

Knowledge and Practice of Gingival Displacement Methods; a Survey-Based Study among the Dentists in Saudi Arabia

Yazeed Alawwad¹, Abdullah Saleh Alkhateeb¹, Mohanad Nasser Alshageige¹, Badr Soliman AlHussain^{2*}

¹ Faculty of dentistry, Qassim university, Qassim, Saudi Arabia. ² Consultant Restorative Dentistry, Riyadh, Saudi Arabia.

Abstract

This cross-sectional study aimed to assess the Gingival Displacement Methods Used by Dental Professionals; A Survey-Based Study to Assess the Knowledge & Practice of Dentists in Saudi Arabia. The study subjects comprised of general dentists and specialists/consultants having experience of fewer than 10 years or more than 10. Gingival Displacement Methods Used by Dental Professionals; Assess the Knowledge & Practice of Dentists in Saudi Arabia was measured using a 07 item questionnaire. After ensuring the reliability of the questionnaire, differences across gender, clinical position, and clinical experience were seen using a statistical measure Chi-square through SPSS to determine the statistically significant differences ($p < 0.05$). Findings revealed 56.7% of participants were male and 67.8% were working as general dentists, and 32.2% were specialists. 67.8% were those with less than 10 years of experience. Females were more experienced than male participants. Both groups, specialists, general dentists, all provide gingival displacement for fixed prostheses, the preferred method was mechanical while the preferred chemical was epinephrine. while acquiring clinical experience, experience specialists use a combination of all three scenarios for treatment.

Keywords: Knowledge, Practice, Gingival displacement, Saudi dentists

INTRODUCTION

A key denominator for perceptions and intermittent veneers or permanent dental prostheses is correctly recording the prepared abutments and finish lines. To register the subgingival finish lines, the gingival tissue must be moved during all impression operations. For a good subgingival impression, the sulcular environment must be effectively managed. It has two major components: the tension exerted on the gingival tissues and pollutants that may be present or produced in the sulcus. The primary sulcular width is 0.2mm. Impressions with a smaller sulcular width have faster void speeds, less ripping of the impression material, and less unimportant accuracy. Gingival redirection can be accomplished by mechanical, chemo-mechanical, or careful methods. Rotational curettage and electro-surgery are other conscious procedures that may be disengaged. For a long time, the mechanical approach of gingival elimination employing a simple withdrawal line has been the norm. It works by genuinely pushing away a certain objective [1-5].

The chemo-mechanical method is the most often used approach, which employs withdrawal lines impregnated with trained hemostatic experts and astringents. Quickly refined by combining compound action with pressure pushing. The manufactured elements employed near withdrawal ropes may be meticulously organized into vasoconstrictors and astringents. Epinephrine is a vasoconstrictor. The careful

withdrawal techniques are rapid but damaging and include tissue extraction. Gingival migration stick was introduced using kaolin and aluminum chloride. A common goal for imprints and span crowns or permanent dental prostheses is to enroll the coordinated projections and final goals precisely. The gingival tissue should be removed from all impression frameworks. Powerful administration of the sulcular climate is required for a fruitful subgingival impression. It includes two key perspectives: the power that comes to bear on the gingival tissues and pollutants that might be available or produced in the sulcus. Gingival withdrawal, hemostasis, and sulcular purifying are much of the time joined and firmly related techniques; however, they have explicitly separate

Address for correspondence: Badr Soliman AlHussain,
Consultant Restorative Dentistry, Riyadh, Saudi Arabia.
Email: bader.hussain @ riyadh.edu.sa

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 3.0 License, which allows others to remix, tweak, and build upon the work non commercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to cite this article: Alawwad Y, Alkhateeb A S, Alshageige M N, AlHussain B S. Knowledge and Practice of Gingival Displacement Methods; a Survey-Based Study among the Dentists in Saudi Arabia. Arch. Pharm. Pract. 2021;12(2):112-7. <https://doi.org/10.51847/xG3acvurHi>

targets. Withdrawal is the transitory uprooting of tissue away from pre-arranged teeth [6].

A significant restriction of direct optical impressions is their impediment to the view. A perfect sulcus is a prerequisite of vital signs while making advanced PC helped plan/PC supported assembling (computer-aided design/CAM) impressions. Withdrawal line strands that stay in the sulcus might influence the precision of gingival withdrawal and may bring about relic-created blunders. Fifteen percent aluminium chloride in an injectable framework decreases these ancient rarities by leaving a spotless sulcus on expulsion. The circuitous catch of digitized data is considered more exact by clinicians. This can result in huge mistakes in instances of flimsy impression edges with a sweep not exactly the reaching test tip [6].

Literature Review

A review in India announced that the chemo-mechanical procedure was loved by the bigger part (69%) of the dental subject matter experts. This could be a direct result of the display. 9% participants preferred mechanical strategy, 51% of respondents jumped at the chance to use aluminium chloride as a medicament, 24% of respondents got a kick out of the opportunity to use epinephrine, aluminium potassium sulfate, ferric sulfate, and tannic destructive was the preference of eleven and nine percent and five percent respondents, a large portion of the participants truly check out the affliction of the patients simply now and then, sixty-nine percent of respondents wet the withdrawal string, just 2.8% of respondents announcing foundational responses as expanded heartbeat rate, expanded circulatory strain, palpitations, and syncope because of the gingival removal system [1].

Another study in India reported that out of the absolute dental specialists rehearsing in the Nagpur district, 66% were general dental experts, 15% were prosthodontists, 13% were endodontists, 3% were oral specialists, and 1% were periodontists. In comparison, the rest, 2%, were other dental professionals. The study showed that roughly 89% of the dental professionals rehearsing in the Nagpur area do not remove gingival before establishing connections. Just 12% of the dental specialists revealed utilizing gingival withdrawal strings, while 88% of the dental specialists do not use withdrawal lines. Better methods, for example, cordless gingival relocation, were being used by not many dental specialists, i.e., 6%, because of the absence of information and strategy affectability of this material. It tends to be presumed that gingival relocation is a vital stage in the creation of fixed halfway false teeth, which dental professionals in the Nagpur district are neglecting. The impact of not performing gingival uprooting strategy before taking impression ought to be emphasized, involved insight on gingival dislodging should be granted at the undergraduate level, and the significance of gingival relocation for the accomplishment of prosthesis should be passed on to dental

experts to achieve a change which brings about a superior recovery of patients with halfway edentulous [2].

Another study held in Nepal reported that inside the review's limits, 60.6% of members utilized gingival withdrawal strings for gingival uprooting, 5.1% of dental specialists utilized the cordless method, and 18.9% utilized the careful method as a guide for gingival uprooting. Pre-impregnated strings were being used by a sum of 47 (26.1%) dental specialists of which, 49% utilized aluminium chloride pre-impregnated strings, 29.8% utilized strings impregnated with aluminium potassium sulfate also, and 27.6% utilized epinephrine impregnated withdrawal string. This could be because of the expanded degree of mindfulness among rehearsing dental specialists concerning the unfavorable impacts of epinephrine impregnated lines. 47 dental specialists who utilized the withdrawal line wet the withdrawal rope before evacuation from a gingival sulcus [7].

A review in New Zealand uncovered that the reaction rate was 51%. Facade, crown, and scaffold medicines were regularly done by 89% of respondents, while embed treatment and embed upheld prostheses were given by 65%. Around normal teeth, the gingival withdrawal was mostly accomplished with surgery (counting electro-surgery, laser, and turning curettage) as well as a string by 82% of dental specialists. A rope with synthetics was used by 63% and a plain string by 37%. Gingival withdrawal around inserts was utilized by 18%. Among the last mentioned, the most popular gingival withdrawal technique for use around inserts was plain rope (utilized by thirty-one percent), while twenty-five percent employed string with manufactured substances. One more twenty-three percent announced utilizing a medical procedure as their method for a gingival withdrawal around inserts. At the same time, nineteen percent revealed utilizing ExpasyI™ (Pierre-Roland), and two percent detailed using Magic Foam Cord™ (Dentsply), the two of which are injectable networks for gingival withdrawal. While simply few individuals report using it for implants in New Zealand. A bewildering finding a large enormous number of individuals who revealed utilizing a medical procedure for a gingival withdrawal around typical teeth [8].

MATERIALS AND METHODS

This is cross-sectional research carried out among dentists in Saudi Arabia by an online survey. Hospitals and clinics were contacted and participants were requested to fill up the survey. An online questionnaire was designed including questions about personal and demographic data followed by questions linked to their knowledge and perception regarding the use of various gingival displacement methods. The gathered data was analyzed using SPSS version 22, where descriptive as well as inferential statistics were performed. Comparisons between groups will be made with the value of significance kept under 0.05 using the Chi-square test.

RESULTS AND DISCUSSION

The present study reports that 56.7% of participants were male and 67.8% were working as general dentists, and 32.25 were specialists. 67.8% were those having to experience less than 10 years. 84.4% answered that they perform gingival retraction for all fixed prostheses cases, and the most preferred method was mechanical, while most of them use epinephrine for a chemo-mechanical procedure (**Table 1**). The majority responded yes (73.3%) on whether they wet the cord before the procedure, and most of them routinely take a medical history (86.7%). They occasionally (48.9%) check the patient's pulse rate and blood pressure, and the majority never had a patient complaining about systematic manifestation. A higher number of female dentists were practicing as specialists and had experience of more than 10 years as compared to male participants. Still, the majority of both genders were practicing as general dentists with less than 10 years of experience. Male and females both did the gingival procedure for fixed prostheses, and the most preferred procedure method was mechanical, while epinephrine most preferred chemical in the present study. An equal number of both genders moistened the retraction cord before the procedure and routinely ask for medical history. In contrast, females occasionally ask for pulse rate and blood pressure, but males routinely check these vitals (**Table 2**).

They never had any patient complaining about any manifestation. Specialists use gingival for all fixed prostheses cases, as well as general dentists do (**Table 3**). The preferred method for displacement is mechanical for both positions, epinephrine is the preferred chemical, and general dentists use ferric acid more than specialists. Both wet the retraction cord before the procedure and routinely asked for medical history, and vital checks never had any complaints. So Shrestha *et al.*, 2017 reported in their study that 5.1% of dental specialists utilized the cordless method, and 18.9% utilized the careful method as a guide for gingival uprooting. Pre-impregnated strings were being used by a sum of 47 (26.1%) dental specialists of which, 49% utilized aluminium chloride pre-impregnated strings, 29.8% utilized strings impregnated with aluminium potassium sulfate also, and 27.6% utilized epinephrine impregnated withdrawal string.

Table 1. Frequency Table

Questions	Frequency	Percentage
Gender		
Male	51	56.7%
Female	39	43.3%
Work Position		
General Dentist	61	67.8%
Specialist/consultant	29	32.2%
Clinical Experience		
Less than 10 years	61	67.8%
More than 10 years	29	32.2%

How often do you perform a gingival retraction procedure before making impressions for fixed prostheses?		
For all fixed prostheses cases	76	84.4%
For long-span fixed prostheses	06	6.7%
For only selected cases	06	6.7%
Never	02	2.2%
Your preferred method of choice for gingival displacement		
Mechanical	56	62.2%
Chemicomechanical	25	27.8%
Surgical	01	1.1%
Combination of the above	08	8.9%
If you prefer a chemo-mechanical method which chemical do you prefer to use?		
Epinephrine	52	57.8%
Aluminium chloride	06	6.7%
Ferric sulfate	14	15.6%
Aluminium potassium sulfate	00	00
Tannic acid	01	1.1%
Other	17	18.9%
Do you wet the retraction cord before removal from the gingival sulcus?		
Yes	66	73.3%
No	24	26.7%
Do you ask for medical history?		
Routinely	78	86.7%
Occasionally	09	10%
Never	03	3.3%
Do you check pulse rate and blood pressure?		
Routinely	38	42.2%
Occasionally	44	48.9%
Never	08	8.9%
Have you ever had a patient complaining of any systemic manifestations as a result of gingival displacement?		
Yes	29	32.2%
No	61	67.8%

Table 2. Comparison across Gender

Questions	Male	Female	P-value
Work Position			
General Dentist	37	24	.268
Specialist/consultant	14	15	
Clinical Experience			
Less than 10 years	37	24	.268
More than 10 years	14	15	
How often do you perform a gingival retraction procedure before making impressions for fixed prostheses?			
For all fixed prostheses cases	41	35	.523
For long-span fixed prostheses	05	01	
For only selected cases	04	02	
Never	01	01	

Your preferred method of choice for gingival displacement			
Mechanical	36	20	.106
Chemicomechanical	12	13	
Surgical	01	00	
Combination of the above	02	06	
If you prefer a chemico-mechanical method which chemical do you prefer to use?			
Epinephrine	33	19	.466
Aluminium chloride	03	03	
Ferric sulfate	06	08	
Aluminium potassium sulfate	00	00	
Tannic acid	00	01	
Other	09	08	
Do you wet the retraction cord before removal from the gingival sulcus?			
Yes	33	33	.034
No	18	06	
Do you ask for medical history?			
Routinely	41	37	.018
Occasionally	09	00	
Never	01	02	
Do you check pulse rate and blood pressure?			
Routinely	25	13	.328
Occasionally	22	22	
Never	04	04	
Have you ever had a patient complaining of any systemic manifestations as a result of gingival displacement?			
Yes	20	09	.104
No	31	30	

Table 3. Comparison across Work Position

Questions	General Dentist	Specialist/Consultant	p-value
Gender			
Male	37	14	.268
Female	24	15	
Clinical Experience			
Less than 10 years	54	07	.000
More than 10 years	07	22	
How often do you perform a gingival retraction procedure before making impressions for fixed prostheses?			
For all fixed prostheses cases	52	24	.958
For long-span fixed prostheses	04	02	
For only selected cases	04	02	
Never	01	01	
Your preferred method of choice for gingival displacement			
Mechanical	40	16	.243
Chemicomechanical	17	08	
Surgical	01	00	
Combination of the above	03	05	

If you prefer a chemico-mechanical method which chemical do you prefer to use?			
Epinephrine	33	19	.617
Aluminium chloride	04	02	
Ferric sulfate	09	05	
Aluminium potassium sulfate	00	00	
Tannic acid	01	00	
Other	14	03	
Do you wet the retraction cord before removal from the gingival sulcus?			
Yes	41	25	.057
No	20	04	
Do you ask for medical history?			
Routinely	50	28	.092
Occasionally	09	00	
Never	02	01	
Do you check pulse rate and blood pressure?			
Routinely	22	16	.230
Occasionally	33	11	
Never	06	02	
Have you ever had a patient complaining of any systemic manifestations as a result of gingival displacement?			
Yes	19	10	.752
No	42	19	

Table 4. Comparison across Work Experience

Questions	Less than 10 years	More than 10 years	P-value
Gender			
Male	37	14	.268
Female	24	15	
Clinical Position			
General dentist	54	07	.000
Specialist/consultant	07	22	
How often do you perform a gingival retraction procedure before making impressions for fixed prostheses?			
For all fixed prostheses cases	53	23	.226
For long-span fixed prostheses	04	02	
For only selected cases	04	02	
Never	00	02	
Your preferred method of choice for gingival displacement			
Mechanical	41	15	.047
Chemicomechanical	17	08	
Surgical	01	00	
Combination of the above	02	06	
If you prefer a chemico-mechanical method which chemical do you prefer to use?			
Epinephrine	35	17	.748
Aluminium chloride	05	01	
Ferric sulfate	08	06	
Aluminium potassium sulfate	00	00	
Tannic acid	01	0	
Other	12	05	

Do you wet the retraction cord before removal from the gingival sulcus?			
Yes	41	25	.057
No	20	04	
Do you ask for medical history?			
Routinely	51	27	.360
Occasionally	08	01	
Never	02	01	
Do you check pulse rate and blood pressure?			
Routinely	23	15	.449
Occasionally	32	12	
Never	06	02	
Have you ever had a patient complaining of any systemic manifestations as a result of gingival displacement?			
Yes	18	11	.424
No	43	18	

This study was aimed to examine the gingival displacement methods used by dentists to assess the knowledge and practice of dentists in Saudi Arabia. To analyze the data, in descriptive statistics, Chi-square was used to compare the findings across gender, clinical position, and clinical experience. In the first analysis, a frequency measure was applied, and conclusions reported that 56.7% of participants were male and 43.3% were female. 67.8% of the participants were practicing as general dentists, and 32.25 were specialists or consultants. Most of the participants were in infield practice for less than 10 years. 84.4% answered that they perform gingival retraction for all fixed prostheses cases, and the most preferred method was mechanical, while most of them use epinephrine for the chemo-mechanical procedure. The majority responded yes (73.3%) on whether they wet the cord before the procedure, and most of them routinely take a medical history (86.7%). They occasionally (48.9%) check the patient's pulse rate and blood pressure. The majority never had a patient complaining about systematic manifestation and comparable reports that the chemo-mechanical strategy was liked by the greater part (sixty-nine percent) of the informed dental authorities. This could be an immediate aftereffect of the displaying and receptiveness of different medicaments more than ahead of time. A mechanical methodology for gingival relocation was liked by nine percent of the respondents, 51% of respondents got a kick out of the opportunity to utilize aluminium chloride as a medicament, by far most of the respondents genuinely look at the illness of the patients just every so often, sixty-nine percent wet the withdrawal string, just 2.8% of respondents announcing foundational responses as expanded heartbeat rate, expanded circulatory strain, palpitations, and syncope because of the gingival removal system [1].

In the next analysis, gender differences were examined, and findings revealed non-significant differences. A higher number of female dentists were practicing as specialists and

had experience of more than 10 years compared to male participants. Still, the majority of both genders were practicing as general dentists with less than 10 years of experience. Male and females both did the gingival procedure for fixed prostheses, and the most preferred procedure method was mechanical, while epinephrine most preferred chemical in the present study. An equal number of both genders wet the retraction before the procedure (33) and routinely ask for medical history.

In contrast, females occasionally ask for pulse rate and blood pressure, but males routinely check the vitals. They never had any patient complaining about any manifestation. A similar study in India reported the same choices from dentists: out of the absolute dental specialists rehearsing in the Nagpur district, 66% were general dental experts, 15% were prosthodontists, 13% were endodontists, 3% were oral specialists, and 1% were periodontists. In comparison, the rest, 2%, were other dental professionals. The study showed that roughly 89% of the dental professionals rehearsing in the Nagpur area don't perform gingival removal before establishing connections. Just 12% of the dental specialists revealed utilizing gingival withdrawal strings, while 88% of the dental specialists don't utilize withdrawal lines. Better methods, for example, cordless gingival relocation, were being used by not many dental specialists, i.e., 6%, because of the absence of information and strategy affectability of this material. It tends to be presumed that gingival relocation is a vital stage in the creation of fixed halfway false teeth, which dental professionals in the Nagpur district are neglecting. The impact of not performing gingival uprooting strategy before impression making ought to be emphasized, involved insight on gingival dislodging should be granted at the undergrad level, and the significance of gingival relocation for the accomplishment of prosthesis should be passed on to dental experts to achieve a change which brings about a superior recovery of patients with halfway edentulous [2].

Furthermore, findings reported non-significant differences across clinical positions were reported. Results reported that general dentists have lesser experience as compared to specialists. Specialists use gingival for all fixed prostheses cases, as well as general dentists, do. The preferred method for displacement is mechanical for both positions, epinephrine is the preferred chemical, and general dentists use ferric acid more than specialists. Both wet the retraction cord before the procedure and routinely asked for medical history along with vital checks never had any complaints. So Shrestha *et al.*, 2017 reported in their study that 5.1% of dental specialists utilized the cordless method, and 18.9% utilized the careful method as a guide for gingival uprooting. Pre-impregnated strings were utilized by a sum of 47 (26.1%) dental specialists of which, 49% operated aluminium chloride pre-impregnated strings, 29.8% utilized strings impregnated with aluminium potassium sulfate also, and 27.6% utilized epinephrine impregnated withdrawal string. This could be because of the expanded degree of mindfulness among

rehearsing dental specialists concerning the unfavorable impacts of epinephrine impregnated lines. 47 dental specialists who utilized the withdrawal line wet the withdrawal rope before evacuation from the gingival sulcus. [7].

In the last analysis, comparison across experience, non-significant differences revealed that participants having more than 10 years of experience were mostly female and specialists (**Table 4**). Participants from both groups use gingival for all fixed prostheses. The preferred choice for the displacement method is mechanical for both groups but more specialists use a combination of all three scenarios. The preferred chemical was epinephrine for both, and the second preference was ferric acid, while the third for more experienced was another. For lesser ones, Aluminum chloride was the third choice. Both groups wet the retraction before the procedure and ask for medical history routinely. Those having lesser experience had patients with complaints more than those with higher experience, but overall, both groups have no patients with complaints. Literature reported that difference based on experience is not yet studied on this topic. This research is also a worthy addition to the existing body of knowledge.

CONCLUSION

The presentation was based on the gingival displacement method used by dental professionals, knowledge of dentists in Saudi Arabia. Data were analyzed through chi-square and findings reported non-significant differences across gender, a significant difference in clinical position with regards to working experience. Females were more experienced than male participants. Both groups, specialists, general dentists, all provide gingival displacement for fixed prostheses, the preferred method was mechanical while the preferred

chemical was epinephrine. During acquiring skills, specialists having experience use combination of all three scenarios for treatment.

ACKNOWLEDGMENTS: Authors of this study would like to acknowledge the support and cooperation of the research center of Qassim University.

CONFLICT OF INTEREST: None

FINANCIAL SUPPORT: None

ETHICS STATEMENT: This study fulfilled all the ethical requirements including data collection and confidentiality of study participants.

REFERENCES

1. Reddy SG, Bharathi M, Vinod B, Reddy KR, Reddy NS. Gingival displacement methods used by dental professionals: A survey. *J Orofac Sci.* 2016;8(2):120.
2. Gajbhiye V, Banerjee R, Jaiswal P, Chandak A, Radke U. Comparative evaluation of three gingival displacement materials for efficacy in tissue management and dimensional accuracy. *J Indian Prosthodont Soc.* 2019;19(2):173.
3. Curtis DA, Lin GH, Rajendran Y, Gessese T, Suryadevara J, Kapila YL. Treatment planning considerations in the older adult with periodontal disease. *Periodontology 2000.* 2021;87(1):157-65.
4. Einarsdottir ER, Lang NP, Aspelund T, Pjetursson BE. A multicenter randomized, controlled clinical trial comparing the use of displacement cords, an aluminum chloride paste, and a combination of paste and cords for tissue displacement. *J Prosthet Dent.* 2018;119(1):82-8.
5. Kumari S, Singh P, Parmar UG, Patel AM. Evaluation of Effectiveness of Three New Gingival Retraction Systems: A Comparative Study. *J Contemp Dent Pract.* 2021;22(8):922-7.
6. Prasad KD, Hegde C, Agrawal G, Shetty M. Gingival displacement in prosthodontics: A critical review of existing methods. *J Interdiscip Dent.* 2011;1(2):80.
7. Shrestha L, Pradhan D, Mehta VV, Dixit S. Gingival retraction methods: A descriptive survey among dentists in Nepal. *Int J Contemp Med Res.* 2017;4:1836-9.
8. Al-Ani A, Bennani V, Chandler NP, Lyons KM, Thomson WM. New Zealand dentists' use of gingival retraction techniques for fixed prosthodontics and implants. *NZ Dent J.* 2010;106(3):92-6.