scores revealed significant improvements from baseline to 6 months ( $p<0.05$ ).

## DISCUSSION

To the best of our knowledge, this is the first study that evaluates to patient-centered outcomes OHRQoL, dental anxiety and periodontal esthetic perception in patients with gingival recession. The present study addressed that treatments of the gingival recession were improved the OHRQoL, dental anxiety and periodontal esthetic perception in individuals.

Patients with suffered gingival recession exhibited worse OHIP-14 scores. Gingival recessions consequences, such as tooth loss, tooth mobility, and, pain may compromise smile esthetic and speech, and consequently, negatively influence the quality of life and self-esteem [14,20]. Some studies report that discomfort and pain after free gingival graft procedures [21,22]. Douglas de Oliveria et al. suggested that the reduction in tooth hypersensitivity as the reason for the healing of QoL after root coverage surgery procedures [23]. These procedures reduced QoL scores and thus, improved QoL post-treatment. Ozcelik et al. investigated the immediate postoperative QoL of periodontitis patients after non-surgical and surgical treatments and they found that surgery without enamel matrix derivative experienced the worst QoL in the immediate postoperative [16]. The results from some studies recommended that surgical and non-surgical periodontal therapy can increase the QoL of patients. Root coverage procedures like connective tissue grafts increase QoL of patients with recession irrespective of the amount of root coverage reached [21]. In the present study, free gingival graft operation has improved the quality of life in a patient with gingival recession postoperative at 1 and 6 months. However, unlike other studies, the results of the present study demonstrated that was a positive relationship between VR reduction and KT gain and OHIP-14 scores.

Dental anxiety is a universal problem dental health problem in the populations of many countries and the prevalence of dental anxiety has been the subject of many studies [13,24]. Dental anxiety leads to avoidance of dental care which results in severe adverse consequences of patients' oral health and general health. Besides, dental anxiety is strongly associated with oral

hygiene and impairing the oral health-related quality of life and esthetics perception [25,26]. The patients with gingival recessions are complaining to hypersensitivity and feeling the fear of tooth loss but to the authors' knowledge, there is no study investigating this symptom or considering it as a patient-centered outcome in root coverage [15]. In the present study, the patients had moderate dental anxiety scores at baseline and free gingival graft operation was decreased the dental anxiety scores in a patient with gingival recession postoperative at 6th months.

Orofacial esthetics, which contained the gingiva, teeth, mouth and face assessment is negatively affected by dental anxiety. The patients with dental anxiety had lower ratings of satisfaction on all aspects of orofacial esthetics. The low level of satisfaction with the orofacial esthetics was reported in aesthetically impaired prosthodontic patients and patients with anxiety [27]. Furthermore, the orofacial appearance was related to self-reported oral health status and dental condition, and anxiety. Orofacial esthetics improved appearance-related self-confidence in young individuals after orthodontic therapy [8]. Besides orthodontic problems, periodontal problems also remarkably impact the perception of dental aesthetics. Periodontal aesthetics are a complement to dental aesthetics and measure by the PAPS questionnaire. Patients with periodontal aesthetic problems such as gingival enlargements, gingival recessions, and excessive gingival appearance have lower satisfaction scores [3]. Ribeiro et al. (2014) and Cairo et al. (2012) reported that satisfaction perception of patients had mean >85 VAS values after periodontal surgery used by visual analog scale. But these studies no noticed baseline satisfaction levels [28,29]. The effect of the tooth and gingival display on smile aesthetics has been investigated in various studies [6,30-32]. Van der Geld et al. (2007) investigated patient-centered outcomes on smile attractiveness and submitted that tooth size and visibility and upper lip position were important factors in self-perception of smile attractiveness [33]. Silva et al. assessed patient-centered and clinical outcomes of aesthetic crown lengthening surgery. They reported that while the patients were not pleased with tooth and gingival display when talking or smiling prior to therapy, most patients happen very satisfied with these features, postoperatively [3]. Roman et al. (2012) investigated evaluate the patient-centered outcomes after treatment of single and multiple recessions and they found all patients judged the esthetic appearance as improved [5], similar to other studies [34,35]. There are many studies on objective outcomes of gingival recessions in literature [36-39], but a few studies investigated patient-centered esthetic outcomes and perception of appearance and satisfaction. There were used commonly a visual analog scale (VAS) or a 5-point scale to define patients' satisfaction with the esthetic outcome in these studies [40]. At present study, the patients noticed significant improvements in periodontal esthetics perception at 1 and 6 months. The operation area was completely

healing and the grafted tissue was matured and showed a good esthetic appearance at postoperative 6 months.

These findings showed that free gingival graft operation was provided VR reduction and KT gain and thus improved patient-centered outcomes as increased patients' periodontal esthetic perception and quality of life and also decreased patients' dental anxiety.

### CONCLUSION

Gingival recessions affect negatively one persons' esthetic perception and quality of life and can cause dental anxiety. In addition, the surgical treatment of gingival recessions has a positive effect on oral health quality of life, periodontal esthetic perception and reduction of anxiety as well as improvement keratinized tissue width and reduction of recession.

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