

KNOWLEDGE OF DENTAL PROFESSIONALS ABOUT THE MANAGEMENT OF FOOD IMPACTION ASSOCIATED WITH FIXED PARTIAL DENTURE PROSTHESIS

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ABSTRACT

One of the most common complaints about fixed partial denture (FPD) prostheses is food impaction. However, these complaints are often neglected by the dental practitioner leading to pain for the patient in the long term. This cross-sectional study was carried out among the dental professionals in Riyadh using an online survey. Dental clinics and hospitals in Riyadh were contacted and participants were asked to fill up the survey. This cross-sectional study was carried out among the dental professionals in Riyadh using an online survey. Dental clinics and hospitals in Riyadh were contacted and participants were asked to fill up the survey. Online questionnaire was constructed consisting of questions about demographic and personal data followed by questions about food impaction and its management. 410 dental professionals responded to the survey, which included 61% males and 39% females. Regarding their qualifications, 72% were BDS and 28% had done master's or Saudi board post-graduation. The attitudes of dentists when fabricating or giving instructions to lab technicians needs to be improved.

Key words: Food impaction, Fixed dental prosthesis, Complications, Dental professionals.

Introduction

Fixed Partial Dentures (FPD) are commonly used for prosthodontic rehabilitation [1]. However, the maintenance of it is of equal importance. Prosthesis dislodgement and food impaction are the most common complaints of the patients regarding FDP. Therefore, the practitioner must be aware of the factors of food impaction that lead to failures of FDP and that could help in minimization such incidences and meeting the patient's expectations [2, 3].

For the benefits of the patients, the dentist should be involved at the time of selection of pontic designs and its awareness should be improved on the pontic design selection for different situations, as it can reduce the harmful impacts of any food impaction [4].

One of the most common complaints about fixed partial denture (FPD) prostheses is food impaction. However, these complaints are often neglected by the dental practitioner leading to pain for the patient in the long term. The practitioner, therefore, must be able to evaluate the factors contributing towards the food impaction and then carry out the treatment. Generally, a patient is treated with a symptomatic treatment rather than a root cause elimination. Patients mostly complain about halitosis, bleeding gums, and pain. If the FI is not treated properly, it in future gives rise to secondary caries, periodontal pocket, gingival abscess formation, and interdental bone loss [5]. For temporary relief

in pain patients usually use dental floss, proximal brush, or toothpick. However, if the frequency of such use is increased it leads to increased frustration for the patients and worsens the inflammation [6, 7].

Eosinophilic Esophagitis (EoE) is the most widespread fundamental etiology in cases of food impaction. It is also seen that there is an increased incidence of the complicated EoE. Whereas it is also noted that EoE is not properly identified and addressed with patients by the medical practitioner [8].

In a similar study conducted, it was seen that the knowledge was good, however, there were some lacking. It was also seen that the knowledge and practice enhanced with increasing levels of education [9]. Another study showed that there was a lack of knowledge of interdental cleaning and practice. Therefore, mass educative programs should be introduced to increase awareness, knowledge, and its practice [10].

Another study in India indicated that dental professionals possess sufficient knowledge to make an appropriate diagnosis but there are knowledge gaps that warrant a need for more teaching such subjects in the dental undergraduate curriculum [11].

Study hypotheses

Knowledge of dental professionals about the management and effect of food impaction in FPDs is low.

Aims

- To determine the knowledge, experience, and practice among the dental professionals about the management of food impaction in FPDs.
- To compare the level of knowledge between dental professionals based on their work experience and qualification.

Materials and Methods

Study design

This cross-sectional study was carried out among the dental professionals in Riyadh using an online survey.

Sample

Dental clinics and hospitals in Riyadh were contacted and participants were asked to fill up the survey.

Instrument

Online questionnaire was constructed consisting of questions about demographic and personal data followed by questions about food impaction and its management.

Instrument validity and reliability

A pilot study was performed by sending the survey to twenty participants and the data reliability was assessed using Chronbach’s coefficient alpha. The validity of the questionnaire was evaluated by sending it to experts in REU, but no change was made.

Statistical analysis

Collected data were analyzed using SPSS22, where inferential and descriptive statistics were carried out. The significance level was considered below 0.05 using the Chi-square test.

Results and Discussion

A total of 410 dental professionals responded to the survey, which included 61% males and 39% females (**Figure 1**). Regarding their qualifications, 72% were BDS and 28% had done master’s or Saudi board post-graduation (**Figure 2**). As far as their work experience is concerned, 33% had more than 5 years of experience and 67% had less than 5 years (**Figure 3**). **Table 1** shows the frequencies of responses to questions asked in the questionnaire. 51.8% of the participants had received less than 5 patients with food impaction complaint in the last 6 months, most common complaint was pain on biting, 68.7% of patients were sometimes aware of any food impaction, most common site of FI was the posterior mandibular region (41%), 50.6% responded with food being impacted in interproximal spaces, 48.2% reported caries as a consequence of FI, 51.8% mentioned faulty prosthesis design as the cause of FI, the majority were in the favor of redoing the FPD (53%) as a

treatment of FI, 28.9% reported that patients mostly responded positively to the treatment and 37.3% revealed symptoms mostly subsided once treatment was provided.

Table 2 shows the comparison of survey responses based on qualification, with a majority of the differences being statistically significant. 30% of specialists had received more than 10 cases during 6 months as compared to 17% general practitioners (p-value: .007), 43% reported caries being the major consequence of FI as compared to 61% of specialists (p-value: .009), most common contributory factor for faulty FPD reported by GPs was poor margin adaptation and improper contour of the crown by the specialists (p-value: .009), specialists were more strict about giving necessary information to the lab technician as compared to general practitioners (p-value: .000) and 35% of specialists reported symptoms being fully subsided after treatment as compared to 10% of GPs (p-value: .000).

Table 3 demonstrates the comparison of survey responses based on work experience, with a majority of the differences being statistically significant as well. 41% of experienced dentists had received more than 10 cases during 6 months as compared to 17% of less experienced practitioners (p-value: .000), 22% of less-experienced practitioners reported FI being occurred in maxillary posteriors as compared to 32% of more experienced dentists (p-value: .000), most common contributory factor for faulty FPD reported by less experienced practitioners was poor margin adaptation and improper contour of the crown by more experienced dentists (p-value: .009).

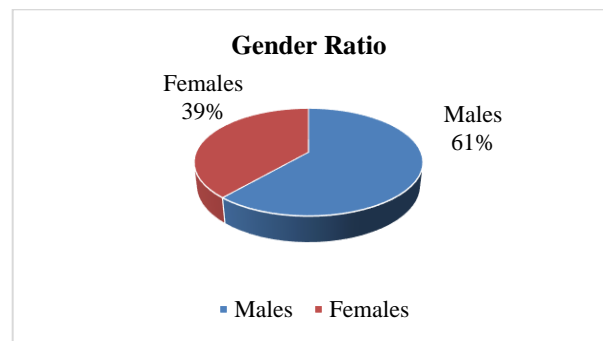


Figure 1. Gender ratio of study participants

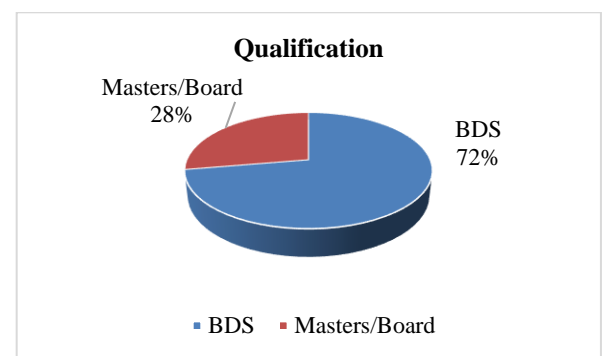


Figure 2. Qualifications of study participants

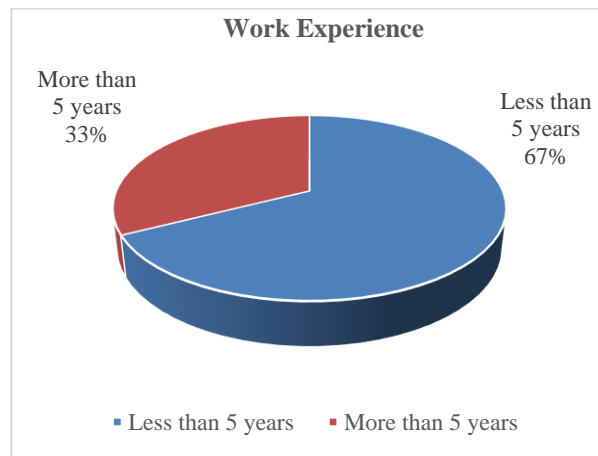


Figure 3. Work experience of study participants

Table 1. Response frequencies of the study participants

Survey Questions	Response Frequencies
Number of patients reporting complaints of food impaction in last 6 months	Less than 5: 51.8% 5 to 10: 27.7% More than 10: 20.5%
Presenting complaint along with food impaction	Pain: 41% Bleeding gums: 24.1% Halitosis: 24.1% Any other: 10.8%
Were the patients aware of the occurrence of food impaction?	Never: 7.2% Sometimes: 68.7% Mostly: 15.7% Always: 8.4%
Time elapsed after fabrication of prosthesis when food impaction occurred	less than 6 months: 50.6% 6 months to 1 year: 34.9% more than 1 year: 14.5%
Common site of food impaction about FPD/crown	Anterior maxillary region: 6% Posterior maxillary region: 28.9% Anterior mandibular region: 9.6% Posterior mandibular region: 41% No particular region: 14.5%
Surfaces most commonly involved in food impaction	labial/buccal: 16.9% lingual/palatal: 14.5% interproximal: 50.6% area beneath pontic: 18.1%
Consequences of food impaction observed	Proximal caries of teeth adjacent to abutment teeth: 48.2% Secondary caries beneath the crown in relation to abutment: 21.7% Pocket formation in relation to abutment teeth and adjacent abutment teeth: 20.5% Interproximal bone loss between the abutment and adjacent teeth: 9.6%
Presence of use of interdental aids	Never: 31.3% Sometimes: 57.8% Mostly: 7.2% Always: 3.6%

If yes, interdental aids used by the patient	Dental floss: 37.3% Interproximal toothbrush: 13.3% Toothpicks: 15.7% Anything else: 13.3% Not applicable: 20.5%
Most likely reason for food lodgment	Faulty FPD/crown design: 51.8% Improperly restored adjacent teeth: 33.7% Improper alignment of opposing teeth: 3.6% Others: 10.8%
Contributory factors for faulty FPD design	Improper contact relation of the crown with the adjacent tooth or crown: 30.1% Improper contour of the crown: 30.1% Improper pontic design: 12% Poor margin adaptation of the crown: 27.7%
Treatment options considered	Redoing the FPD: 53% Refilling of the adjacent tooth: 12% Altering the existing restoration of the adjacent tooth: 15.7% Blocking the interproximal contact area: 6% Prescribing interdental aids: 8.4% Others: 4.8%
Was the necessary information related to the new FPD design communicated to the lab technician?	Never: 8.4% Sometimes: 59% Mostly: 20.5% Always: 12%
Did the patients respond to prescribed treatment satisfactorily?	Never: 7.2% Sometimes: 51.8% Mostly: 28.9% Always: 12%
Specialists/Consultants to whom these patients can be referred	Prosthodontist: 62.7% Periodontist: 26.5% Any other: 10.8%
Did the symptoms of food impaction subside after final treatment?	Never: 8.4% Sometimes: 37.3% Mostly: 37.3% Always: 16.9%
Recall was done after how long	Once every month: 20.5% Once a year: 55.4% Once every 2 years: 13.3% No recall appointment was made: 10.8%

Table 2. Survey response comparisons on the basis of qualification

Survey Questions	BDS	Masters/Board	p-value
Number of patients reporting with complaints of food impaction in last 6 months	Less than 5: 55% 5 to 10: 28% More than 10: 17%	Less than 5: 43% 5 to 10: 26% More than 10: 30%	.007
Presenting complaint along with food impaction	Pain: 45% Bleeding gums: 23% Halitosis: 23% Any other: 8%	Pain: 30% Bleeding gums: 26% Halitosis: 26% Any other: 17%	.011
Were the patients aware of the occurrence of food impaction?	Never: 5% Sometimes: 72% Mostly: 17% Always: 7%	Never: 13% Sometimes: 61% Mostly: 13% Always: 13%	.004

Time elapsed after fabrication of prosthesis when food impaction occurred	less than 6 months: 53% 6 months to 1 year: 37% more than 1 year: 10%	less than 6 months: 43% 6 months to 1 year: 30% more than 1 year: 26%	.000
Common site of food impaction about FPD/crown	Anterior maxillary region: 7% Posterior maxillary region: 33% Anterior mandibular region: 7% Posterior mandibular region: 38% No particular region: 15%	Anterior maxillary region: 4% Posterior maxillary region: 17% Anterior mandibular region: 17% Posterior mandibular region: 48% No particular region: 13%	.000
Surfaces most commonly involved in food impaction	labial/buccal: 20% lingual/palatal: 12% interproximal: 50% area beneath pontic: 18%	labial/buccal: 9% lingual/palatal: 22% interproximal: 52% area beneath pontic: 17%	.007
Consequences of food impaction observed	Proximal caries of teeth adjacent to abutment teeth: 43% Secondary caries beneath the crown in relation to abutment: 25% Pocket formation in relation to abutment teeth and adjacent abutment teeth: 22% Interproximal bone loss between the abutment and adjacent teeth: 10%	Proximal caries of teeth adjacent to abutment teeth: 61% Secondary caries beneath the crown in relation to abutment: 13% Pocket formation in relation to abutment teeth and adjacent abutment teeth: 17% Interproximal bone loss between the abutment and adjacent teeth: 9%	.009
Presence of use of interdental aids	Never: 30% Sometimes: 62% Mostly: 7% Always: 2%	Never: 35% Sometimes: 48% Mostly: 9% Always: 9%	.002
If yes, interdental aids used by the patient	Dental floss: 37% Interproximal toothbrush: 13% Toothpicks: 13% Anything else: 17% Not applicable: 20%	Dental floss: 39% Interproximal toothbrush: 13% Toothpicks: 22% Anything else: 4% Not applicable: 22%	.009
Most likely reason for food lodgment	Faulty FPD/crown design: 53% Improperly restored adjacent teeth: 35% Improper alignment of opposing teeth: 5% Others: 7%	Faulty FPD/crown design: 48% Improperly restored adjacent teeth: 30% Improper alignment of opposing teeth: 0% Others: 22%	.000
Contributory factors for faulty FPD design	Improper contact relation of the crown with the adjacent tooth or crown: 28% Improper contour of the crown: 27% Improper pontic design: 15% Poor margin adaptation of the crown: 30%	Improper contact relation of the crown with the adjacent tooth or crown: 35% Improper contour of the crown: 39% Improper pontic design: 4% Poor margin adaptation of the crown: 22%	.002
Treatment options considered	Redoing the FPD: 50% Refilling of the adjacent tooth: 5% Altering the existing restoration of the adjacent tooth: 20% Blocking the interproximal contact area: 8% Prescribing interdental aids: 12% Others: 5%	Redoing the FPD: 61% Refilling of the adjacent tooth: 30% Altering the existing restoration of the adjacent tooth: 4% Blocking the interproximal contact area: 0% Prescribing interdental aids: 0% Others: 4%	.000
Was the necessary information related to the new FPD design communicated to the lab technician?	Never: 10% Sometimes: 58% Mostly: 23% Always: 8%	Never: 4% Sometimes: 61% Mostly: 13% Always: 22%	.000

Did the patients respond to prescribed treatment satisfactorily?	Never: 10% Sometimes: 52% Mostly: 30% Always: 8%	Never: 0% Sometimes: 52% Mostly: 26% Always: 22%	.000
Specialists/Consultants to whom these patients can be referred	No Statistically Significant Association		.670
Did the symptoms of food impaction subside after final treatment?	Never: 8% Sometimes: 40% Mostly: 42% Always: 10%	Never: 9% Sometimes: 30% Mostly: 26% Always: 35%	.000
Recall was done after how long	No Statistically Significant Association		.331

Table 3. Survey response comparisons on the basis of work experience

Survey Questions	Less than 5 years	More than 5 years	p-value
Number of patients reporting complaints of food impaction in last 6 months	Less than 5: 61% 5 to 10: 29% More than 10: 11%	Less than 5: 33% 5 to 10: 26% More than 10: 41%	.000
Presenting complaint along with food impaction	Pain: 41% Bleeding gums: 20% Halitosis: 30% Any other: 9%	Pain: 41% Bleeding gums: 33% Halitosis: 11% Any other: 15%	.000
Were the patients aware of the occurrence of food impaction?	No Statistically Significant Association		.082
Time elapsed after fabrication of prosthesis when food impaction occurred	less than 6 months: 59% 6 months to 1 year: 32% more than 1 year: 9%	less than 6 months: 33% 6 months to 1 year: 41% more than 1 year: 26%	.000
Common site of food impaction in relation to FPD/crown	Anterior maxillary region: 5% Posterior maxillary region: 32% Anterior mandibular region: 7% Posterior mandibular region: 45% No particular region: 11%	Anterior maxillary region: 7% Posterior maxillary region: 22% Anterior mandibular region: 15% Posterior mandibular region: 33% No particular region: 22%	.000
Surfaces most commonly involved in food impaction	No Statistically Significant Association		.098
Consequences of food impaction observed	No Statistically Significant Association		.205
Presence of use of interdental aids	Never: 32% Sometimes: 52% Mostly: 7% Always: 2%	Never: 30% Sometimes: 56% Mostly: 7% Always: 7%	.040
If yes, interdental aids used by the patient	Dental floss: 39% Interproximal toothbrush: 14% Toothpicks: 13% Anything else: 18% Not applicable: 16%	Dental floss: 33% Interproximal toothbrush: 11% Toothpicks: 22% Anything else: 4% Not applicable: 30%	.000
Most likely reason for food lodgment	Faulty FPD/crown design: 50% Improperly restored adjacent teeth: 38% Improper alignment of opposing teeth: 5% Others: 7%	Faulty FPD/crown design: 56% Improperly restored adjacent teeth: 26% Improper alignment of opposing teeth: 0% Others: 19%	.000
Contributory factors for faulty FPD design	Improper contact relation of the crown with the adjacent tooth or crown: 27%	Improper contact relation of the crown with the adjacent tooth or crown: 37%	.000

	Improper contour of the crown: 27% Improper pontic design: 16% Poor margin adaptation of the crown: 30%	Improper contour of the crown: 37% Improper pontic design: 4% Poor margin adaptation of the crown: 22%	
Treatment options considered	Redoing the FPD: 46% Refilling of the adjacent tooth: 9% Altering the existing restoration of the adjacent tooth: 21% Blocking the interproximal contact area: 9% Prescribing interdental aids: 13% Others: 2%	Redoing the FPD: 67% Refilling of the adjacent tooth: 19% Altering the existing restoration of the adjacent tooth: 4% Blocking the interproximal contact area: 0% Prescribing interdental aids: 0% Others: 11%	.000
Was the necessary information related to the new FPD design communicated to the lab technician?	No Statistically Significant Association		.000
Did the patients respond to prescribed treatment satisfactorily?	Never: 11% Sometimes: 52% Mostly: 30% Always: 7%	Never: 0% Sometimes: 52% Mostly: 26% Always: 22%	.000
Specialists/Consultants to whom these patients can be referred	No Statistically Significant Association		.572
Did the symptoms of food impaction subside after final treatment?	Never: 11% Sometimes: 36% Mostly: 39% Always: 14%	Never: 4% Sometimes: 41% Mostly: 33% Always: 22%	.017
Recall was done after how long	Once every month: 21% Once a year: 57% Once every 2 years: 9% No recall appointment was made: 13%	Once every month: 19% Once a year: 52% Once every 2 years: 22% No recall appointment was made: 7%	.002

The present study aimed at determining the experience and practice of dental practitioners towards the problems related to food impaction associated with fixed partial dentures. Untreated and chronic food impaction around a fixed prosthesis is accountable for inflammation that causes pain, bleeding, and edema around the mucosa. It also contributes to the onset of tooth mobility, loss of bone, pocket formation, papillary loss, and halitosis. It is important to comprehend the differences between food impaction and food lodgment. Unlike food impaction that is a more chronic condition, food lodgment is the mere lodgment of food particles and debris in mucosa around the fixed prosthesis that can be removed by natural self-cleansing mechanisms. So, to prevent the onset of food impaction around the prosthesis, clinicians should recall and monitor patients every 3-6 months for the development of faulty or open proximal contacts and occlusion [12]. However, the practice of recall was frequently maintained by merely 20.5% of our study participants on monthly basis.

Food impaction is caused mainly due to the faulty design of FPD or crown, which is reported by the study participants. Food impaction caused by faulty constructed restoration could be best prevented if appropriate precautions are taken while designing the prosthesis. In recent years, heat-pressed glass-ceramic material is extensively used for restoration. It can decrease the occurrence of food impact in those who preserved the adjacency relationship between the proximal

and distal middle surfaces of teeth. For the reconstruction of the adjacent area, compared to the traditional whole-crown restoration, they did not show better results in a good edge close and preventing food impaction [13].

It was observed in our findings that the most common problem related to the prosthesis and food impaction was pain, followed by bleeding gums and halitosis. Another similar study conducted in Chennai, India by Ashok & Sangeetha (2016) listed the common problems associated with fixed prostheses and disclosed that 40% of patients had complained of food impaction, due to which they faced pain and halitosis [14]. Most of the FPD failures are a result of poor patient care after insertion while the others occur due to defective design and inadequate execution of laboratory and clinical procedures. Regarding the latter issue, it was noticed that 59% of our study sample rarely communicated necessary information related to the new FPD design with the lab technician.

When comparing the responses from our participants with another similar study by [6], it was noted that bleeding gums was the most common complaint reported by their dentists among their patients. However, a similar question in our study revealed that pain was the most common presenting complaint. Moreover, when inquired about the common site of food impaction, the posterior mandibular region was found to be reported by the majority of dentists, which was

similar to what we observed among our study participants. Furthermore, when inquired about the treatment options for food impaction, the Indian study reported redoing the FPD, which was similar to what we retrieved from our study participants. Finally, recall time was observed to be once a year among the majority of dentists in their study, which was also similar to our study observations.

Conclusion

- The attitudes of dentists when fabricating or giving instructions to lab technicians needs to be improved.
- Treatment options for food impaction seem to be limited among our study participants and they need to widen their scope and go through recent literature to improve their knowledge and practice.
- The experience and attitude of specialists/consultants participating in this study were seen to be significantly better as compared to general practitioners.
- Dentists with more experience had more exposure and a better attitude towards the management of food impaction as compared to new graduates.

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