

PERIODONTAL HEALTH STATUS OF FIXED SELF-CURE DENTURE ABUTMENTS

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ABSTRACT

This analytical cross sectional study was conducted at the Prosthodontics and Periodontology Department of Islamabad Dental Hospital, over a period of one year from July 2015 to June 2016. The aims of study were to document chief complaints of patients at the time of their visit to Islamabad Dental hospital, reasons to visit unqualified dentists, evaluate complications of fixed self-cure dentures in short and long term wearers and compare bone loss of abutment and adjacent teeth. Thirty systemically healthy patients reporting to the department with complaints regarding previously received FSD were included in the study.

After written consent, patients filled questionnaire and were clinically & radiographically examined by a researcher following denture removal. Most common chief complaint was pain 15(50%), and lack of awareness was the major reason for receiving FSD 24(80%). In long term wearers deep pockets (>6mm) were present in 19 abutments while in short term wearers only one abutment had deep pocket. In short term wearers' mobility was recorded in 7(36.8%) abutments whereas in long term wearers mobility was recorded in 51(92.7%) abutments. The bone loss in abutments was significantly more as compared to the adjacent teeth (p-value=0.04). Abutment tooth loss was observed in 10(33.3%) patients at the time of denture removal and a total of 19(25.6%) with poor prognosis were advised extractions.

In conclusion, dentures fixed with self-cure acrylic resin have harmful effects that lead to periodontal pocket formation, bone loss or abutment tooth loss especially with long term use of these dentures.

Keywords: *Unqualified dentists, periodontal health, fixed dentures abutments, mobility.*

INTRODUCTION

Unethical and fraudulent practice of dentistry by dental quacks is common in the subcontinent. Many patients seek their treatment because of ignorance, financial constraints, difficult access to qualified dentists, low cost of treatment or attraction of an inexpensive fixed replacement in single visit.^{1,2} Patients also get attracted to dental quacks because of their deceitful publicity stating a quicker, cheaper and sure cure.³

One study reported that about 70% of the quacks are dental technicians.⁴ Quacks provide various dental treatments including extractions, fillings, denture provision, crowns, cleaning of teeth and prescriptions for pain management.⁵⁻⁷ Self-cure acrylic is commonly used in many of their treatment modalities, such as fillings and replacement of missing teeth.⁸ Missing teeth are usually replaced by self-cure acrylic dentures which are fixed in partially dentate patients and complete dentures with suction discs in edentulous patients.^{2,6,8} Mostly, these unprincipled fixed self-cure dentures are given by dental quacks; one study reported that 72% of prostheses given by quacks is a fixed self-cure denture,² however in one study the patients in addition to receiving this treatment from quacks, reported to have received this treatment from government hospitals (30%) and private clinics (28%).⁹

Properly fabricated dentures are inherently removable for cleaning and hygiene maintenance, however the dentures delivered by quacks are fixed by engaging tooth and tissue undercuts for fixation using self-cure acrylic resin directly into the patient's mouth. Sometimes wrought wires are also added to stabilize and retain ill-fitting dentures with the support of adjacent

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teeth.⁸ These self-cure dentures have very high amount of residual monomer which leads to severe irritation, cytotoxic, allergic and inflammatory reactions. Unreacted residual monomer of acrylic leach out into saliva, and can cause undesirable effects.¹⁰ In this study, these kinds of replacements are referred to as fixed self-cure (auto polymerized) acrylic resin partial denture (FSD). These dentures may be very satisfying for a patient initially, but result in untoward consequences on the oral cavity. Detrimental effects of FSD reported in literature include gingivitis, periodontitis,² halitosis,⁹ mucosal inflammation,⁹ abutment tooth mobility,^{2,9} pain,^{1,2,11} and tooth loss.^{11,12}

Despite the fact that quackery is common in the subcontinent, and FSDs are a regular malpractice, little research has been done on the consequences of these dentures. One local study evaluated oral effects of wearing FSD,⁹ however, no study was found by the researchers which evaluated effects of self-cure dentures on periodontal health of abutment teeth.

The aims of study were to document chief complaints of patients at the time of their visit to Islamabad Dental hospital, and the reasons which persuaded them to visit dental quacks and to evaluate complications of fixed self-cure dentures in short and long term wearers. A comparison was done for bone loss of abutment and adjacent teeth with the hypothesis that bone loss in abutment teeth will be greater than the adjacent teeth.

METHODOLOGY

This cross sectional study was conducted at the Prosthodontic and Periodontology department of Islamabad Dental Hospital, IM&DC, Islamabad, after approval from the Institutional Review Board, dental section, IM&DC. A total of 30 patients out of 39 were included in the study by convenient sampling technique over a period of one year from July 2015 to June 2016. Nine patients who were systemically unhealthy or did not give consent for FSD removal and subsequent examination were excluded from the study.

Written consent was obtained prior to data collection, detailed history of patients was recorded and a questionnaire was filled. Questionnaire included inquiries related to socio-demographic details, reasons for receiving the FSD, information regarding denture wearing experience, initial satisfaction with FSD and reason for seeking present treatment.

The location of FSDs were noted in the performa. The dentures were then removed using slow speed hand piece (Air motor) with acrylic trimming burs, and where needed, wire cutters. Comprehensive clinical examination was then done to record clinical findings on a performa. The clinical parameters were broadly classified under oral hygiene status and abutment tooth

status. For oral hygiene, Silness-Löe plaque index (PI) was used to assess the level of oral hygiene and recorded in a score ranging from 0 to 3. For abutment tooth status the parameters used were: probing pocket depth (PPD), gingival recession (GR), tooth mobility, caries, and interdental bone loss. The PPD was measured at six sites per tooth using Michigan's O probe with William's markings. A reading of >3mm was labelled as a pathological pocket.¹³ The GR was recorded according to Miller's classification. Tooth mobility was scored according to Miller's index and caries was assessed using G.V Black classification. Bone loss of the abutment tooth was determined on a digital radiograph obtained by paralleling technique, and compared with the adjacent teeth. For this, the distance from CEJ to the crest of alveolar bone was measured by taking digital periapical radiograph using CSN image software by paralleling technique (RX4, CSN Industrie, Italy). Tooth was considered as having interdental bone loss if the distance from CEJ to the crest of the bone was more than 2mm.¹⁴ All clinical examination was done by one trained researcher.

The study sample was divided into short term wearers who wore the FSD for one year or less than one year and long term wearers who wore FSD for more than one year. Short term and long term complications were then evaluated. The collected data were encoded, entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics were done for chief complaints, reasons to visit dental quacks and short and long term complications. Chi-square test was applied to compare the bone loss in abutment and adjacent teeth with level of significance set at p -value ≤ 0.05 .

RESULTS

Study sample consisted of 30 patients fulfilling inclusion criteria, 16 (53.3%) males and 14(46.7%) females, with age range from 20 to 65 years. Majority 17(56.7%) were uneducated, while 7(23.3%) were educated till primary, 6(20%) had secondary education or above. Reasons for receiving self-cure dentures from quacks are given in table 1.

At the time of receiving FSD from quacks, 22(73.3%) patients were highly satisfied with the given treatment, 7 (23.3%) were fairly satisfied and only 1 (3.3%) patient was not satisfied. Most common presenting complaint when asked from all patients was pain 15(50%), followed by esthetic concerns 8(26.6%). Location of saddle areas for FSDs is given in table 2.

Retention was achieved with self-cure extensions in interdental area of abutments in 26(86.7%) of patients and with a combination of wrought wire with interdental extensions of self-cure in 4(13.3%) of patients. Halito-

TABLE 1: REASONS FOR RECEIVING SELF-CURE DENTURES

Reason	No (percentage)
Lack of awareness	24(80%),
Financial constraints	5(16.7%)
reluctance to extract retained roots	1(3.3%)
Total	30

TABLE 2: LOCATION OF FIXED SELF-CURE DENTURES

Type of saddle	No of patients	Percentage
Maxillary anterior	16	53.3
Mandibular anterior	2	6.7
Maxillary right posterior	3	10.0
Maxillary left posterior	4	13.3
Mandibular left posterior	1	3.3
Mandibular anterior and left posterior	1	3.3
Maxillary anterior and left posterior	2	6.7
Mandibular anterior and right posterior	1	3.3
Total	30	100.0

TABLE 3: CLINICAL EVALUATION OF ABUTMENT TEETH

Clinical Parameters	Present
Mean probing depth >3mm	40(54%)
Gingival recession (Class I or more)	63(85.13%)
Mobility (Grade I or more)	58(78.3%)
Caries	21(28.3%)
Bone loss (2mm or more)	44(59.45%)

TABLE 4: COMPARISON OF BONE LOSS IN ABUTMENT AND ADJACENT TEETH

Bone loss (mm)	Abutment	Adjacent
Absent	30(40.5%)	45(60.81%)
2-4	23(31.08%)	22(29.7%)
5-6	11(14.86%)	6(8.10%)
7-8	10(13.5%)	1(1.35%)
Total	74	74

TABLE 5: PERIODONTAL HEALTH OF ABUTMENTS IN LONG TERM AND SHORT TERM WEARERS

Periodontal parameters	Short Term Wearers (19 abutments)	Long Term Wearers (55 abutments)
Probing Pocket depth <3mm	7(36.84%)	33(60%)
Gingival Recession	14(73.68)	49(89%)
Interdental Bone loss	7(36.84%)	37(62.27%)
Mobility	7(36.8%)	51(92.7%)

sis was observed in all patients and discolouration of denture teeth was seen in 7(23.3%) patients. Majority of patients 17(56.7%) had poor oral hygiene. The FSDs were removed using slow speed handpiece in 27(90%) patients and with wire cutters and handpiece in 3 (10%) cases. After removal, mucosal redness was seen in 18(60%) patients and mucosal swelling in 9(30%).

Thirty FSDs had 74 abutment teeth, evaluation in terms of periodontal parameters (periodontal pocket depth, gingival recession), mobility, caries and bone loss was done (table 3). Miller’s class 1 GR was present in 10(13.51%) abutments, class II in 25(33.78%) and class III in 28(37.83%) abutments. Miller’s grade I mobility was present in 28(37.83%) abutments, grade II in 17 (22.97%) and grade III was observed in 13(17.56%) abutments. Class I caries was found in 7(9.45%), class II in 11(14.86%) and class III in 3(4.05%) abutments. The mean interdental bone loss of 74 abutment teeth was compared with 74 adjacent teeth (teeth next to the abutments in the same arch) on digital radiographs (Table 4). Abutment loss was observed in 10(33.3%) patients at the time of denture removal and a total of 19(25.6%) with poor prognosis were advised extractions.

There were 9(30.0%) patients with 19 abutment teeth who wore FSD for short-term (\leq one year) and 21(70.0%) patients with 55 abutment teeth who wore FSD for long-term ($>$ one year). Presenting complaint common in long term wearers was pain 11(52.3%) followed by esthetics 3(14.3%). Whereas short term wearers complained more of unsatisfactory esthetics 5(55.5%) followed by pain 4(44.4%). Long term wearers also had complaints of loose denture 3(14.3%), tooth mobility 2(9.5%), bleeding gums 1(4.7%) and masticatory issues 1(4.7%).

Probing pocket depths, gingival recession, interdental bone loss and mobility were more prevalent in long term wearers as compared to short term wearers (Table 5). In short term wearers 5(26.3%) abutments had class I gingival recession, 8(42.1%) had class II

recession and 1(5.26%) had class III recession. In long term wearers 5(9.09%) had class I gingival recession, 17(30.9%) had class II recession and 27(49.09%) had class III recession.

Probing pocket depths of 3-5mm were found in 6(85.71) abutments of short term wearers and 14(42.42) abutments of long term wearers. Whereas, PPD of \geq 6mm were recorded in 19(57.57) abutments of long term wearers and 1(14.28) abutment of short term wearers. In short term wearers, grade I and II mobility was seen in 3(15.8%) abutments each and grade III was seen in 1 (5.3%) abutment. Whereas in long term wearers grade I mobility in 25(45.5%) abutments, grade II in 14(25.5%) and grade III in 12(21.8%). A white lesion was also observed in one patient and was diagnosed as candidal thrush.

DISCUSSION

Patients with complaints arising from consequences of fixed self-cure denture (FSD) routinely report to dental hospitals and dentists. This study explored, the patient given reasons for receiving these unprincipled dentures along with periodontal effects of FSD in patients with short and long term denture wearing. There was noticeable periodontal damage and bone loss in FSD wearers, which was observed more in abutments of long term as compared to short term wearers (table 5). Pronounced deleterious effects on periodontium and bone were also observed in abutment teeth as compared to adjacent teeth, which indicate direct impact of FSD on alveolar bone (p-value=0.04). The most likely reason for such damaging effects on periodontium could be the constant contact of these unprincipled dentures with the marginal gingival tissue and embrasure areas leading to poor plaque control. The authors could not find other studies reporting the extent of gingival recession or interdental bone loss on the abutment teeth of FSD. One study however, reported gingivitis in 28% and periodontitis in 4% of their study sample on patients treated by dental quacks.² This limited research on the topic could be due to the fact that this type of malpractice is seen generally in subcontinent, and in developing countries only.^{5,9,15}

Due to poor prognosis 19(25.6%) abutments were lost, tooth mobility was observed in 58(78.3%) of total abutments, 7(36.8%) abutments in short term wearers and an alarming number of 51(92.7%) abutments in long term wearers had grade I to III mobility. Severe periodontal destruction in long term wearers may explain the large number of mobile teeth in these patients. In one study abutment tooth mobility was seen in 37% patients wearing fixed self-cure dentures,⁹ another study done on patients treated by quacks reported that 20% of patients had mobile teeth.² These results underpin the periodontal destruction caused by FSD

made with poor design and unsuitable materials. The detrimental effects of FSD on abutment health has been reported in various case reports^{3,11,12,16,17} and studies from Pakistan.^{2,9} However detailed comparison with other studies in this regard is not possible due to lack of research on this topic.

Major reason for receiving FSD from quacks in present study, lack of awareness was 24(80%), followed by financial constraints 5(16.7%), in this study. These results are supported by Memon⁹ and Parlani¹ who reported 47% and 50% of the patients respectively, visited quacks due to lack of knowledge. Other studies have also reported lack of awareness as the main reason for visiting quacks, followed by unavailability of dentist.^{2,7} Whereas a West Indian study reported the major reason for going to a quacks was cost, followed by unavailability of dentists.⁵

Majority of patients 22(73.3%) in this study reported to be initially satisfied with their treatment. This result was also in agreement to a previous study by Naidu and colleagues⁵ who stated that majority of patients (83%) were highly satisfied after receiving dental treatment from quacks. In addition to lack of awareness, limited or no knowledge of available scientific treatment options is one of the major reasons a patient undergoes treatment from quacks. This statement is strengthened by the results of this study and many previous studies.^{1,9,15} In the present study majority of the patients 17(56.7%) were uneducated, while 7(23.3%) were educated till primary, 6(20%) had secondary education or above. Similar results were shown in another study where 54% patients visiting quacks were illiterate and 12% were educated till primary level.¹⁸ Naidu and colleagues reported that majority of patients seeking treatment from quacks were less educated elderly from low socioeconomic status.⁵

Present study show poor oral hygiene 17(56.7%) coupled with halitosis 23(76.7%) in most of the patients. A previous study has shown comparable results where poor denture hygiene (74%) poor oral hygiene 71% and halitosis was observed in 80% cases.⁹ Another study reported poor oral hygiene in 80% of the patients and halitosis in 24% patients.

These FSDs are usually given in tooth bounded saddles and for missing anterior teeth. In the present study 18(60%) of the dentures were replacing anterior teeth, another study reported that mostly (40%) FSD were given in anterior region.⁹ This could be because of the aesthetic concerns and affordability issues of the low socioeconomic status patients who visits quacks for inexpensive replacements. Main presenting complaint, pain 15(50%), followed by esthetic concerns 8(26.6%) are similar to another study which reported aesthetics (44%) followed by pain as chief complaint.⁹ Pain was

also the chief complaint of patients in a study from Pakistani 36%² and India (28.6%)¹ and a case report from Malaysia.¹¹

This study evaluated health of abutment tooth and adverse effects of wearing fixed self-cure acrylic denture. The strength of this study is the comparison of interdental bone loss in abutments and adjacent teeth and assessment of periodontal parameters of FSD abutments. Small sample size and convenience sampling of patients who visited Islamabad dental hospital only, were the limitations of this study. The sample may not be the true representation of the general population and therefore the generalizability of the results may be restricted. Future studies are suggested in this regard with larger sample size, and control groups with other prostheses for comparison and to establish a relation between FSD and periodontitis.

These unprincipled practices should be controlled by public awareness campaigns at the hospitals, community visits and through social media. Moreover community dentistry workers, can help prevent quackery and its associated malice by making the public aware of its hazards to the periodontium and abutments bone and residual ridge. There is a need to encourage policy makers to take measures against quacks and prohibit such harmful treatments

CONCLUSION

- Fixed self-cure dentures severely effect abutment teeth and periodontium leading to periodontal pocket formation, gingival recession, and interdental bone loss tooth mobility leading to early abutment tooth loss.
- Detrimental effects of fixed self-cure dentures compound with the increased duration in the oral cavity.
- Patients are unaware of the adverse consequences of FSD when they receive this treatment.

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