COMPLICATIONS AND THEIR SEVERITY IN PATIENTS OF CONVENTIONAL METAL CERAMIC FIXED DENTAL PROSTHESIS: A CLINICAL STUDY

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ABSTRACT

The aim of this study was to present the frequency of biological and technical complications and its severity related with metal ceramic fixed partial dentures (FPDs). Total 245 abutments of 140 patients presented with complications in their FPDs were examined. The mean age of the patients was 42 years (range 23-83). 66.1% and 33.8% complication were found in the FPDs provided by qualified and unqualified persons respectively with an average 5.4 years length of services. Among the biological complications caries were present in 21.2% (52) of the abutment teeth; 13.06% (32) had periapical problems, 12.65% (31) periodontal problems and 2.85% (7) had abutment fracture. Sixty eight out of 245 abutments with a decementation problem indicated a the major technical complication, whereas 25 with esthetic problem, 15 had occlusal problems. The primary technical complication decementation was associated with wrong preparation. Varying severity grades of complications, grade I 27.3%, grade II 35.1 % and grade III 37.5% were observed. In conclusion majority of the FPDs having complications were provided by unqualified and were of grade II and III. The common complications were de-cementation, dental caries, periodontal disease and periapical problems.

INTRODUCTION

Fixed Prosthodontics treatment present excellent satisfaction regarding both patient as well as dentist. This may transform the unhealthy, unattractive dentition into a comfortable, healthy and esthetics dentition. Complication has been defined as “a secondary disease or condition develops in the course of a primary disease or condition.” Despite the fact that complication could be a sign that will clinical failure features took place, this is simply not in this case. Usually, complications are conditions that will happen while in or even soon after suitably performed fixed Prosthodontics procedures. Knowledge regarding the clinical complications that can happen with fixed Prosthodontics increases your clinician’s power to complete good analysis, create the best treatment plan, speak realistic expectations to help people, and also strategy enough time intervals needed for post-treatment health care. The investment of time as well as income concerned along with the higher level connected with anticipations as well as desire intended for FDPs can certainly merely possibly be normal whenever they turned out long lasting. The cost of dealing with any complication is not only high but it also discomforts the patients in addition to questioning the competence of the practitioner. An earlier report from a developed country pointed out that 1.5% to 15% FDPs are failing annually. Recently, a local study done in Pakistan on the analysis of reasons for dislodged metal-ceramic FDPs showed a disappointing situation. The purposes of this article is to present clinical complications and failure associated with the metal ceramic Fixed prostheses and severity of complications.

METHODOLOGY

Data were collected on a well structured performa design for that study by using non-probability convenient sampling technique. The inclusion criteria for this study were the consecutive patients of both gender, any age group presenting with complications of metal ceramic fixed-fixed design to the Prosthodontics department of Peshawar Dental College during January 2014 to December 2014. Patients having complaints in FPDs but treated as outdoor and having single crown or any other FPDs design were excluded. The diagnosis

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was based on detail history, intra-oral clinical examination following the standard techniques of inspection, palpation, percussion and probing. Radiographic examination when necessary was also done. Prostheses evaluation included the recording of the numbers of abutment, duration/time after cementation, fitting by Qualified having BDS degree and unqualified persons. Biological complications (caries, periapical problems, periodontal problems and abutment fracture), technical complications (decementation, ceramic de-bonding and chipping, fracture of metal-frame) esthetic and occlusal problems were recorded. Following Grades/criteria (Grade I to Grade III) for each complication were used/noted. Higher grade of a complication indicated the extent of the progression of the problem or severity of the complication and its management.

Caries

i. Caries. Intact surface white/yellowish spots on tooth surface but rough on probing
ii. Caries. Surface discontinuity on probing
iii. Caries. Cavity even on naked eye

Periapical Problems in Abutment

i. Abutment tender on percussion.
ii. Grade I plus radiographic evidence of periapical radiolucency.
iii. Grade II plus swelling or sinus/fistula formation.

Periodontal Problem

1. Mild inflammation – slight change in color and slight edema but no bleeding on probing;
2. Moderate inflammation – redness, edema and glazing, bleeding on probing;
3. Severe inflammation – marked redness and edema, ulceration with tendency to spontaneous bleeding

Abutment Fracture

1. Fracture of crown portion
2. Fracture of root portion
3. Fracture of crown and root both

Decementation

1. Decementation due to wrong Luting cement
2. Decementation due to wrong Preparation
3. Decementation due to excessive forces.

Esthetic Problems

1. Unacceptability to patient only.
2. Unacceptability to researcher only.
3. Unacceptability by both the patient and investigator/researcher.

Prostheses Fracture

1. Chipping of porcelain facing/veneers
2. Debonding of porcelain
3. Grade II plus fracture of metal core/framework.

Occlusal Problems

1. Premature occlusal contact
2. Localized high bite.
3. Teeth remaining out of occlusal contact.

RESULTS

A total of 140 patients were examined in that study with 245 abutments. Out of total 58 were males and 82 were females with the mean age of 42 years and range of 23-83. Information regarding the fitting place is showed in Table 1. The length of services ranging from 3 to 7 with an average of 5.4 years. (Table 2)

Results regarding biological complications showed

<table>
<thead>
<tr>
<th>Complications</th>
<th>No and % of Complications observed in abutments prepared by un qualified persons</th>
<th>No and % of Complications observed in abutments prepared by qualified persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental caries</td>
<td>39 (75)</td>
<td>13(25)</td>
</tr>
<tr>
<td>Periapical Problems</td>
<td>22(68.75)</td>
<td>10(31.25)</td>
</tr>
<tr>
<td>Periodontal Problems</td>
<td>18(58.06)</td>
<td>13(41.94)</td>
</tr>
<tr>
<td>Abutment Fracture</td>
<td>05(71.42)</td>
<td>02(28.57)</td>
</tr>
<tr>
<td>Decementation</td>
<td>42(61.76)</td>
<td>26(38.24)</td>
</tr>
<tr>
<td>Prosthesis Fracture</td>
<td>10(66.66)</td>
<td>05(33.33)</td>
</tr>
<tr>
<td>Esthetic Problems</td>
<td>17(68)</td>
<td>08(32)</td>
</tr>
<tr>
<td>Occlusal Problems</td>
<td>09(60)</td>
<td>06(40)</td>
</tr>
<tr>
<td>Total</td>
<td>162(66.12)</td>
<td>83(33.87)</td>
</tr>
</tbody>
</table>
Metal ceramic fixed dental prosthesis

**TABLE 2**

<table>
<thead>
<tr>
<th>Reasons of failure</th>
<th>No and % of FPD failure</th>
<th>Mean year of services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental caries</td>
<td>52(21.22)</td>
<td>6.8</td>
</tr>
<tr>
<td>Periapical Problems</td>
<td>32(13.06)</td>
<td>5.0</td>
</tr>
<tr>
<td>Periodontal Problems</td>
<td>31(12.65)</td>
<td>6.7</td>
</tr>
<tr>
<td>Abutment Fracture</td>
<td>07(02.85)</td>
<td>5.8</td>
</tr>
<tr>
<td>Decementation</td>
<td>68(27.75)</td>
<td>3.5</td>
</tr>
<tr>
<td>Prosthesis Fracture</td>
<td>15(06.12)</td>
<td>4.0</td>
</tr>
<tr>
<td>Esthetic Problems</td>
<td>25(10.20)</td>
<td>6.0</td>
</tr>
<tr>
<td>Occlusal Problems</td>
<td>15(06.12)</td>
<td>5.6</td>
</tr>
</tbody>
</table>

**TABLE 3**

<table>
<thead>
<tr>
<th>Biological Complications</th>
<th>No and %</th>
<th>Grade I</th>
<th>Grade II</th>
<th>Grade III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental caries</td>
<td>52(21.22)</td>
<td>06(11.53)</td>
<td>14(26.92)</td>
<td>32(61.53)</td>
</tr>
<tr>
<td>Periapical Problems</td>
<td>32(13.06)</td>
<td>19(59.37)</td>
<td>10(31.25)</td>
<td>03(09.37)</td>
</tr>
<tr>
<td>Periodontal Problems</td>
<td>31(12.65)</td>
<td>04(12.90)</td>
<td>05(16.12)</td>
<td>22(70.96)</td>
</tr>
<tr>
<td>Abutment Fracture</td>
<td>07(02.85)</td>
<td>07(100)</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Complications</th>
<th>No and %</th>
<th>Grade I</th>
<th>Grade II</th>
<th>Grade III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decementation</td>
<td>68(27.75)</td>
<td>19(27.94)</td>
<td>41(60.29)</td>
<td>08(11.76)</td>
</tr>
<tr>
<td>Prosthesis Fracture</td>
<td>15(06.12)</td>
<td>05(33.33)</td>
<td>10(66.66)</td>
<td>00</td>
</tr>
<tr>
<td>Esthetic Problems</td>
<td>25(10.20)</td>
<td>07(46.66)</td>
<td>02(13.33)</td>
<td>21(84.00)</td>
</tr>
<tr>
<td>Occlusal Problems</td>
<td>15(06.12)</td>
<td>07(27.34)</td>
<td>86(35.10)</td>
<td>92(37.55)</td>
</tr>
</tbody>
</table>

that 52 (21.22%) teeth developed carious lesion, 12.65% having periodontal problems, 13.06% periapical problems and 2.85% abutment fracture. Information regarding technical complications showed that 68 (27.7%) FPD showed decementation and the decementation was associated with 19 wrong luting cement, 41 wrong preparation and 8 due to excessive load. This study identified 15 (6.12%) the incidence of prosthesis fracture. 25 (10.2%) patients presented with esthetic problems, 4 were observed by the operator, while rests were noted both by operator and patients. Data showed that 15 (6.12%) had occlusion problems in the prosthesis. (Table 3)

**DISCUSSION**

Complication related to a prosthesis, length of services in term of success is mainly determined, when a patient visit a dentists for repair or replacement of the existing restorations. Although metal-ceramic restorations are considered to be definitive restorations, the overall mean years of service for FPDs in this study was 5.4 years, these readings are similar to the findings of Oginin AO but are lower to the result published by the developed countries. Reason for this difference was due to FPD provided by the unqualified people. More complications were observed in the FPD of females. These finding are supported by the studies of Bragger and are contrary to the findings of studies done locally.

It is worrying that mostly complications noted in this study were FPD made by quacks. Previous reports from western countries stated dental caries as the primary cause for failure of FPDs, but our outcomes were contrary to the findings of the western people carious lesion as a primary cause but it was a major complication noted. Ikai et al and Walton et al reported the incidence of periodontal problems around prostheses as 23% and 27% respectly. On the other hand a local study reported the incidence of periodontal disease as low as 11%. Our results are in accordance to the study done locally. These differences are due to poor oral hygiene, host related factor and socioeconomic status and sub gingival preparation of the participants. Data regarding periapical involmment suggested that our findings are similar to Goodacre et al (11%) but are greater than Bragger et al. This difference was due to over preparations/wrong preparations of the abutments.
Restoration quality, arrangement of the teeth, tooth color and shape are the factors to produce the final esthetic. Study from Oginni\(^7\) concluded that poor esthetic was the most frequent cause of failure of restoration followed by fracture of FPD, data from western researcher supported carious as primary reasons but our data and a local study\(^15\) showed that decementation as the major cause of failure of FPD. In this study most of the complications like de-cementation and unacceptable aesthetics are technical and laboratory aspects of fixed prostheses fabrication. Thus it is recommended that the qualified persons should be involved in the laboratory/manufacturing of complication-free FDP.

This data suggest that mostly complications were of Grade II and III present in the FPD provided by unqualified persons. It is a great issue of concern in our population. These results point to a serious problem, which suggests policy changes may be required. Therefore, in consideration of the poor and neglected dental conditions in rural areas standard dental care and services should be provided in the future. Moreover it is suggested that careful treatment planning, specific radiographic, clinical, and laboratory procedures can increase the length of service of FPD.

REFERENCES