A knowledge, attitude, and practice survey on “the methodology followed in the fabrication of fixed partial denture amongst private practitioners”

Abinaya Kannan¹, Suresh Venugopalan¹, Dhanraj M. Ganapathy¹, Ashish R. Jain²*

ABSTRACT

Background: With various treatment modalities coming up for replacement of missing teeth in the field of dentistry, fixed partial denture (FPD) remains the most sought option after dental implants. Preparation of abutment teeth and fabrication of FPD have an established protocol as instructed in the dental school which must be meticulously followed. Aim: In this study, we aim at probing practitioners’ attitude toward this established protocol and its application in their day-to-day practice.

Methodology: A cross-sectional survey was conducted with a pre-tested structured questionnaire containing 11 composite choice-based questions among 100 practicing dentists on the management of failed complete veneer crowns over short clinical abutments. Pertinent data were extracted and analyzed. Results: Nearly 50% of the surveyed population employed crown-root ratio as a diagnostic parameter to determine the prognosis of the FPD while the remaining 50% of the population were sparsely distributed among other groups. While 35% of the population advised intentional root canal treatment (RCT) for cases with clinical symptoms, an equal proportion of 32% advised intentional RCT for all cases. 61% of the population agreed to not doing cord packing clinically as compared to a minor 39% who perform it for precision in impression. While 56% of the population agreed to perform tooth preparation with the placement of depth orientation groups, an alarmingly equal 44% stated that they performed only minimal buccal and lingual preparation. 45% of the surveyed participants felt that it was the luting cement that accounted majorly for retention. Conclusion: The knowledge, awareness level, and their application in clinical practice showed significant variation. This survey indicates most private practitioners advocate RCTs for abutment teeth, which are vital and prefer under preparation of the abutment teeth for avoiding pulp exposure. They also prefer to record impressions without any gingival retraction. Clinicians depending on dental cement for the long-term survival of the FPD rather than on the quality of the tooth preparation are a remarkable outcome of the survey. The private practitioners, in their FPD practice, definitely deviate from the recommended clinical protocols.

KEY WORDS: Clinical protocol, Fixed partial denture practice, Gingival retraction cord, Knowledge; attitude; and practice survey, Luting cement for retention

INTRODUCTION

Tooth loss and failure to replace missing teeth start the vicious cycle that leads to derangement of the dentition. Replacement of missing teeth plays a key role in maintaining the harmonious functioning of the stomatognathic system.

Loss of teeth due to caries, periodontal pathology, trauma, and other pathologies occur far and wide. Fixed replacement of missing teeth has been the most preferred. Fixed partial denture (FPD) has been the preferred prosthetic option next to dental implant. With knowledge and attitude toward implant as a prosthetic option to replace missing teeth being below average and the high treatment charges, FPD seems to be a more acceptable option among patients.¹

With the provision of FPD being practiced far and wide, the various steps in fabrication need to be critically appraised, inculcated and practiced meticulously for a good prognosis. Diagnosis of the type of defect at the edentulous site, the condition of the abutment teeth, the root surface area, the cross-section, crown-root ratio, span of edentulism, gingival recession, bone loss, and stability of the

¹Department of Prosthodontics, Saveetha Dental College, Saveetha University, Chennai, Tamil Nadu, India; ²Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha University, Chennai, Tamil Nadu, India

*Corresponding author: Dr. Ashish R. Jain, Department of Prosthodontics, Saveetha Dental College and Hospital, Saveetha University, Poonamallee High Road, Chennai - 600 127, Phone: +91-9884233423. E-mail: drashishjain_r@yahoo.com

Received on: 04-03-2018; Revised on: 23-04-2018; Accepted on: 26-05-2018
abutment teeth should generally be taken into account.\cite{2-10}

Following diagnosis, with case selection FPD should be fabricated with meticulous preparation of the abutment teeth (strictly adhering to the ideal principles), appropriate soft tissue management (isolation and retraction - mechanical, chemomechanical, rotary, and laser), precise impression recording the prepared and unprepared surfaces of the abutment (ideal impression technique and method), adequate temporization (mechanically, biologically, and esthetically acceptable), and critical evaluation of fit in metal trial and proper occlusion during cementation.

In this survey, we have evaluated the knowledge and attitude of private practitioners on the methodology followed in the fabrication of FPD and their application in practice.

**Aim**
The aim of the study was to assess the knowledge, attitude, and practice among private practitioners regarding methodology followed in the fabrication of FPD.

**METHODOLOGY**

**Study Type**
This is a cross-sectional study.

**Study Area**
Chennai, the capital city of Tamil Nadu, which has the maximum amount of floating population that has come from far and wide to earn a decent living. Being the metropolitan of Tamil Nadu, Chennai, boasts the best health services that it could offer. It is one of the best study areas to assess if dentists do a straight from book practice or follow a protocol of their own in practice through a structured questionnaire.

**Study Population**
The study population under consideration is general dentists, specialists, and students holding a part-time practice.

**Inclusion Criteria**
The following criteria were included in this study:
- General dentists holding a private practice
- Specialists involved in a practice of their own
- Specialists who take up consultations
- Interns and postgraduates who work part-time.

**Exclusion Criteria**
The following criteria were excluded from this study:
- Academicians who do not hold a practice are not included in the study
- Dentists who are not willing to participate were not included
- Dentists who were not available even after two visits.

**Ethical Clearance**
- Before the start of the study, the ethical clearance was obtained from the Institutional Ethics Committee, Saveetha University
- The anonymity of the participants was maintained.

**Scheduling**
Data collection was scheduled in the months of October and November 2015.

**Sampling Technique**
A list of the dentist’s practicing in Chennai was obtained from the Tamil Nadu Dental Council. A sample of 100 was selected from the procured list by simple random sampling method.

**Survey Instrument**
A structured, tested questionnaire to assess the knowledge, attitude, and practice (KAP) on the methodology followed in the fabrication of FPD among dentists in Chennai was fabricated as the main survey instrument.

The questionnaire had an initial demographic part (for collecting demographic information chiefly pertaining to their qualification) and a core part with the structured questions (11 questions for assessing KAP).

**Survey Methodology**
The study subjects were informed about the survey, on eliciting their consent in participation, the questionnaires were distributed. Adequate time was provided to them between the two visits to fill their questionnaires.

On the second visit, the answered questionnaires were corrected, analyzed for flaws, checked for completeness and then taken up for assessment.

**Statistical Analysis**
Data were entered into Microsoft Excel spreadsheet and analyzed using SPSS software (version 20), descriptive statistics were used to analyze the completed data.

**RESULTS**
The questionnaire consisted of an initial demographic part and a core part. The demographic part had question on qualification of subject (23 - prosthodontists, 64 - non-prosthodontists, and 13 - general dentists) [Figure 1].
69% of the survey participants claimed to providing FPD frequently in their practice, 21% of them gave FPD rarely while 10% of them never provided FPD for their patients [Figure 2].

The core part consisted of 11 composite choice-based questions that touched various aspects involved in the provision of FPD.

When questioned on the parameters of diagnosis chiefly used 50% used crown-root ratio (radiographs), 16% used clinical mobility, 6% used other parameters for diagnosis, 9% agreed that crown-root ratio and clinical mobility together constituted to the diagnosis while 1% of population crown-root ratio and gingival recession were taken into consideration, 2% of population crown-root ratio and other parameters can be counted as diagnostic parameters, 1% of the population had taken into account only mobility and gingival recession, 14% had taken crown-root ratio, gingival recession and mobility as the basic diagnostic criteria [Figure 3].

On taking into consideration of intention root canal treatment (RCT), 17% felt intentional RCT can be advocated only for cases with insufficient clearance, 35% advised intentional RCT for cases which elicited clinical symptoms such as severe sensitivity and/or pain, 32% prescribed intentional RCT for invariably all cases for longevity of results and 16% of the study subjects opted to advise intentional RCT for cases with both insufficient clearance as well as those with clinical symptoms such as severe sensitivity and/or pain [Figure 4].

In terms of method of tooth preparation, 56% described their preparation as depth orientation groove placement followed by occlusal, labial, lingual, and proximal reductions, the remaining 44% stated their preparation as minimal buccal, proximal, and lingual reduction with adequate occlusal clearance thereby preserving as much tooth structure as possible [Figure 5].

When questioned on the placement of gingival retraction cord before impression making, 39% of the study subjects agreed that they pack gingival retraction cord before impression making while the remaining 61% claimed to not pack gingival retraction cord before making an impression of the prepared tooth surface [Figure 6].

While 31% of the survey population felt gingival retraction cord placement dictates the outcome of the treatment, 69% of the study subjects disagreed to it [Figure 7].

Considering choice of impression material, 12% felt alginate was sufficient to record the preparation, 85% stated putty with light body was the impression material of their choice while 3% chose both alginate and putty with light body [Figure 8].

Moving on to provision of temporary/transient FPDs after preparation, 66% stated provision for all FPD cases, 14% did not provide temporary crown and bridge for all cases while 20% provided temporaries for few cases only [Figure 9].

Regarding checking of metal fit/coping fit, 59% stated that they gave metal trial/coping trial for all cases, 19% did not give metal/coping trial for any of their cases while 22% gave metal/coping trial for a few cases only [Figure 10].

When questioned on the cement used for luting, 9% reported to have used IRM/ZOE, 67% used glass ionomer cement (GIC), 15% used resin-modified GIC (RMGIC), 1% used resin cement, and 1% used GIC and RMGIC while 7% used GIC and resin cement [Figure 11].

Considering their opinion on factors that account chiefly for the retention of FPD, 39% believed tooth preparation majorly accounted for retention, 45% felt the cement used for luting accounted for retention while 16% believed that quality of impression and lab work accounted for retention [Figure 12].

Descriptives on Demographic Data

Figure 1 depicts the qualification of the study subjects; 13% being general dentists who hold a bachelor’s degree, 23% being prosthodontists, and 64% being postgraduate - specialists pertaining to other fields in dentistry.
Figure 3: Parameters of diagnosis for suitable fixed partial denture candidates

Figure 4: Cases indicated for intentional root canal treatment

Figure 5: Method of tooth preparation

Figure 6: Placement of gingival retraction cord before impression making

Figure 7: Dictation of the treatment outcome by retraction cord placement
Figure 2 depicts frequency in the provision of FPD to patients in practice. While a majority of 69% of those who took up the survey claimed to providing FPD frequently in their practice, 21% stated they gave FPD rarely, and 10% stated that they never provided FPD for their patients.

Core Data

Figure 3 depicts parameters of diagnosis for suitable FPD candidates. While crown-root ratio (radiographs) was chiefly used by 50% to assess the fitness of the adjacent tooth to harbor a fixed prosthesis, 16% used mobility as the chief diagnostic criterion, none of the subjects felt that gingival recession alone accounted to diagnosis, 6% stated they had other parameters for diagnosis, and 9% agreed that crown-root ratio (radiograph) and gingival recession can be counted as diagnostic parameters, 2% of the study sample reported that crown-root radiograph and other parameters were taken into consideration, 1% of the population had taken into account only mobility and gingival recession, 14% had taken crown-root ratio (radiograph), gingival recession as well mobility as the basic diagnostic criteria while 1% of the entire population felt that diagnosis of suitable candidates for FPD was brought about by taking up crown-root ratio (radiograph), mobility, gingival recession, and other factors as parameters essential for diagnosis.

Figure 4 depicts cases indicated for intentional RCT. While 17% felt intentional RCT can be advocated only for cases with insufficient clearance, 35% advised intentional RCT for cases which elicited clinical symptoms such as severe sensitivity and/or pain, 32% prescribed intentional RCT for invariably all cases for longevity of results and 16% of the study subjects opted to advise intentional RCT for cases with both insufficient clearance and those with clinical symptoms such as severe sensitivity and/or pain.

Figure 5 depicts method of tooth preparation. While 56% of the population described their preparation as depth orientation groove placement followed by occlusal, labial, lingual, and proximal reductions, the remaining 44% stated their preparation as minimal buccal, proximal, and lingual reduction with adequate occlusal clearance thereby preserving as much tooth structure as possible.
Figure 6 depicts placement of gingival retraction cord before impression making. 39% of the study subjects agreed that they pack gingival retraction cord before impression making while the remaining 61% claimed to not pack gingival retraction cord before making an impression of the prepared tooth surface.

Figure 7 depicts dictation of the treatment outcome by retraction cord placement. While 31% of the population feel gingival retraction cord placement dictates the outcome of the treatment, 69% of the study subjects strongly disagree to it.

Figure 8 depicts the impression material of choice for recording the preparation. 12% of the dentists surveyed felt alginate was sufficient to record the preparation, 85% stated putty with light body was the impression material of their choice while 3% chose both alginate and putty with light body.

Figure 9 depicts provision of temporary/transient FPDs. 66% of the study stated that they provide temporary/transient FPDs after preparation for all cases, 14% did not provide temporary/transient FPDs for all cases while 20% provided temporaries for few cases only.

Figure 10 depicts provision of metal trial/coping trial. 59% stated they gave metal trial/coping trial for all cases, 19% did not give a metal/coping trial for any of their cases while 22% gave metal/coping trial for a few cases.

Figure 11 depicts cement used for luting in practice. While 9% used IRM/ZnOE for luting, 67% stated that they use GIC, 15% used RMGIC, 1% used resin cement, 1% used GIC and RMGIC for luting, and 7% used GIC and resin cement.

Figure 12 depicts factors accounting to retention of FPD. 39% considered their tooth preparation as the main factor responsible for retention of FPD, 45% stated the cement used for luting being responsible for the retention while 16% felt quality of the impressions and lab work majorly accounted for retention.

DISCUSSION

Replacement of missing teeth has been one of the most sought-after dental treatment over the decades. With an increase in awareness of dental caries and periodontal diseases, the incidence of complete edentulousness is common in the latter half of the sixth decade and the seventh decade of life. However, partial edentulousness is still a common occurrence in people of almost all age groups. With an increase in dental awareness, people of all economic groups resort to the replacement of missing teeth. With a majority of patients opting FPD due to economic reasons or insufficient bone density for implants, FPD provision is one of the most instituted dental therapy in dental clinics.[11]

A dentist’s perspective in the fabrication of FPD is considered in this study. This study aims at assessing the knowledge of the dentists on the methodology in FPD fabrication, their attitude toward it and the assessment of how far theoretical knowledge needs to be applied in clinical practice to ensure a successful outcome clinically.

A study on the KAP among 100 private practitioners on the methodology in the fabrication of FPD in Chennai without attrition was performed. Out of the 100 practitioners, 13% were general dentists and 23% were prosthodontists while 64% were specialists pertaining to other fields.

Various parameters accounting to determine the prognosis of the FPD such as crown-root ratio, mobility, gingival recession, root surface area, root morphology, and cross-section, and convergence/divergence of roots have previously been reported in the literature.[2-10] The question focusing on the most commonly used parameter elicited crown-root ratio as the most used parameter of diagnosis (50% of the population) while all others used combinations of factors as parameters for diagnosis.

With RCT usually being indicated in cases with major tooth structure loss approximating to the vicinity of the pulp chamber, in cases with inadequate clearance where preparation might invariably lead to pulp exposure and teeth with pre-existing deep restorations that have irritated the pulp; a question on the advocacy of RCT for abutment teeth was put forth.[11] A majority of 35% practitioners advocated intentional RCT for cases which were symptomatic abutment teeth, and a marginally equal 32% advised the same for all cases to ensure longevity of results, while 17% of the population advised the same for inadequate clearance, the remaining 16% preferred intentional RCT for cases which were symptomatic as well as cases that have inadequate clearance.

Depth orientation grooves being the prime factor aiding in guiding reduction of precise amounts of tooth structure, participants were questioned on the application of this in their clinical practice.[12-17] While 56% of the surveyed crowd had their preparation majorly guided by placement of depth orientation grooves followed by occlusal, labial, lingual, and proximal reduction; the remaining 44% stated doing a minimal preparation.

Gingival retraction being a mandatory procedure of isolation aiding in the precise recording of the prepared
and unprepared surface of abutment teeth, various methods (mechanical, chemomechanical, rotary, and electrorotary) have been resorted to, in the past, to achieve the same.\textsuperscript{13-18} However, 69% of the surveyed population stated that they felt gingival retraction cord did not dictate the outcome of the treatment and 61% of the crowd did not perform cord packing in their practice.

Material of choice for recording the preparation, which is suggested as a standard in terms of dimensional stability, precision in recording and replicating is putty with light body.\textsuperscript{20-26} Putty with light body was the impression material of choice for 85% practitioners, 12% used alginate, and 3% used alginate and putty and light body.

With temporization of the FPD preparation being stated as a mandatory part to protect the prepared abutment teeth from chemical, mechanical, and biological insults and to prevent migration of teeth at a microscopic level until the definitive restoration is placed; the rate of temporization of FPD cases was evaluated.\textsuperscript{27-31} Only 66% of the practitioners agreed to having temporized their FPD patients after preparation.

Metal trial/coping trial has been a procedure to check the precision of the laboratory work and marginal fit. A 59% have admitted on performing the same for all their cases, 22% stated performing a trial on selected cases, and 19% of them did not perform trial for any of the cases.

A wide array of luting cement is available for cementation of FPDs. A critical evaluation of the mechanical, chemical, and biological properties of the material is vital for choice of luting cement.\textsuperscript{32-35} In this survey, the commonly used luting agents were GIC for luting (67%), RMGIC (15%), IRM or Zinc Oxide Eugenol (9%), Resin cement (1%), and a combination of the above (8%).

While various factors have been stated in the literature to account for the retention of a fixed dental prosthesis, such as the taper used for preparation, degree of convergence, and parallelism of prepared abutments; a striking 45% strongly believe that cement used for luting accounted for retention, while 39% trusted that tooth preparation aided in retention and the remaining 16% thought that lab work and the impression material of choice dictated the retention of the prosthesis.\textsuperscript{19}

**CONCLUSION**

With marginal variation observed in various parameters in this study, it may be concluded that most private practitioners do not strictly adhere to the theoretical protocol prescribed in the literature and believe that it does not dictate the outcome of the treatment.

Emphasis should be made on proper preparation based on protocol and also on the fact that tooth preparation accounts more for retention of the final prosthesis as compared to the luting cement.

From the survey statistics, it is evident that the knowledge obtained from the literature had not exactly been applied entirely to ensure success clinically. However, a long-term study on survival of FPDs prepared in such ways might have to be performed to bring about a definitive conclusion on these grounds.

**REFERENCES**


Source of support: Nil; Conflict of interest: None Declared