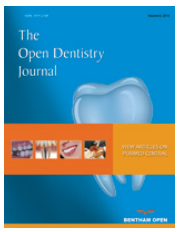

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RESEARCH ARTICLE

Knowledge, Awareness, and Practice of Gingival Veneer Prosthesis Among Dental Students, Interns, and Practitioners in the Riyadh Region: A Cross-Sectional Questionnaire-Based Survey

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Abstract:

Background:

The treatment modality of using gingival veneer prosthesis for anterior gingival recession is not widely known even in the dental fraternity. This survey has been conducted considering its essential nature and absence of data on its awareness in the Riyadh region.

Aims:

The aim of the study was to assess the knowledge, awareness, and practice of gingival veneer prosthesis among dental students, interns, and practitioners in the Riyadh region.

Materials and Methods:

A descriptive cross-sectional electronic survey was conducted on dental students, interns, and practitioners of both genders in Saudi Arabia, using a convenient sampling method. The final questionnaire consisted of 12 questions. The percentage of various responses, with reference to the demographics, and statistical significance, were tested by independent sample t-test and p-value <0.05. The responses/data of 446 participants were tabulated and processed in SPSS (version 21.0).

Results:

The preferred treatment option for an anterior gingival recession proposed by prosthodontists was prosthetic correction ($p<0.05$), and for other groups, it was periodontal surgery ($p<0.05$). 66% of general practitioners' group and 56% of dental students and interns' group, respectively, were not sure about the ideal treatment option for Miller's class III & IV gingival defects, while 70% of general practitioners' group and 65% of the students and interns' group, respectively, were not sure about the ideal treatment option for the management of gingival tissue loss between implants,.

Conclusion:

There is a significant lack of knowledge on using gingival veneer prosthesis as a treatment option for anterior gingival defects among general dental practitioners, interns, and dental students ($p<0.05$).

Keywords: Gingival veneers, Awareness, Riyadh region, Dentists, Prosthodontists, Dentistry.

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1. INTRODUCTION

The loss of periodontal attachment is a concern that influences treatment options for teeth in various dental specialties. The loss of support mechanism affects not only the functional aspect of teeth but also has an impact on aesthetics as well. Significantly, when such a change occurs in the maxillary or mandibular anterior region, it compromises aesthetics, even at the beginning of the pathologic process. Gingival recession refers to atrophic changes in periodontal tissue. The main characteristic of gingival recession is the apical migration of marginal gingiva which gradually displaces

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away from the cementoenamel junction, thereby exposing the root surface to the oral environment [1]. It manifests in the anterior region as elongated clinical crowns, widened embrasures, and altered phonetics [2]. In addition, the teeth may also show hypersensitivity. In the past, many procedures have been tried to eliminate this problem. The focus had been on the elimination of the disease process and restoration of health.

Table 1. The demographic structure of the sample.

S.No	-	-	N (446)	%
1	Gender	Male	294	65.9
		Female	152	34.1
2	Nationality	Saudi	317	71.1
		Non-Saudi	129	28.9
3	Level of Education	4th and 5th years students and newly graduated dentists (Interns)	147	33.0
		General practitioners	121	27.1
		Post graduate	178	39.9
4	Post Graduate Specialty	Prosthodontist	82	18.4
		Other specialty	96	21.5

The various aetiologies causing gingival recession have been mentioned as supra and sub-gingival calculus, inadequate width, and thickness of keratinized tissue, incorrect tooth brushing techniques, bone anatomy, tooth position, orthodontic movements, mechanical trauma, chemical trauma, high frenum attachment, subgingival restorative procedures, calculus, periodontal diseases, smoking and removable prosthesis [3 - 8]. The treatment approach has been to augment soft tissues coronal to the gingival margin [9, 10]. The viewpoint was on covering the exposed root region. The gingival recession can be managed with gingival augmentation [10]. With successful surgical treatment, the result mimics the original tissue contours. Such treatments may include both soft tissue and bone augmentation to support the soft tissue [11]. However, such corrective procedures may become unpredictable when a large tissue volume is missing, necessitating replacement procedures for the missing gingiva, such as the gingival prosthesis or veneer, a removable periodontal prosthesis given to replace lost gingiva [12]. The materials used for fabricating such prostheses include acrylics, porcelain, composite resins, and silicones [13]. This kind of treatment modality was proposed more than three decades ago [14 - 16].

Recently, several case reports have been presented and have improvised the previous prosthesis [17]. However, it was evident that this procedure is not widely known even in the dental fraternity [18]. The knowledge and awareness regarding treatment strategies of tooth wear among general practitioners and prosthodontists in Jordan demonstrated a lower level of confidence among general practitioners in diagnosing and treating the condition [19]. Another study conducted at Leeds revealed that patients with complex tooth wear may have difficulty in getting the treatment done by general practitioners under the NHS GDS contract, and also highlighted the beneficial effects of post-graduation education on the level of confidence in the management of such cases [20]. There is a lacuna in the current literature related to the knowledge and awareness of using gingival veneer prosthesis as a management option in gingival recession cases. This study hence aimed to assess and compare the knowledge, awareness, and practice of gingival veneer prosthesis among dental students, interns, and practitioners in the Riyadh region (Tables **1** and **2**).

Table 2. Comparison of responses between prosthodontists, other specialities, general practitioners, dental students and interns.

-	Prosthodontist %	Other Specialities %	Significance (p)	General Practitioners %	Significance (p)	Students and Interns %	Significance (p)
1. **How frequently are you to encounter open interdental spaces (gingival recession) of the anterior region of jaws in the patients that you treat in your clinic?**							
a. Less than 25%	23.2	19.8	0.28	37.2	0.00	36.1	0.00
b. 25-50%	31.7	25	0.05	25.6	0.07	24.5	0.03
c. 50-75%	26.8	33.3	0.06	17.4	0.00	11.6	0.00
d. 75-100	18.3	21.9	0.24	19.8	0.59	27.9	0.00
2. **What is the commonest etiology of open interdental spaces (gingival recession) of the anterior region of jaws which you seen in your practice?**							
a. Periodontal diseases (plaque induced)	74.4	85.4	0.00	71.9	0.43	85.0	0.00
b.Trauma(mechanical/physical)	13.4	8.3	0.03	18.2	0.07	8.8	0.03
c. Abnormal tooth position	7.3	4.2	0.07	5.8	0.39	4.1	0.04
d. Secondary to dental treatment	4.9	2.1	0.04	4.1	0.62	2.0	0.02
3. **What is the common presenting complaint of the patients with open interdental spaces (gingival recession) of the anterior region in your practice?**							
a. Elongated clinical crowns	6.1	4.2	0.24	6.6	0.77	9.5	0.07
b. Altered sound production (phonetics)	2.4	5.2	0.06	2.5	0.97	7.5	0.00
c. Food impaction in the spaces	18.3	17.7	0.84	14.0	0.11	15.0	0.20
d. Unesthetic appearance.	73.2	72.9	0.94	76.9	0.24	68.0	0.10

(Table 2) contd.....

4. **Which would be your preferred treatment option for open interdental spaces (gingival recession) in the anterior region of jaws?**							
a. Periodontal surgery.	19.5	93.8	0.00	83.5	0.28	93.2	0.00
b. Prosthetic replacement.	78.0	2.1	0.00	2.5	0.00	4.8	0.00
c. Not sure.	2.4	4.2	0.20	14.0	0.00	2.0	0.69
5. **When you have a patient with the(low-volume) gingival recession of the anterior region (Miller's Class I & II), what is your treatment option for that patient?**							
a. Periodontal surgery.	89.0	86.5	0.30	43.8	0.00	46.3	0.00
b. Prosthetic replacement.	9.8	10.4	0.77	3.3	0.00	2.0	0.00
c. Not sure.	1.2	3.1	0.09	52.9	0.00	51.7	0.00
6. **When you have a patient with the (high-volume) gingival recession of the anterior region (Miller's Class III & IV), what is your treatment option for that patient?**							
a. Periodontal surgery.	19.5	80.2	0.93	32.2	0.00	42.2	0.00
b. Prosthetic replacement.	79.3	17.7	0.31	1.7	0.00	2.0	0.00
c. Not sure.	1.2	2.1	0.37	66.1	0.00	55.8	0.00
7. **What would be your treatment of choice for inter-proximal periodontal tissue loss in between dental implant prosthesis of the anterior region of jaws?**							
a. Periodontal surgery.	87.8	87.5	0.90	28.1	0.00	32.0	0.00
b. Prosthetic replacement.	9.8	7.3	0.24	1.7	0.00	2.7	0.00
c. Not sure.	2.4	5.2	0.06	70.2	0.00	65.3	0.00
8. **What would be your preferred treatment option in cases of mal-positioned implants with open inter-dental spaces (gingival recession) of the anterior region?**							
a. New implants with bone graft.	87.8	92.7	0.03	63.6	0.00	74.8	0.00
b. prosthetic replacement (Gingival veneer prosthesis).	12.2	5.2	0.25	13.2	0.01	10.2	0.14
c. Not sure.	0	2.1	0.01	23.1	0.00	15.0	0.00
9. **Which the following, according to you, could be the disadvantages of surgical correction for patients having open inter-dental spaces (gingival recession) of the anterior region?**							
a. Surgical costs	22.0	22.9	0.76	21.5	0.88	49.7	0.00
b. Healing time	25.6	21.9	0.25	18.2	0.01	10.2	0.00
c. Patient discomfort	20.7	27.1	0.05	29.8	0.00	17.7	0.27
d. The unpredictable outcome of the surgical procedure	31.7	28.1	0.31	30.6	0.74	25.2	0.04
10. **Do you practice gingival veneer prosthesis as a treatment option for open inter-dental spaces (gingival recession)?**							
a.Yes	26.8	30.2	0.32	27.3	0.89	32.0	0.10
b.No	73.2	69.8	0.32	72.7	0.89	68.0	0.10
10.A- If No, Which among the following is the likely reason for not practicing gingival veneer prosthesis?							
a. Personal preference.	63.3	64.2	0.85	18.2	0.00	26.2	0.01
b. Patient acceptability.	21.7	11.9	0.00	17.0	0.17	8.7	0.00
c. Prosthesis design and maintenance.	11.7	17.9	0.05	13.6	0.48	11.7	1.0
d. Not aware of such prosthesis	3.3	6.0	0.16	51.1	0.00	53.4	0.00
10.B- If Yes, Which among the following aspects of gingival veneer prosthesis is a reason for you to include this as a treatment option in your practice?							
a. Cost-effectiveness.	13.6	10.3	0.48	6.1	0.06	11.4	0.60
b. Easy maintenance.	31.8	34.5	0.69	27.3	0.49	6.8	0.00
c. Good esthetics.	40.9	31.0	0.19	36.4	0.53	45.5	0.46
d. Reduced hypersensitivity.	4.5	6.9	0.49	9.1	0.21	20.5	0.00
e. Prevents food lodgement.	0	10.3	0.00	9.1	0.00	6.8	0.01
f. Improved phonetics.	9.1	6.9	0.57	12.1	0.49	9.1	1.0
11. **Which among the following clinical scenarios do you think gingival veneer prosthesis is an excellent treatment option?**							
a. High esthetic demands (high lip line)	75.6	85.4	0.00	76.0	0.89	52.4	0.00
b. Prevent food impaction.	14.6	4.2	0.00	2.5	0.00	20.4	0.03
c. Improve saliva control.	2.4	3.1	0.58	6.6	0.01	4.1	0.19
d. Improves speech.	2.4	2.1	0.00	2.5	0.97	1.4	0.24
e. Reduces root dentine sensitivity	4.9	5.2	0.00	12.4	0.00	21.8	0.00
12. **With advantages such as improved esthetics, preventing food impaction, improved saliva control, improved speech, and reduced root dentine sensitivity. Will you recommend gingival veneer prosthesis as a treatment option in the future in your practice?**							

(Table 2) contd.....

a.Yes	95.1	88.5	0.00	80.2	0.00	74.1	0.00
b.No	4.9	11.5	0.00	19.8	0.00	25.9	0.00
12.A- If No, which among the following reasons would restrict you from advocating its use in your practice?							
a. Personal preference,	25.0	45.5	0.13	20.8	0.05	22.6	0.84
b. Patient acceptability,	25.0	27.3	0.87	45.8	0.93	61.3	0.06
c. Prosthesis design, maintenance	50.0	27.3	0.36	33.3	0.54	16.1	0.08

Independent sample t-test, *Statistical significance at 5%

2. MATERIALS AND METHODS

The study has been approved by the Research Ethics committee, Majmaah University, with Ethical approval no. MUREC-Nov.30/COM-2020/11-5.

2.1. Pilot Study

A pilot study was performed with 17 experienced prosthodontists. The clarity of the questionnaire was evaluated based on the feedback of the participants. Based on the inputs of the pilot study, the questionnaire was revised before the main study has been conducted.

2.2. Actual Survey

The descriptive cross-sectional study was conducted among the dental students, interns, and practitioners of both genders in Saudi Arabia, using a convenient sampling method. A pre-coded questionnaire was sent through social media to the participants after receiving their consent.

The final questionnaire consisted of 12 questions. The proforma consisted of informed consent, demographic information, and the questionnaire. The questionnaire was self-administered and closed-ended, while the participation was voluntary. The questionnaires consisted of two parts. The first part included personal data, and information related to education level and workplace; the second part evaluated the knowledge and awareness of the practitioners regarding the gingival recession and using the gingival veneer as a treatment option. Questions 1-3 focused on the participant's awareness of the clinical problem of interdental spaces, whereas Questions 4-12 focused on the participant's awareness about treatment options for gingival recession.

2.3. Statistical Analysis

The data obtained were tabulated and processed in SPSS (version 21.0). The percentage of various responses with reference to the demographics was estimated. The response percentages of dental students, interns and dental specialists were compared with prosthodontists, and statistical significance was tested by independent sample t-test; $p<0.05$ was considered as statistically significant difference.

3. RESULTS

A total of 446 subjects participated in the study, 66% were males while 34% were females. 71.1% of the participants were Saudi Arabians, while 28.9% were non-Saudi practitioners. Among the respondents, 33% were students in the fourth and fifth years of their graduation in dentistry, 27.1% were general practitioners, and 39.9% were dentists with post-graduation. Out of the postgraduates, 18.3% were prosthodontists, and 21.5% were dentists from other specialties. Concerning the frequency of encountering open interdental spaces, 31% of prosthodontists encountered such conditions in up to one-half of the patients. Also, 18% of them encountered such conditions in most of the cases. However, dentists of other specialties encountered similar percentages ($p<0.05$). Therefore, irrespective of the specialty, dentists have been found to be aware of the problem ($p<0.05$). Concerning awareness regarding etiology, most of them said that it was due to periodontal disease or trauma. Both prosthodontists and others gave similar responses. Concerning the presenting complaint, food impaction in the spaces and unaesthetic appearance were the maximum observed presentations to the dentist.

The preferred treatment option proposed by prosthodontists was prosthetic correction ($p<0.05$), and for other specialists, general practitioners, dental students, and interns, it was periodontal surgery ($p<0.05$). The preferred treatment option for Miller's class I and II gingival defects was unanimously periodontal surgery as suggested by all the groups included in the study, followed by prosthetic replacement. A significant proportion of participants among the general practitioners' group, as well as the dental students and the interns' group, were not sure about the treatment option, accounting for 52.9% and 51.7%, respectively ($p<0.05$).

The preferred treatment option for Miller's class III & IV gingival defects was periodontal surgery as specified by non-prosthodontists ($p>0.05$) and prosthetic replacement by prosthodontists. In contrast, a significant proportion of participants among the general practitioners' group, as well as the dental students and the interns' group, were unsure about the treatment option, accounting for 66.1%, and 55.8%, respectively ($p<0.05$).

Periodontal surgery was opted the most ($p>0.05$), followed by prosthetic replacement, as the treatment of choice for interproximal periodontal tissue loss in between dental implant prosthesis of the anterior region. However, a significant proportion of participants among the general practitioners' group, as well as dental students and the interns' group, were not sure about the treatment option, accounting for 70.2%, and 65.3%, respectively ($p<0.05$). Regarding preferred treatment options for mal-positioned implants with open inter-dental spaces (gingival recession) of the anterior region, 'new implants with bone graft' received maximum responses followed by 'prosthetic replacement' among all groups.

Among the study participants, 73% of prosthodontists, 70% of other specialists, 73% of general practitioners, and 68% of dental students and interns did not practice gingival veneer prosthesis. The primary reason cited was personal preference (64% among specialists). A significant proportion of participants among the general practitioners' group, as well as

dental students and the interns' group were not aware of gingival veneer prosthesis as a treatment option (51.1% and 53.4%, respectively) ($p<0.05$).

4. DISCUSSION

Gingival recession is common among patients seeking dental care; the frequency of subjects in our study encountering open interdental spaces was similar to that found in previous studies published in the literature [21 - 26]. Kassab *et al*. [21] and Hosanguan *et al*. [24] have reported it to occur in about 50% of the population. However, such prevalence studies, according to Toker *et al*. (2009) conducted in hospital settings, have shown higher prevalence rates (78%) [25]. In the current study, clinicians have encountered such conditions in up to one-half of the patients.

Previous authors have discussed clinicians' awareness concerning the etiology of gingival recession and found them to have a good amount of knowledge on the etiology of this clinical condition. Bhat *et al*. [18] reported similar findings which have been found to be in agreement with the present study. Since ours is a closed-end study, the options for etiology are limited. Other studies have included abnormal tooth position, traumatic occlusion, and high-adrenal attachment in their questionnaire [27, 28]. Nevertheless, clinicians were very much aware of the etiology.

The present study participants reported food impaction in the spaces and unaesthetic appearance to be the most common presenting complaints to the dentist. The relation of food impaction to periodontal disease is well known; especially in open contacts, this can pose significant damage to periodontium [29, 30]. Zavanelli *et al*. stated that respondents regarded teeth as having great value in facial appearance, and aesthetic treatment was given priority among all age groups. The study also stated that the participants preferred aesthetic treatment to restore functional needs [31]. In the present study, unaesthetic condition was described as the major presenting complaint hastening the visit to the dentist, rather than food impaction.

Based on the prognostic evaluation of root coverage, Miller's classification is the gold standard still in use today [32]. While clinicians are aware of this classification, their personal preference for a particular treatment modality is evident in the survey. The study also revealed that a significant proportion of participants among the general practitioners' group, as well as dental students and the interns' group, were not sure about the treatment option for Miller's class I and II defects, accounting for 52.9% and 51.7%, respectively. Likewise, for Miller's class III and IV defects, 66.1% among the general practitioners' group, and 55.8% among the dental students and the interns' group, respectively, were unsure about the treatment option. The current trend in treating missing teeth with dental implants and estimated projections towards an increase in implant treatment in the future makes it all the more mandatory for a dental practitioner to learn all the treatment aspects of dental implants [33]. Inter-proximal tissue loss in relation to implant is known to cause food impaction and associated complications. In this survey, 70.2% among the general practitioners, and 65.3% among the dental students and interns were unsure about the treatment option. For cases with mal-positioned implants with open inter-dental spaces, clinicians majorly preferred to replace the implant with bone grafts. Since the loss of interproximal tissue has both aesthetic and clinical sequelae, awareness about treating such clinical conditions is essential [34].

Among the study participants, 73% of prosthodontists, 70% of other specialists, 73% of general practitioners, and 68% of dental students and interns did not practice gingival veneer prosthesis. The primary reason cited was personal preference (64% among specialists). A significant proportion of participants among the general practitioners, as well as dental students and interns, were not aware of gingival veneer prosthesis as a treatment option, accounting for 51.1% and 53.4%, respectively. Further, there have been reports in the literature stating that no single procedure is considered superior to gingival recession management [35 - 41]. Therefore, clinicians must be aware of many procedures to approach the problem in the right direction and afford an amicable solution. It is necessary to mention that there is a deficit in knowledge regarding the gingival veneer prosthesis, as observed in the conducted survey. This treatment option can offer a non-surgical treatment option, especially for patients who have medical contraindications and for whom it is difficult to undergo a surgical procedure. Prosthodontists' mindset is always oriented to provide prosthetic replacement while others seek a surgical or interdisciplinary solution. It may partially be due to their training and the mindset of applying their capability to solve the issue.

The sample size of the present study is not a representative sample of dentists registered in Saudi Arabia. Hence, the findings may not be generalized. It could be considered a potential limitation of the study. The findings from the present study could be used as a guide or reference for the future studies. In the current perspective, evidence-based treatment is the norm, and ignorance towards a particular therapeutic modality requires effort to educate the relevant specialists regarding that treatment modality and bring them in line with contemporary technology. It has been observed that most of the participants encountered cases of gingival recession very often and were very much aware of its etiology. However, the problem was only with the treatment modality. In this context, it is necessary to address the reason for such a knowledge deficit. It may be necessary to strengthen the curriculum in dental schools and create awareness about continuing the education after graduating. A change in the clinician's attitude to encourage and motivate oneself towards continuing dental education is required. Also, it is essential to conduct dental education programs in order to improve awareness of gingival veneer prosthesis. The prosthodontists were used as a reference point for comparison in this study. This is because authors believe that prosthodontists have holistic knowledge of gingival veneer prosthesis. To the best of our knowledge, this comparison is unique and validated in this study.

The study involved some limitations such that the questionnaire was a self-administered one, and validation of the questions was carried out by a pilot study. The study was conducted using social media and the authors had no control

over sampling, hence the response rate was not sought. Another limitation of the study is that individual reminders over social media could not be sent, and hence, it might have influenced the sample size and return rate.

CONCLUSION

The authors observed that a significant percentage of dental practitioners did not practice gingival veneers, and a high percentage of respondents, including the general practitioners, dental students, as well as interns, were unaware of such a procedure. Furthermore, a significant influence of personal preference was found to play a role in its treatment plan.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Research Ethics committee, Majmaah University, with Ethical approval no. MUREC-Nov.30/COM-2020/11-5.

HUMAN AND ANIMAL RIGHTS

No animals were used in this study. The reported experiments on humans were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from each participant prior to the study.

STANDARDS OF REPORTING

STROBE guideline and methodologies were followed in this study.

AVAILABILITY OF DATA AND MATERIALS

The data supporting findings of this study is available from corresponding author [M.Z.M], upon reasonable request.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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