

## Original Research

### Assessment of factors of failures of fixed partial denture

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#### ABSTRACT:

**Background:** Fixed partial dentures (FPDs) have been the treatment of choice for the replacement of missing teeth for some years. The present study was conducted to assess factors responsible for failures of fixed partial denture. **Materials & Methods:** 118 cases of fixed partial denture in last 5 years were selected. The type of material, the type of pontic design, dental caries, tender on percussion, food lodgement, periapical pathology, mobility in abutment, occlusal problem, unacceptable color match etc. was recorded. **Results:** Out of 118 patients, males were 68 and females were 50. Out of 118 cases, 34 (28.9%) showed failure rate. Aesthetic factors comprised of unacceptable color match in 2, Overcontoured margin in 1, Undercontoured margin in 2 and mechanical factors such as loss of retention in 5, bridge fracture in 3, coronal tooth fracture in 2, porcelain fracture in 3, occlusal wear in 4 and perforation in 2 cases. Biological factors seen were caries in 3, periapical pathology in 2, tender on percussion in 1, tenderness on bite in 1, occlusal problem in 2 and sinus opening in 1 case. The difference was significant ( $P < 0.05$ ). **Conclusion:** Most common cause of FPD fracture was unacceptable color match, Overcontoured margin, Undercontoured margin, loss of retention, bridge fracture, coronal tooth fracture, porcelain fracture, occlusal wear, perforation, caries, periapical pathology.

**Key words:** Undercontoured margin, loss of retention, bridge fracture

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#### INTRODUCTION

Fixed partial dentures (FPDs) have been the treatment of choice for the replacement of missing teeth for some years.<sup>1</sup> Edentulism and dental disease have been shown to affect patients adversely. Patients with the dental disease suffer from an altered self-image. They may be expected by others to be socially less competent and have less intellectual achievement.<sup>2</sup> A fixed partial denture is defined as a fixed restoration which replaces one or more missing teeth and is attached to natural teeth or an implant.<sup>3,4</sup> In case of improper treatment planning, they are more likely to fail prematurely and lead to irreversible damage to the teeth and supporting structures.<sup>5</sup> In last few years, several investigators have taken great interest in investigating the life span and long-term quality of fixed dental prosthesis. Some of the common failures

in fixed bridge prosthodontics are loose retainers, fracture of soldered joints, fracture of porcelain, fracture of the abutment teeth or voids in retainer or pontic. Failure of these restorations may also lead to recurrent caries or loss of abutment teeth.<sup>6</sup>

Failure of the fixed prosthesis can occur in many ways. The reasons for failure may be divided into biological failures, mechanical failures, and esthetic failures. Mechanical failures are more directly under the influence of the clinician. Biological problems are less easily controlled and in some instance may be unrelated to the treatment or prosthesis.<sup>7</sup> The present study was conducted to assess factors responsible for failures of fixed partial denture.

**MATERIALS & METHODS**

The present study comprised of 118 cases of fixed partial denture in last 5 years. All cases were taken into consideration. The protocol of the study was approved from institutional ethical committee.

Data related to patients such as name, age, gender etc. was recorded. A thorough oral examination was

performed. The type of material, the type of pontic design, dental caries, tender on percussion, food lodgement, periapical pathology, mobility in abutment, occlusal problem, unacceptable color match etc. was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of cases**

| Total- 118 |       |         |
|------------|-------|---------|
| Gender     | Males | Females |
| Number     | 68    | 50      |

Table I shows that out of 118 patients, males were 68 and females were 50.

**Table II Failure rate among patients**

| Total cases | Failure | Percentage |
|-------------|---------|------------|
| 118         | 34      | 28.9%      |

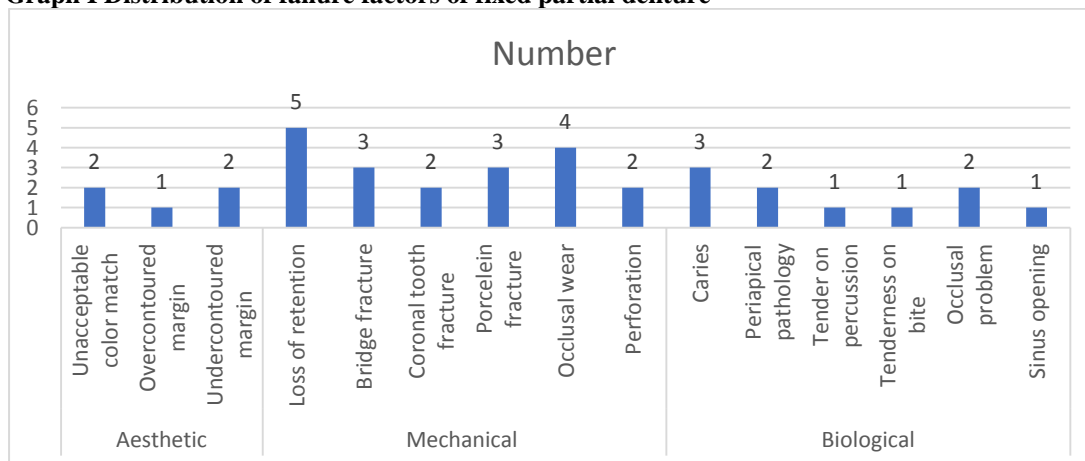
Table II shows that out of 118 cases, 34 (28.9%) showed failure rate.

**Table III Distribution of failure factors of fixed partial denture**

| Factors    | Parameters               | Number | P value |
|------------|--------------------------|--------|---------|
| Aesthetic  | Unacceptable color match | 2      | 0.05    |
|            | Overcontoured margin     | 1      |         |
|            | Undercontoured margin    | 2      |         |
| Mechanical | Loss of retention        | 5      | 0.02    |
|            | Bridge fracture          | 3      |         |
|            | Coronal tooth fracture   | 2      |         |
|            | Porcelain fracture       | 3      |         |
|            | Occlusal wear            | 4      |         |
|            | Perforation              | 2      |         |
| Biological | Caries                   | 3      | 0.04    |
|            | Periapical pathology     | 2      |         |
|            | Tender on percussion     | 1      |         |
|            | Tenderness on bite       | 1      |         |
|            | Occlusal problem         | 2      |         |
|            | Sinus opening            | 1      |         |

Table III, graph I shows that aesthetic factors comprised of unacceptable color match in 2, Overcontoured margin in 1, Undercontoured margin in 2 and mechanical factors such as loss of retention in 5, bridge fracture in 3, coronal tooth fracture in 2, porcelain fracture in 3, occlusal wear in 4 and perforation in 2 cases. Biological factors seen were caries in 3, periapical pathology in 2, tender on percussion in 1, tenderness on bite in 1, occlusal problem in 2 and sinus opening in 1 case. The difference was significant (P< 0.05).

**Graph I Distribution of failure factors of fixed partial denture**



## DISCUSSION

Replacement of missing teeth in partially edentulous arch involves various treatment options like removable, fixed prosthesis, and implants.<sup>8</sup> Fixed prosthodontic treatment can offer exceptional satisfaction for both patient and dentist.<sup>9</sup> Restoring and replacing of teeth with FPDs represents an important treatment procedure in dental practice, mainly because of the continuing high prevalence of caries and periodontal diseases in the adult and geriatric populations.<sup>10</sup> Reasons of failure can be caries, uncemented restoration, over-contoured restoration, poor occlusal plane, periodontal disease, periapical involvement, failed post retained crowns, poor esthetics, crown perforation and defective margins of restorations.<sup>11</sup> Knowledge regarding the clinical complications that can occur in fixed prosthodontics enhances the clinician's ability to complete a thorough diagnosis and to develop the most appropriate treatment plan. It provides realistic expectations to patients and to plan the time intervals needed for post-treatment care.<sup>12</sup> The present study was conducted to assess factors responsible for failures of fixed partial denture.

We found that out of 118 patients, males were 68 and females were 50. Chandranaik et al<sup>13</sup> assessed biological, mechanical, and esthetic failure factors among fixed partial dentures (FPDs). A total of 450 fixed partial denture failures in subjects were assessed. The fixed partial denture was examined for the failure factors (biological, mechanical, and esthetic). The selected subjects underwent a clinical examination and set of a questionnaire about the complaint of the fixed partial denture and further detail clinical examination about the failure factor. Out of 450 fixed partial denture failures, 33.3% of it showed the biological failure, 55.1% showed the mechanical failure and 11.5% showed esthetic failure. The most frequent reason for failure was mechanical factors followed by biological and esthetic failure factors.

We found that out of 118 cases, 34 (28.9%) showed failure rate. Sheikh et al<sup>14</sup> assessed causes of failures of FPD. 142 patients of both genders who had FPD failures due to various reasons were included. The cause of failure was recorded. Esthetic causes were over contoured margin in 12, under contoured margin in 6 and unacceptable color match in 8 cases. Other causes of failures was loss of retention in 30, periapical pathology in 12, bridge fracture in 10, caries in 8, coronal tooth fracture in 7, occlusion problem in 5, porcelain fracture in 13, mobility of abutment in 5, perforation in 4, food lodgement in 8, occlusal wear in 10 and sinus formation in 2 cases. The difference was significant ( $P < 0.05$ ). Common cause of failures was under contoured, over contoured margin, loss of retention and periapical pathology.

We observed that aesthetic factors comprised of unacceptable color match in 2, Overcontoured margin in 1, Undercontoured margin in 2 and mechanical

factors such as loss of retention in 5, bridge fracture in 3, coronal tooth fracture in 2, porcelain fracture in 3, occlusal wear in 4 and perforation in 2 cases. Biological factors seen were caries in 3, periapical pathology in 2, tender on percussion in 1, tenderness on bite in 1, occlusal problem in 2 and sinus opening in 1 case. Geibala et al<sup>15</sup> evaluated patient satisfaction with fixed prosthesis following placement and to assess the oral health and oral hygiene practices awareness by survey questionnaire. One hundred and ninety-two questionnaires were filled by patients wearing fixed prosthesis; the questionnaire included the subjective perception of treatment with fixed prosthesis, patients' perception of clinical outcome, regarding esthetics, masticatory function, speech, and together patient's attitude toward oral hygiene measures. Results showed that 84% of the patients were satisfied with their fixed prosthesis, while only 46.4% of patients were satisfied with the chewing ability. In concern, with esthetic outcome, 80% of patients showed that they were satisfied with the esthetic. The results showed that a high significantly number of patients did not use any form of interdental aids' to clean their fixed prosthesis (94%). The main reason for not using any dental aids' (91.1%) was a lack of post fixed prosthodontics instructions and not been informed by the dentist.

## CONCLUSION

Authors found that most common cause of FPD fracture was unacceptable color match, Overcontoured margin, Undercontoured margin, loss of retention, bridge fracture, coronal tooth fracture, porcelain fracture, occlusal wear, perforation, caries, periapical pathology.

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