

The Knowledge and Practice of Fixed Prosthodontics: A Survey among Saudi Arabian Dental Practitioners

Saud Abdulaziz Alharbi, B.D.S* Mazen Sulaiman Alkhalaf, B.D.S** Osama Ahmad Alswailem, B.D.S*** Syed Shujaula, M.D.S****

ABSTRACT

Objective: The aim of this study was to evaluate the knowledge, attitude and fixed prosthodontics practice guidelines amongst dental practitioners in the Kingdom of Saudi Arabia.

Design: A descriptive cross-sectional study was done in the Kingdom of Saudi Arabia.

Setting: This study was done amongst 500 Dental Practitioners in the Kingdom of Saudi Arabia in 2020-21.

Methods: 500 dentists were selected randomly from private and public dental sectors and dental schools. A survey was conducted through a questionnaire composed of 19 questions. An IBM SPSS statistical program was employed for the analysis. Chi square test was used to compare between males and females. All questions had the p value < 0.05 that means there is statistically significant difference. Results were analyzed and compared using Chi-square.

Results: This study showed that 320 (64%) participants fabricated study cast before proceeding with the fabrication of the fixed prostheses and 420 (82%) of them assessed abutment tooth radiographically. The vitality test for restored abutments was always done by 330 (66%) of the respondents, Carbide and diamond burs were used by 230 (46%) and additional cured silicone was used by 380 (76%) of them for making final impression. Maximum number of participants [410 (82%)] used retraction cord before making final impression. Both written prescriptions and verbal instructions were used by 360 (72%) of the practitioners for communication with the lab.

Conclusion: Dental practitioners showed acceptable level of knowledge, awareness and practice of fixed prosthodontics. There was no gender variation in the knowledge regarding the fixed prosthesis.

Keywords: Prosthodontics, Dental practitioner, Nursing, Students

INTRODUCTION

Dental caries, periodontal diseases or trauma can lead to loss of tooth or tooth structure. This can affect esthetics & function of the remaining dentition¹. For maximum satisfaction of both the patient and the practitioner, is the treatment provided by the fixed prosthodontic modality as one of the major line of treatment. This modality of treatment can transform an unhealthy, poor esthetic and less function tooth/teeth into an attractive (esthetic) and functionally sound teeth or tooth. Thus the quality of fixed prosthetic treatment directly affects its long time survival and provides good function².

It is essential that the dental practitioner follows all the fundamental clinical guidelines for longevity of treatment³. The study aimed to assess the private section practitioner's knowledge, awareness level and application in clinical practice showed significant variation in the private section practitioners in their fixed prosthodontics (FPD) practice, definitely deviating from the recommended clinical protocols⁴.

Though the dental practitioners were aware of the laminate veneer, it is necessary to increase their awareness about the recent advances

and consequences for laminate veneer failure⁵. The purpose of this study was to evaluate the knowledge, attitude and practice of fixed prosthodontics among dental practitioners in Saudi Arabia.

METHODS

This descriptive cross-sectional study was conducted through questionnaire based on e-survey among 500 dental Interns and Dental practitioners selected randomly from private and public sectors and dental schools around Kingdom of Saudi Arabia. The study was approved by Qassim University Dental Research Facilitation Committee.

Selection Criteria

- i. The dentist must work inside the kingdom of Saudi Arabia
- ii. Has at least completed five fixed Prosthodontics cases

A questionnaire was distributed to 500 dental interns and dental practitioners around Saudi Arabia to know what exact steps they follow while fabricating a fixed prosthesis.

* College of Dentistry
Qassim University, Saudi Arabia.
E-mail: Saud.Alharbi@qudent.org

** College of Dentistry, Qassim University, Saudi Arabia.

*** College of Dentistry, Qassim University, Saudi Arabia.

**** Assistant Professor
Department of Prosthodontics (Fixed and Removable)
College of Dentistry, Qassim University, Saudi Arabia.

A survey was conducted with 19 online standard questionnaire which were mailed to dental practitioners. The questionnaire comprised questions to assess the knowledge, attitude, and practice of fixed prosthodontics among dental practitioners (DP's) of kingdom of Saudi Arabia, which is adapted to Kannan et al⁴. Questionnaires were mailed randomly to dental practitioners and dental interns throughout the kingdom including private and public clinics. Questionnaire was prepared both in English and Arabic languages.

All the participants were informed about the aims and objectives of the study. After eliciting their consent in participation, the questionnaires were mailed. Adequate time was provided to fill the questionnaire. The response of the practitioners was recorded, analyzed for flaws, checked for completeness and were taken up for assessment. The questionnaires consisted of the first part measured gender, level of education, nationality, place of work and number of years of practicing experience. The second part evaluated the knowledge of standard guidelines to be followed by the practitioner in prosthodontic practice such as pre-treatment vitality tests, radiographic evaluation, type of try used, type of impression, impression material and quality of communication with the dental laboratory technician.

STATISTICAL ANALYSIS OF RESULTS

Sample was collected and compared to the standard and results were shown as Percentages. An IBM SPSS statistical program was employed for the analysis. Chi square test was used to compare between males and females. All questions had the p value < 0.05 that means there is statistically significant difference. Results were analyzed and compared using Chi-square.

RESULTS

A total of 500 dentists participated in the study; 150 (30%) were females while 350 (70%) were males. 475 (95%) were Saudis while 25 (5%) were Non-Saudi practitioners (Table 1). Among 500 respondents, 135 (27%) were newly graduated dentists (interns) and 365 (73%) were general practitioners (Table 1). 320 (31%) of dentists were practicing crown and bridge for 1-3 years, 150 (30%) of dentists were practicing crown and bridge for 4-10 years, 10 (2%) of dentist were practicing for 11-16 years while 54 (18.6%) of them were practicing for more than 16 years (Table 1). Most of respondents 250 (50%) worked in private clinics. While 150 (30%) of respondents worked in dental schools and 100 (20%) worked in government hospitals (interns) (Table 1).

Table 1: Demographic structure of sample

	No	Percentage %
Gender		
Male	350	70%
Female	150	30%
Nationality		
Saudi	475	95%
Non-Saudi	25	5%
Years of practice		
1-3 Y	320	64%
4-10 Y	150	30%
11-16 Y	20	4%
More than 16 Y	10	2%
Level of education		
Newly graduated dentist (interns)	135	27%

	General practitioners	365	73%
Place of work			
Private clinics	250	50%	
Dental schools	150	30%	
Governmental hospitals	100	20%	

320 (64%) of participants always fabricated study models before commencing fixed prosthodontic treatment and 155 (31%) of them often fabricated and 25 (5%) of participants started treatment without study models (Table 2). 420 (82%) of participants always used radiographs for abutment tooth evaluation 80 (18%) of them used it often.

330 (66%), always carried on the vitality test for the restored abutment teeth and 134 (26.8%) often did while 36 (7.2%) rarely conducted the vitality test of the restored abutment teeth. Majority of respondents 400 (80%) were using high-speed hand pieces and 95 (19%) were using both high and low speed during preparation and only 5 (1%) were using low speed hand piece. The diamond bur was used during preparation by 230 (46%) and 5 (1%) of the participants were using carbide burs whereas 265 (53%) were using both carbide and diamond burs during preparation (Table 2). Table 2 shows that additional silicon was mostly used the practitioners i.e., 380 (76%) for making final impression followed by condensation cured silicon 65 (13.3%) and 25 (5%) preferred to make final impressions by alginate 30 (6%) were using other materials. 265 (73%) of respondents were using stock trays and 50 (10%) preferred using special trays. 85 (17%) preferred to use both special and stock try in their practice (Table 2).

Putty and wash techniques were mostly used by dentists 400 (80%) who use elastomeric impression material followed by single step 55 (11%). Monophase technique was used by 25 (5%). 20(4%) of respondents rarely took bite registration do intraocclusal records (bite) for multiple teeth replacement. while majority of respondents 415 (83%) always took bite registration and 65 (13%) participants often used wax for bite registration and 20 (4%) rarely used bite registration. 290 (58%) of the respondents always wax for bite registration, 85 (17%) used wax and silicon while 125 (25%) used silicone alone. (Table 2) 410 (82%) of respondents always used retraction cord and 90 (18%) often used retraction cords. 435 (87%) practitioners always gave provisional restoration while 55 (11%) often gave provisional restoration unlike 10 (2%) of the practitioners never gave provisional crown and bridges. 455 (91%) respondents disinfected the final impression chemically before fabricating cast and sending to lab, while 40 (8%) often disinfected and 5 (1%) of them did not disinfect it (Table 2). Both written prescriptions and verbal communications were used during communication between dentist and lab by 360 (72%) respondents while 135 (27%) provided written instructions and 5 (1%) gave only verbal communication. There was significant statistical difference between male and female practitioners regarding all the information received through the e response related to the steps involved in the fabrication of fixed prostheses (P=0.001) except for gender variation for the survey related to communication method of the dental practitioner with the dental technician showed P=0.046 (Table 2).

DISCUSSION

This descriptive cross-sectional study was used to assess knowledge, attitude and fixed prosthodontics practice among Dental Practitioners Saudi Arabia. The most essential part for proper diagnosis and treatment planning is making of study models⁶. Evaluation of the abutment is considered as an integral part in diagnosis and treatment

Table 2: Response rate of the participants on different parameters evaluated

Independent variables	Male N= (%)	Female N= (%)	Total N= (%)	Significance
6. Do you make study cast?				
Always	220 (62.9)	100(66)	320 (64)	P=0.003
Often	105 (30)	50(33.3)	155 (31) 25	
Rare	25(7.1)	0(0)	(5)	
7. Do you take a preoperative radiograph for the abutment tooth (teeth)?				
Always	270(77.1)	150(100)	420(82)	P=0.001
Often	80(22.9)	0(0)	80(18)	
8. Do you do vitality test for restored abutment?				
Always	215(61.4)	115(76.7)	330(66)	P=0.001
Often	144(32.6)	20(13.3)	134(26.8)	
Rare	21(6)	15 (10)	36 (7.2)	
9. Which type of handpiece do you use in the preparation?				
High speed	250(71.4)	150 (100)	400 (80)	P=0.001
Low speed	5 (1.4)	0 (0)	5 (1.0)	
Both	95 (27.1)	0(0)	95(19)	
10. Types of burs you usually use?				
Carbide bur Diamond bur	5 (1.4)	0 (0)	5 (1.0)	P=0.001
Carbide and diamond burs	130 (37.1)	100 (69.3)	230 (46.0)	
	215 (61.4)	50 (33.3)	265 (53)	
11. Which type of impression material do you often use for the final impression?				
Alginate	25 (7.1)	0 (0)	25 (5.0)	P=0.001
Additional cured silicon	245 (70.0)	135 (90.0)	380 (76.0)	
Condensation cured silicon	50 (14.3)	15 (10)	65 (13.3)	
Others	30 (8.6)	0 (0)	30 (6.0)	
12. Which type of impression tray do you use for final impression?				
Stock trays	245 (70.0)	120 (80)	265 (73.0)	P=0.001
Special trays	50 (14.3)	0 (0)	50 (10)	
Both	55 (15.7)	30 (20.0)	85 (17.0)	
13. If you use elastomeric impression materials, which type of impression techniques do you use?				
Putty and wash techniques	250 (71.3)	150 (100)	400 (80)	P=0.001
Monophase	25 (7.1)	0 (0)	25 (5)	
Single step	55 (15.7)	0 (0)	55 (11)	
Other	20 (5.7)	0 (0)	20 (4)	
14. Do you do interocclusal records (bite) for multiple teeth replacement?				
Always	270 (77.1)	145 (96.7)	415 (83)	P=0.001
Often	60 (17.1)	5 (3.3)	65 (13.3)	
Rare	20 (5.7)	0 (0)	20 (4.0)	
15. If yes, which material do you use?				
Wax	230 (65.7)	60 (40.0)	290 (58.0)	P=0.001
Silicon	40 (11.4)	85 (56.7)	125 (25)	
Wax and Silicon	80 (22.9)	5 (3.3)	85 (17)	
16. Do you use retracting cord for soft tissue displacement before you take the impression?				
Always	270 (77.1)	140 (93.3)	410 (82.0)	P=0.001
Often	80 (22.9)	10 (6.7)	90 (18.0)	
17. Do you do Provisional or temporary crown or bridge after finishing the preparation?				
Always	285 (81.4)	150 (100)	435 (87.0)	P=0.001
Often	55 (15.7)	0 (0)	55 (11.0)	
Rare	10 (2.9)	0 (0)	10 (2.0)	
18. Do you chemically disinfect the impression after your remove it from the patient mouth and before you pour it or send it to the lab?				
Always	305 (87.1)	150 (100)	455 (91.0)	P=0.001
Often	40 (11.4)	0 (0)	40 (8.0)	
Rare	5 (1.4)	0 (0)	5 (1.0)	
19. What is your communication method with the dental technician?				
Written prescriptions	85 (24.3)	50 (33.3)	135 (27.0)	P=0.046
Verbal communications	5 (1.4)	0 (0)	5 (1.0)	
Both	260 (74.3)	108 (66.8)	360 (72.0)	

planning for fixed prosthodontic restorations⁷. The results of this survey showed that study models were routinely fabricated by most of the participants before initiating the treatment (320) 64% and 420 (84%) of the respondents took radiographs to evaluate abutment tooth/teeth. Vitality test for restored abutments were always done by 330 (66%) respondents. In the study done by Moldi E et al. to know the techniques and materials used by the practitioners found that 29% practitioners do not take diagnostic impressions and proceeded with the tooth preparation after the clinical intraoral examination⁸. Unacceptable practice in crown and bridge work was noted and majority of the surveyed practitioners rarely used study casts (38.1%) and radiograph (35.6%) for the abutment tooth, Sixty-eight (46%) of surveyed DP's never used vitality test for abutment tooth in the study done by Mohamed AB et al. (2010)⁹.

In this study 265 (53%) of the DPs used both carbide and diamond burs for tooth preparation. A survey conducted in North American dental schools regarding recommendations for rotary instrumentation for fixed prosthodontic and operative procedures at the predoctoral and postgraduate level. Completed surveys were received from 58 of 64 dental schools, a response rate >90%. Medium grit burs predominated in predoctoral education for gross tooth reduction for fixed prosthodontics, whereas coarse grit burs predominated at the graduate level ($p < .05$). The use of the diamond bur alone predominated for axial wall refinement, whereas the use of carbide burs or carbide burs in combination with diamond burs prevails for marginal refinement ($p < .05$). In predoctoral operative dentistry, recommendations for cavity outline form were similar at all dental schools ($p > .05$) and were principally tungsten carbide (WC) burs. Carbide burs were the instrument of choice for internal walls, but the WC bur alone or in combination with diamond burs were preferred for refining composite margins ($p < .05$)¹⁰.

The results of the present study revealed that additional cured silicon was mostly used, 380 (76%) for making final impression followed by condensation cured silicon, 65 (13%) and 25 (5%) preferred to make final impression using alginate, The results of questionnaire study done in Maharashtra state, India revealed 43% of participants used irreversible hydrocolloid, 26% used Condensation silicone, 23% used addition silicone, 5% use polyether, 2% uses polysulfide impression material¹¹. Similar study conducted in Khartoum showed that alginate impression material, 101 (68.2%) was the most common used type of impression material by the surveyed DP's while Condensation cured silicone 36 (24.3%) and additional cured silicone 11 (7.4%) materials were also selected⁹. Another study conducted in India, found that 55.46% used irreversible hydrocolloid and 44.54% use elastomeric impression materials to make final impression⁸. Regarding impression technique used for final impression, Putty and wash techniques were mostly used by dentists who used elastomeric impression material 400 (80%) in present study. Amruta et al., found that Elastomeric impression technique practiced most commonly was single mix (48%); 28% use putty reline without spacer, 20% use putty reline with spacer, 3% use multiple mix technique¹¹. Another study found that elastomeric impression technique was practiced most commonly is putty reline with/without spacer (77.2%)⁸. Similar study done in Khartoum state show that the putty and wash impression technique was the most recommended technique and it was selected by 38 DP's (80%)⁹.

The aim of Maru K et al. study was to gather information on selection, usage, and materials and methods employed in inter-occlusal records and their communication with the dental laboratory for restorative procedures practiced by dentists, their result showed that a significant number of dental practitioners (79%) use inter-occlusal recording materials for the fabrication of crowns and bridge works. The most

commonly use inter-occlusal recording material was wax (54.6%)¹², In the study done in Khartoum state ,wax was the most popular registration material, being selected by 100 DP's (94.3%), followed by silicone 5 (4.7%) and silicone putty 1 (0.9%)⁹. In the present study majority of respondents, 415 (83) always took bite registration for multiple teeth replacement and wax was the most used material for bite registration 290 (58%).

Regarding using retraction cord before taking final impression, Gadhavi et al., aimed to evaluate the use of various gingival displacement techniques prior to impression making in fixed partial dentures by the Prosthodontists in Vadodara. The results of their study showed that 62% prefer the use of gingival displacement technique for successful clinical practice while 38% of them do not follow the procedure believing it does not make major difference in clinical practice¹³ and also Moldi et al. found that 72.8% of practitioners use gingival retraction cord⁸. Amruta et al. found that, 51% do not practice gingival retraction, 46% of practitioners use gingival retraction cord, 2% do rotary curettage, 1% use laser and electro-surgery seems rarely used for gingival retraction by private dental practitioners¹¹. On the other hand, Only 9.4% used retraction cord while 53.7% of the surveyed DP's never adopted the use of retraction cords⁹. While in the current study 117 (40.3%) of respondents always used retraction cord and 15 (5.2%) never used retraction cord.

The utilization of properly fabricated provisional prostheses will permit a higher rate of success of the definitive treatment¹⁴. More than one third of the investigated DP's (36%) in Khartoum state never made provisional crown and bridge restorations, and the majority of the two thirds not always made it⁹. In present study provisional restorations were routinely used by 435 (87%) practitioners which reveals their knowledge in standard practice guidelines.

Prevention of cross infection in dental practice in general and dental laboratory specifically should now be a routine in practice. In Khartoum state, 73% of the surveyed dental practitioners never disinfected the impression before being send to the dental laboratory and they recommended that the DPs should be provided with continuous dental education programmes especially in the practice of crown and bridge work⁹. In 2014, study conducted in Qassim, Saudi Arabia found that the majority of Qassim Prosthodontists routinely rinse and disinfect the preliminary/working impressions prior to sending them to the dental laboratory¹⁵ Also in present study 455 (91%) of respondents disinfect the final impression chemically before pouring it and sending it to the lab.

Many studies have demonstrated concerns about the quality of dentist and dental technician communication¹⁶. Poor communication between dental practitioners and dental technicians for fixed prosthodontics was cited in Ireland¹⁷. Another study showed that both verbal and written prescriptions (54%) were selected as a communication method between DP's and technicians⁹. Result of the survey conducted in Riyadh by Tulbah et al. showed that the quality of communication between dentists and dental technicians in Riyadh can sometimes be inadequate, and governmental laboratories have a lower level of communication¹⁸. This may be due to the lack of communication between Prosthodontists and their dental technicians, as reported by a study conducted in Qassim by Sedky N. in 2014¹⁵. While the current study showed that the dentists, 360 (72.%) communicated well with the labs by giving both written and verbal instructions.

CONCLUSION

Dental practitioners showed acceptable level of knowledge, awareness and practice of fixed prosthodontics. There was no

gender variation in the knowledge regarding the fixed prosthesis. However, efforts should be made for the practitioners to be aware of advances in fixed prosthodontics through continuous dental education programs.

More surveys should be conducted involving a greater number of dental practitioners to know their improvement in the fixed prosthesis treatment to enable better quality and greater service to the patients. As fixed prosthodontic restorative procedures are widely practiced for dental rehabilitation in Saudi Arabia, it is very important to measure and evaluate the knowledge of DPs about the details of basic steps in the field of fixed prosthodontics and the way of practicing this important branch of dentistry.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflict of Interest: None.

Competing Interest: None.

Acceptance Date: 27 December 2021

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