Assessment of cases of complete denture fracture in 102 subjects

Dr. Swati Patwari¹, Dr. Kankana Lahiri banerjee², Dr. Sagareka Choudhury³, Dr. Kumari Sweta⁴, Dr. B S Shubhum⁵, Dr. Salmoli Ganguly⁶

¹Reader, Department of Prosthodontics, Awadh Dental College and Hospital, Jamshedpur, Jharkhand, India
²Reader, Department of Prosthodontics, Awadh Dental College and Hospital, Jamshedpur, Jharkhand, India (Corresponding author) Email- drkankona20@gmail.com ;
³Senior lecturer, Department of Prosthodontics, Awadh Dental College and Hospital, Jamshedpur, Jharkhand, India
⁴,⁵,⁶PG student, Department of Prosthodontics, Awadh dental college and hospital, Jamshedpur, Jharkhand, India

Corresponding author: Dr Kankana Lahiri Banerjee, Email- drkankona20@gmail.com

ABSTRACT

Background: Denture fracture is a common phenomenon. Inherent properties of the denture base material also play a very important role in impact strength of the denture. The present study was conducted to assess reasons for complete denture fracture in 102 patients.

Materials & Methods: 102 complete denture wearer reported to the department of Prosthodontics for complaint of denture fracture was included. Factors such as retention, stability, occlusal errors were recorded. Cause of denture fracture was recorded.

Results: Out of 102 subjects, males were 72 and females were 50. The reason of denture fracture was material breakage in 32, poor fit in 25, accidental fall in 23, poor occlusion in 12 and acrylic base defect in 10 cases. The site of fracture was midline in 15%, incisor area in 13%, canine area in 12%, labial flange in 20%, molar area in 8%, maxillary tuberosity/retromolar pad area in 32%. The difference was significant (P< 0.05).

Conclusion: Authors found that most common cause of denture fracture was material breakage, accidental fall, poor fit, poor occlusion.

Key words: Complete denture fracture, material breakage, occlusion

I. INTRODUCTION

The material most commonly used for the fabrication of dentures is the acrylic resin, poly methyl methacrylate (PMMA). This material is not ideal in every respect and it is the combination of properties rather than one single desirable property that accounts for its popularity and usage.¹ Despite its popularity in satisfying aesthetic demands whereby, with an appropriate degree of clinical expertise and with the careful selection and arrangement of artificial acrylic teeth, it is possible to produce a prosthesis which defies detection, it is still far from ideal in fulfilling the mechanical requirements of a prosthesis.²

Denture fracture is a common phenomenon. Inherent properties of the denture base material also play a very important role in impact strength of the denture.³ Fractures from accidental droppings can be prevented to a large extent by using high impact resins, metal reinforcement (in the form of plates, wires and fillers) and, glass fibers in the form of woven mat. Reinforcement with glass fibers enhances the mechanical strength characteristics of denture bases such as the transverse strength, ultimate tensile strength, and impact strength.⁴ The technical work of fabricating acrylic dentures using modern techniques which reduce voids and porosities releasing residual stress is a must. The life of a complete denture wearer is abruptly paralyzed by the sudden fracture of his/her denture which is of utmost necessity for

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his/her day to day routine life. The present study was conducted to assess reasons for complete denture fracture in 102 patients.

II. MATERIALS & METHODS
The present study consisted of 102 complete denture wearer subjects of both genders. The complaint of all subjects was fracture upper or lower denture. All were enrolled in the study with the written consent. Ethical approval was obtained before starting the study. Demographic data such as name, age, etc. was recorded. Denture was examined carefully. Factors such as retention, stability, occlusal errors were recorded. Cause of denture fracture was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

III. RESULTS

Table I Distribution of subjects

<table>
<thead>
<tr>
<th>Gender</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>72</td>
<td>50</td>
</tr>
</tbody>
</table>

Table I shows that out of 102 subjects, males were 72 and females were 50.

Table II Reason of denture fracture

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material breakage</td>
<td>32</td>
<td>0.05</td>
</tr>
<tr>
<td>Poor fit</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Accidental fall</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Poor occlusion</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Acrylic base defect</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Table II, graph I shows that reason of denture fracture was material breakage in 32, poor fit in 25, accidental fall in 23, poor occlusion in 12 and acrylic base defect in 10 cases. The difference was significant (P< 0.05).

Graph II Reason of denture fracture
### Table III Site of denture fracture

<table>
<thead>
<tr>
<th>Site</th>
<th>Percentage</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midline</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Incisor area</td>
<td>13%</td>
<td>0.05</td>
</tr>
<tr>
<td>Canine area</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Labial flange</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Molar area</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Maxillary tuberosity/retromolar pad area</td>
<td>32%</td>
<td></td>
</tr>
</tbody>
</table>

Table III shows that site of fracture was midline in 15%, incisor area in 13%, canine area in 12%, labial flange in 20%, molar area in 8%, maxillary tuberosity/retromolar pad area in 32%. The difference was significant (P< 0.05).

### Graph II Site of denture fracture

**IV. DISCUSSION**

The life of a complete denture wearer is abruptly paralyzed by the sudden fracture of his/her denture which is of utmost necessity for his/her day to day routine life. As part of the dental education faculty, it is always our goal to make the life of denture-wearers easier and happier by investigating and solving the problems related to complete denture patients. As literature suggests, there are many causes and reasons associated with fractures of complete dentures. The most common causes of denture fracture may be either extra-oral cause like fall from patient’s hand to the hard ground surface or inside the mouth during function. One has to depend mostly upon the users’ version for the cause of the denture fracture. Inside the mouth, fracture can happen for various reasons like improper occlusion, placement of artificial teeth in the buccal slope of the ridge or against the palate, pressure from opposing natural teeth, poor retention and stability, prolonged use causing wear of artificial teeth and re-sorption of residual ridge, presence of high frenal attachments, prominent mid palatine suture, palatal or lingual torus, hard or soft tissue undercut, etc. The present study was conducted to assess reasons for complete denture fracture in 102 patients. In present study, out of 102 subjects, males were 72 and females were 50. Reason of denture fracture was material breakage in 32, poor fit in 25, accidental fall in 23, poor occlusion in 12 and acrylic base defect in 10 cases. Naik et al in their study found that the ratio of fracture of upper to lower denture was 1:3. Most fractures were common among males (55%). The most common reason being accidental dropping of the denture in case of the lower and...
improper fit and stability of the denture, improper arrangement and occlusion of the teeth for the upper one. Midline fracture was the most common site of fracture (60%). After analysis, the causes for the fracture were divided into material factors and clinical/technical factors. It was concluded that the after denture delivery, instructions of denture care were required to reduce mishaps, proper principles of denture construction were required for mechanical advantage of the denture – balanced occlusion, removal of interferences, reduction of stress concentration areas, etc. has to be followed. We found that site of fracture was midline in 15%, incisor area in 13%, canine area in 12%, labial flange in 20%, molar area in 8%, maxillary tuberosity/retromolar pad area in 32%. Khalid et al 11 in their study the number of fractured complete denture collected was 290 from patients aged 35-80 years of both genders. The (causes of denture fracture, the type of fracture and the history of previous recurrent fractures) were recorded. The main cause of denture fracture was poor fitting (40%), followed by poor occlusal relation (21%). Midline fracture was the commonest type of fracture (59%). From the study (51%) of the dentures had previously been repaired once or more. The ratio of lower to upper complete denture fractures was approximately 3:1; most of the fractured dentures (56%) were those of males. Conclusion: The causes of the fracture were divided into material factors and clinical/technical factors. Denture fractures can be reduced by following prosthodontic principles, analyzing proper fit, eliminating occlusal interferences and using high impact polymers or metal reinforced. Ray et al 12 in their study, 81 reported fracture cases out of 646 complete dentures were selected for this study, out of which upper was 33 (40.8 %) and lower was 48 (59.2 %). It was also noted that, in case of complete denture fracture, 57 cases (70.37 %) had midline fracture, 15 cases (18.52 %) had fracture elsewhere in denture and in 9 cases (11.11 %) teeth were debonded from the base. When the presence of porosity & crazing causes fracture of denture, we had seen that in case of complete denture, these were present in 29 cases (35.80%) & absent in 52 cases (64.20%). 27 cases (33.33%) opposed natural dentition. In 26 cases (32.10%), artificial teeth were set on ridge and in 55 cases (67.90%), teeth are buccal to ridge. When retention & stability were concerned, out of 81 fractured complete dentures, in 66 cases, these were poor. Occlusal prematurity also influences denture fracture. In complete denture fracture cases, out of 81 cases, occlusal prematurity was present in 59 cases.

V. CONCLUSION
Authors found that most common cause of denture fracture was material breakage, accidental fall, poor fit, poor occlusion.

REFERENCES