

The knowledge, attitude and practice of fixed prosthodontics: A survey among Qassim dental practitioners

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ABSTRACT

Aim: The aim of this study was to evaluate the knowledge, attitude and fixed prosthodontics practice guidelines amongst dental practitioners of Qassim in Saudi Arabia. **Materials and Methods:** A descriptive cross-sectional study was done amongst the Dental Practitioners of Qassim Province, Saudi Arabia in 2018. A total of 290 dentists were selected randomly (from public and private dental clinics and dental schools). A survey was conducted through printed and online questionnaire composed of 19 open and multiple-choice questions. Data from the completed questionnaires were analysed using the SPSS Statistical Software Package (version 25). All statistical analyses were carried out at a significance level of $P < 0.05$. Results were analysed and compared using the Chi-square test and frequency test. **Results:** This study showed that 227 (78.3%) of the participants assessed abutment tooth radiographically, also most of them fabricated study cast before starting crown and bridge procedures 37.2% (108). The vitality test for restored abutments was always done by 132 (45.5%) respondents, and 111 (38.3%) of them used poly vinyl siloxane for making final impression, which provides the level of quality of final impression. A total of 117 (40.3%) of them always used retraction cord before making final impression. Both written prescriptions and verbal instructions were used by 209 (72.1%) of the practitioners for communication with the lab. The study revealed that there were no significant differences between males and females in answering questions 11, 13 and 17. **Conclusion:** The dental practitioners (DPs) of Qassim displayed an acceptable level of knowledge and a level of awareness of fixed prosthodontics practicing. However, to further enhance the proficiency, efforts should be made to encourage the practitioners to be aware of the advances in fixed prosthodontics practice through state-of-the-art continuous education programmes. **Clinical Significance:** As fixed prosthodontic restorative procedures are widely practiced for dental rehabilitation in Saudi Arabia, it was 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.

Keywords: Bridge, crown, dental practitioners, fixed prosthodontics

Introduction

Loss of tooth or tooth form often occurs due to caries, periodontal pathology or trauma. Fixed prosthetic replacement and restoration of teeth restores form, function and aesthetic

of the damaged or lost dentition.^[1] Fixed prosthodontics treatment modality provides exceptional satisfaction for both patient and the dental practitioner. It can transform an unhealthy, unattractive dentition with poor function into a comfortable, healthy occlusion capable of years of further service while greatly enhancing aesthetics.^[2] The quality of construction of fixed prostheses directly affects its long-term survival. It is essential that the dental practitioner follows all the fundamental clinical guidelines for longevity of the treatment.^[3] Several studies were

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conducted to evaluate the knowledge, attitude and practice of fixed prosthodontics among dental practitioners. The Kannan *et al.* study aimed to assess the private section practitioner's knowledge, awareness level and application in clinical practice; it showed significant variation in the private section practitioners in their fixed prosthodontics (FPD) practice, definitely deviate from the recommended clinical protocols.^[4] Another study conducted by Ashwatha *et al.* found that the dental practitioners were aware of the laminate veneers. It is necessary to increase the awareness among dental practitioner about the recent advances and consequences of laminate veneer failure.^[5] The purpose of this study was to evaluate the knowledge, attitude and practice of fixed prosthodontics among dental practitioners in Qassim, Saudi Arabia.

Materials and Method

Study setting

This descriptive cross-sectional study was done among dental practitioners (DPs) (general practitioner [GP] and dental intern) of the Qassim province (Buraydah, Unaizah, Al Rass, Almethnab, Al-Bukairiyah and Badaya'a). A total of 290 dentists were selected randomly from private and public sectors and dental schools. The study was approved by Qassim University Dental Research Facilitation Committee on 10 march 2018, EA/6012/2018.

Study subjects

A total of 290 dentists participated in this study. Of which, 164 (56.6%) were females while 126 (43.4%) were males. Hundred and five (36.2%) Saudi practitioners and 185 (63.8%) non-Saudi practitioners participated in the study.

Methodology

A survey was conducted through a printed and online standard questionnaire with 19 open as well as multiple choice questions delivered to dental practitioners. Questionnaire was prepared both in English and Arabic languages. The questionnaire comprised questions to assess the knowledge, attitude, and practice of fixed prosthodontics among dental practitioners (DP's) of Qassim which is adapted to Kannan *et al.*^[4] Questionnaires were distributed to practitioners of Qassim private and public clinics of Buraydah, Unaizah, Al Rass, Almethnab, Al-Bukairiyah and Badaya'a regions and private and public dental schools of Qassim. The questionnaire was semi-structured and pre-tested to check the validity and reliability. The pre-testing of paper-based questionnaire was done by running a pilot test on 30 dentists. The result of the pilot study was evaluated and a reliability coefficient (α) of 0.80 or more was considered adequate. All the respondents were informed about the aims and objectives of the study. After eliciting their consent in participation, the questionnaires were distributed. Adequate time was provided to fill the questionnaire. The response of the practitioners were recorded, analysed for flaws, checked for completeness and were taken up for assessment. The questionnaires consisted of two parts. 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

After data was collected and coded, the statistical analysis was done using SPSS statistical software package (Version 25). All statistical analyses were carried out at a significance level of $P < 0.05$. Results were analysed and compared using Chi-square test and frequency test.

Results

A total of 290 dentists participated in the study; 164 (56.6%) were females while 126 (43.4%) were males. 105 (36.2%) were Saudis while 185 (63.8%) were Non-Saudi practitioners [Table 1].

Among 290 respondents, 84 (29%) were newly graduated dentists (interns) and 206 (71%) were general practitioners [Table 1]. 90 (31%) of dentists were practicing crown and bridge for 1-3 years, 98 (33.8%) of dentists were practicing crown and bridge for 4-10 years, 48 (16.6%) of dentist were practicing for 11-15 years while 54 (18.6%) of them were practicing for more than 16 years [Table 1].

Most of respondents 191 (65.9%) worked in private clinics. While, 81 (27.9%) of respondents worked in dental schools and 18 (6.2%) dentists worked in governmental hospitals [Table 1].

108 (37.2%) of participants fabricated study models before commencing fixed prosthodontic treatment and 84 (29%)

Table 1: Demographic structure of sample

	No	Percentage %
1-Gender		
Female	164	56.6%
Male	126	43.4%
2-Nationality		
Saudi	105	36.2%
Non Saudi	185	63.8%
3-Year of practice		
1-3 years	90	31%
4-10 years	98	33.8%
11-15 years	48	16.6%
More than 16 years	54	18.6%
4-Level education		
Newly graduated dentists (interns)	84	29%
General practitioners	206	71%
5-Place of work		
Private clinics	191	65.9%
Dental schools	81	27.9%
Governmental hospitals	18	6.2%

of them rarely fabricated it and 86 (29.7%) of participants answered that they often fabricate study models and 12 (4.1%) of participants starts treatment without study models [Table 2].

227 (78.3%) of participants always used radiographs for abutment tooth evaluation 45 (15.5%) of them used it often and 3 (1%) never used any radiograph before starting treatment [Table 2].

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

	Male, N (%)	Female, N (%)	Total, N (%)	Significance
6-Do you make study cast?				
Always	36 (28.6)	72 (43.9)	108 (37.2)	X ² =16.672 P=0.001
Often	33 (26.2)	53 (32.3)	86 (29.7)	
Rare	48 (38.1)	36 (22)	84 (29)	
Never	9 (7.1)	3 (1.8)	12 (4.1)	
7-Do you take a preoperative radiograph for the abutment tooth (teeth)?				
Always	96 (76.2)	131 (79.9)	227 (78.3)	X ² =10.803 P=0.013
Often	18 (14.3)	27 (16.5)	45 (15.5)	
Rare	12 (9.5)	3 (1.8)	15 (5.2)	
Never	0 (0)	3 (1.8)	3 (1)	
8-Do you do vitality test for restored abutment?				
Always	72 (57.1)	60 (36.6)	132 (45.5)	X ² =14.298 P=0.003
Often	24 (19)	48 (29.3)	72 (24.8)	
Rare	21 (16.7)	47 (28.7)	68 (23.4)	
Never	9 (7.1)	9 (5.5)	18 (6.2)	
9-Which type of hand-piece do you use in the preparation?				
High speed	90 (71.4)	140 (85.4)	230 (79.3)	X ² =8.435 P=0.004
Low speed	0 (0)	0 (0)	0 (0)	
Both of them	36 (28.6)	24 (14.6)	60 (20.7)	
10-Types of burs you usually use?				
Carbide bur	0 (0)	0 (0)	0 (0)	X ² =10.720 P=0.001
Diamond bur	54 (42.9)	102 (62.2)	156 (53.8)	
Carbide and diamond burs	72 (57.1)	62 (37.8)	134 (46.2)	
11-Which type of impression material do you often use for the final impression?				
Alginate	21 (16.7)	38 (23.2)	59 (20.3)	X ² =5.759 P=0.124
Additional cured silicon	51 (40.5)	60 (36.6)	111 (38.3)	
Condensation cured silicon	30 (23.8)	48 (29.3)	78 (26.9)	
Others	24 (19)	18 (11)	42 (14.5)	
12-Which type of impression tray do you use for final impression?				
Stock trays	69 (54.8)	125 (76.2)	194 (66.9)	X ² =17.800 P=0.000
Special trays	9 (7.1)	12 (7.3)	21 (7.2)	
Both of them	48 (38.1)	27 (16.5)	75 (25.9)	
13-If you use elastomeric impression materials, which type of impression techniques do you use?				
Putty and wash techniques	87 (69)	131 (79.9)	218 (75.2)	X ² =7.202 P=0.066
Monophase	9 (7.1)	9 (5.5)	18 (6.2)	
Single step	27 (21.4)	24 (14.6)	51 (17.6)	
Other	3 (2.4)	0 (0)	3 (1)	
14-Do you do interocclusal records (bite) for multiple teeth replacement?				
Always	108 (85.7)	134 (81.7)	242 (83.4)	X ² =11.342 P=0.010
Often	15 (11.9)	12 (7.3)	27 (9.3)	
Rare	0 (0)	12 (7.3)	12 (4.1)	
Never	3 (2.4)	6 (3.7)	9 (3.1)	
15-If yes, which material do you use?				
Wax	63 (50)	116 (70.7)	179 (61.7)	X ² =16.771 P=0.000
Silicon	27 (21.4)	12 (7.3)	39 (13.4)	
Wax and Silicon	36 (28.6)	36 (22)	72 (24.8)	

Contd...

Table 2: Contd...

	Male, N (%)	Female, N (%)	Total, N (%)	Significance
16-Do you use retracting cord for soft tissue displacement before you take the impression?				
Always	69 (54.8)	48 (29.3)	117 (40.3)	X ² =24.134 P=0.0001
Often	30 (23.8)	69 (42.1)	99 (34.1)	
Rare	18 (14.3)	41 (25)	59 (20.3)	
Never	6 (3.7)	9 (7.1)	15 (5.2)	
17-Do you do Provisional or temporary crown or bridge after finishing the preparation?				
Always	60 (47.6)	72 (43.9)	132 (45.5)	X ² =6.688 P=0.083
Often	57 (45.2)	80 (48.8)	137 (47.2)	
Rare	9 (7.1)	6 (3.3)	15 (5.2)	
Never	0 (0)	6 (3.7)	6 (2.1)	
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	105 (83.3)	105 (64)	210 (72.4)	X ² =17.027 P=0.001
Often	12 (9.5)	18 (11)	30 (10.3)	
Rare	3 (2.4)	12 (7.3)	15 (5.2)	
Never	6 (4.8)	29 (17.7)	35 (12.1)	
19-What is your communication method with the dental technician?				
Written prescriptions	27 (21.4)	36 (22)	63 (21.7)	X ² =15.963 P=0.001
Verbal communications	0 (0)	15 (9.1)	15 (5.2)	
Both written prescriptions and verbal communications	96 (79.2)	113 (68.9)	209 (72.1)	
Other	3 (2.4)	0 (0)	3 (1)	

Vitality test for restored abutments were always done by 132 (45.5%) respondents while 72 (24.8%) often used it and 18 (6.2%) of respondents never use it on regular basis [Table 2].

Majority of respondents 230 (79.3%) were using high-speed handpieces and 60 (20.7%) were using both high and low speed during preparation. While preparing of teeth for dental prosthesis most of the dentists 129 (35.1%) were using three burs and more while 131 (35.6%) while 9 (2.4%) were using one bur during preparation. The diamond bur was mostly used during preparation 198 (53.8%) and 170 (46.2%) were using carbide and diamond burs during preparation [Table 2].

Table 2 shows that additional cured silicon were mostly used by most of the practitioners 111 (38.3%) for making final impression which provides the level of quality of final impression, followed by condensation cured silicon 78 (26.9%) and 59 (20.3%) preferred to make final impressions by alginate while 42 (14.5%) were using other materials. There were no significant differences between male and female participants ($P = 0.124$).

194 (66.9%) of respondents were using stock trays and 75 (25.9%) preferred to use both special and stock try in their practice [Table 2].

Putty and wash techniques were mostly used by dentists 218 (75.2%) who use elastomeric impression material followed by single step 51 (17.6%). Monophase technique was rarely used 18 (6.2%). There

were no significant differences between male and female ($P = 0.066$). Most of female participants 131 (79.9%) and 87 (69%) of male participants were using Putty and wash techniques [Table 2].

9 (3.1%) of respondents never and 12 (4.1%) rarely took bite registration while majority of respondents 242 (83.4%) always took bite registration for multiple teeth replacements. 179 (61.7%) participants used wax for bite registration, 72 (24.8%) used wax and silicon while 39 (13.4%) used silicone alone. [Table 2].

There was significant statistical difference between male and female practitioners regarding retraction cord usage before making final impression. 117 (40.3%) of respondents always used retraction cord and 15 (5.2) never used retraction cords.

132 (45.5%) practitioners always gave provisional restoration while 6 (2.1%) of female practitioners never give provisional crown and bridges. There were no significant differences between male and female respondents. ($P = 0.083$) Table 2.

210 (72.4%) respondents disinfected the final impression chemically before fabricating cast and sending to lab, while 35 (12.1%) of them did not disinfect it [Table 2].

Both written prescriptions and verbal communications were used during communication between dentist and lab by 209 (72.1%) respondents while 63 (21.7%) provide only written instructions [Table 2].

Discussion

This cross-sectional study was used to assess knowledge, attitude and fixed prosthodontics practice among Dental Practitioners in Qassim province, Saudi Arabia. Study models are essential for proper diagnosis and treatment planning.^[6] Evaluation of the abutment is considered as an integral part in diagnosis and treatment planning for fixed prosthodontic restorations.^[7] The current survey showed that most of participants (108) 37.2% fabricated study models routinely before starting treatment. (78.3%) 227 of participants always used radiographs for abutment tooth evaluation. Vitality test for restored abutments were always done by 132 (45.5%) respondents. The study of Moldi E *et al.* (2013) was to integrate impression techniques evolved all over the years for fixed partial dentures and to know the techniques and materials which are used by the practitioners, they found that that 29% practitioners do not take diagnostic impressions and proceeded with the tooth preparation after the clinical intraoral examination.^[8] Mohamed AB *et al.* (2010) found that unacceptable practice in crown and bridge work was noted that the 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.^[9] The results of the present study revealed that additional cured silicon was mostly used, 111 (38.3%) for making final impression followed by condensation cured silicon, 78 (26.9%) and 59 (20.3%) preferred to make final impression using alginate, The results of questionnaire undertaken in Maharashtra state (2016); 43% of participants used irreversible hydrocolloid, 26% used Condensation silicone, 23% used addition silicone, 5% use polyether, 2% uses polysulfide impression material.^[10] 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 selected.^[9] Another study conducted in India (2013), they found that 55.46% use irreversible hydrocolloid and 44.54% use elastomeric impression materials to make final impression.^[8] Regarding Impression technique used for final impression, Putty and wash techniques were mostly used by dentists who used elastomeric impression material 218 (75.2%) in present study. Amruta *et al.*, found that Elastomeric impression technique practiced most commonly is single mix (48%); 28% use putty reline without spacer, 20% use putty reline with spacer, 3% use multiple mix technique.^[10] Another study found that elastomeric impression technique 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] Regarding using retraction cord before taking final impression, Gadhavi *et al.*, the aim of their study was to evaluate the use of various gingival displacement techniques prior to impression making in fixed partial dentures by the Prosthodontists in Vadodara, the result of their study show 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 practice^[11] also Moldi *et al.* found that 72.8% of practitioners use gingival retraction cord.^[8] 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 practitioners.^[10] In the other hand, Only 9.4% used retraction cord while 53.7% of the surveyed DP's never adopted the use of retraction cords,^[9] while in the current study 117 (40.3%) of respondents always use retraction cord and 15 (5.2%) never use retraction cord. Regarding using of inter-occlusal record. Maru K *et al.*, the aim of their 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 practised 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] One hundred in Khartoum state and six DP's did a registration record. 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 present study the majority of respondents, 242 (83.4%) always took bite registration for multiple teeth replacement and wax was the most used material for bite registration 179 (61.7%). 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 disinfect the impression before being send to the dental laboratory and they recommended that provide continuous dental education programmes for all DP's especially in the practice of crown and bridge work.^[9] In 2014, study conducted in Qassim They found that the majority of Qassim Prosthodontists participating routinely rinses and disinfects the preliminary/working impressions prior to sending them to the dental laboratory^[13] Also in present study 210 (72.4%) of respondents disinfect the final impression chemically before pouring it and sending it to lab.

Many studies have demonstrated concerns about the quality of dentist technician communication.^[14] Poor communication between dental practitioners and dental technicians for fixed prosthodontics was cited in Ireland,^[15] Another study conducted in Khartoum showed that both verbal and written prescriptions (54%) were selected as a communication method between DP's and technicians.^[9] A survey conducted in Riyadh by Tulbah *et al.*, they evaluate the quality of communication between dentists and dental their result 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 communication.^[16] A study conducted in Qassim by Sedky N. in 2014, found that lack of communication between Prosthodontists and their dental technicians, reported a significant nonconformity of view between dental technicians and prosthodontics.^[13] While the current study showed that the Qassim dentists, 209 (72.1%) communicated well

with the labs by giving both written and verbal instructions. The utilization of properly fabricated provisional prostheses will permit a higher rate of success of the definitive treatment.^[17] 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 make it.^[9] In present study provisional restorations were routinely used by 132 (45.5%) practitioners which reveals their knowledge in standard practice guidelines.

Conclusion

Within the limitation of the study it can be concluded from the present investigation that most practitioners fabricated study models, used vitality test and took preoperative diagnostic radiographs for abutment evaluation. The additional cured silicon, stock trays and putty and wash techniques were mostly used for making final impression. The majority of dentists were using retraction cord before taking final impression. Most respondents always used inter-occlusal records for multiple teeth replacement and bite registration wax was the most used material for records. Most of dentists disinfected their final impression chemically before fabricating cast and send it to lab and both written prescriptions and verbal communications were used during communication between dentist and lab. Provisional restorations were always given by practitioners. Hence the dental practitioners (DP's) of Qassim displayed an acceptable level of knowledge in fixed prosthodontic practices. However, to further enhance the proficiency; efforts should be made to encourage the practitioners to be aware of the advances in fixed prosthodontic practice through state-of-the-art continuous education programs.

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Conflicts of interest

There are no conflicts of interest.

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