

# A FAILED CANTILEVER FIXED PARTIAL DENTURE - A CASE REPORT

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## Abstract

**Background:** Although there have been lot of options for replacement of missing teeth in the field of prosthodontics, cantilever is a treatment option. However for a successful replacement of tooth with cantilever fixed partial denture, there are certain requirements, supportive biological and mechanical features. A case of 35 year old female patient reported to the department of Prosthodontics, Jamia Millia Islamia, with a failed cantilever prosthesis, this paper aim to discuss the reason for failure of that prosthesis.

**Keywords:** Cantilever, Abutment disocclusion, Root Fracture.

## Introduction

The fixed partial dentures having one or more abutments at one end of prosthesis and other end is unsupported are Cantilever fixed partial dentures.<sup>1,2</sup> This prosthesis is a good choice under favourable oral conditions. If used without following the biological and mechanical aspects involved in fabrication of prosthesis might lead to some complications. Any prosthesis considered successful when it function efficiently without affecting the host. A cantilever prosthesis works based on class II lever system. Any occlusal force on pontics, forces directed on to the abutments.<sup>3</sup> The successful cantilever fixed partial denture (cantilever FPD) needs to satisfy various criteria's and factors. This paper reports a failed case of cantilever FPD and discusses various causes and factors for the failure of cantilever FPD.

## Requirements of cantilever fixed partial denture

The following are the requirements of cantilever FPD:

- a. periodontally strong abutment
- b. multirooted, long or curved root abutments
- c. less masticatory stress in pontic region.

Ante hypothesized, selection criteria for abutments in a fixed restoration, that "the total periodontal membrane area of the abutment teeth should equal or exceed that of the teeth to be replaced."<sup>4</sup> This is an accepted criteria and meaningful guide in selecting abutment even today by many authors and researchers.<sup>1,5</sup>

## Clinical report

A 35 years old female patient reported to OPD of department of Prosthodontics, with pain in left mandibular first molar tooth. The patient gave history of extraction of left mandibular second molar due to dental caries six months back. She also reported that three months later it was replaced by mandibular cantilever FPD with right first molar used as a solitary abutment. [Figure 1]

Just three months after replacement of missing second molar, patient developed severe pain in the abutment tooth. The pain increased on mastication and the abutment tooth left right first molar was tender on percussion. Intraoral periapical radiograph in relation to tooth number 36, 37 showed distal root fracture of left first molar tooth at the apical one third level. [Figure-2]

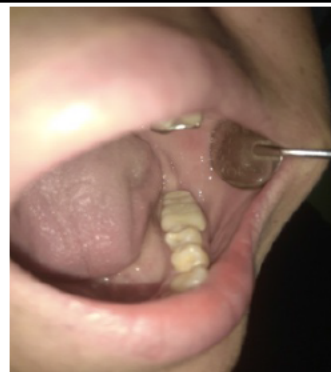


Figure 1: Cantilever fixed partial denture in replacing tooth number;37



Figure 2: Radiographic image of cantilever fixed partial denture showing root fracture of abutment

Immediately with the help of airtor diamond bur the cantilever fixed partial denture was occlusally ground and was kept out of occlusion. The patient reported immediate relief from pain. [Figure-3]

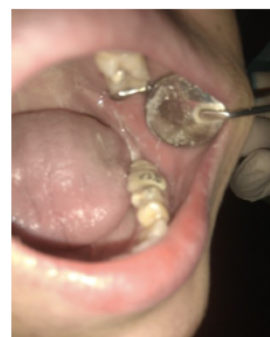


Figure 3: Disoccluded cantilever fixed partial denture.

Wax bite registration was made to check and verify the amount of disocclusion achieved after grinding the cantilever FPD. [Figure-4]



Figure 4: Wax bite registration to show the amount of disocclusion of cantilever FPD.

### Discussion

The number of abutments selected in this case was single which was violating Ante's law. For replacement of missing second molar by a cantilever FPD the second premolar and first molar should have been considered abutment. A single cantilevered pontics needs at least two abutments, this may vary according to the location of pontic and clinical conditions. The strongest forces of mastication by masticatory muscles are applied to the posterior regions of the arch. Additional abutments may be needed to withstand these forces in posterior molar region.<sup>5</sup> The apical one third fracture in root of abutment tooth was because of the fact that about 50% of masticatory forces applied on cantilever pontic was absorbed by the abutment nearest the cantilever pontic. However, an additional abutment like three-abutment cantilever restoration reduces the "combined total resultant" forces on the distal abutment compared to a two-abutment cantilever bridge.<sup>6</sup> For success of any prosthodontic procedure greater emphasis must be given on proper case selection, diagnosis, and treatment planning.<sup>7</sup>

### Mechanical Features of cantilever fixed partial denture

The farthest abutment tooth from the cantilever pontic experiences the greatest dislodging forces of mastication.<sup>8</sup> The abutment adjacent to cantilever pontic acts as a fulcrum and forms an axis of rotation for the prosthesis. So, the dislodging rotational forces lifting the prosthesis are greatest in farthest abutment teeth. Clinically at the areas of compression and distension of the cantilever bridge, the cement and metal thickness should be strongest and greatest over the abutment teeth.<sup>8</sup>

### The prognosis of fractured root

Since it was an apical one third fracture, there was chance of remineralisation after 3-6 months.<sup>9</sup> So radiographic review was done every three months. After six months, when the remineralization was evident on radiograph the prosthodontic rehabilitation was done.

### Conclusion

The reason for failure of cantilever FPD in this patient is because of strong masticatory force generated in this region, cantilever should be considered only when

mechanical and biological factors are favourable. The replacement of posterior tooth with cantilever should be considered with caution, if at all planned multiple abutment teeth should be utilized.<sup>8</sup>

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