



## **Treatment Planning for Fixed Partial Dentures**

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### **ABSTRACT:**

This study delves into the treatment planning for Fixed Partial Dentures (FPD), exploring the key considerations, methodologies, and advancements in dental prosthetics. Through a comprehensive review of literature, the paper aims to provide valuable insights into the selection of materials, and treatment planning for Fixed partial denture.

**Keywords:** FPD treatment plan, Abutment, preparation and preservation of periodontium.

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### **Introduction:**

Diagnosis and Treatment planning has significant impact in the treatment of Fixed Partial Denture (FPD) which gives a perfect outcome for the patients. With certain generalizations about treatment planning for Fixed Partial Dentures, the steps in the diagnosis and treatment planning has been discussed. Dental bridges, stand at the forefront of restorative dentistry, serving as a pivotal solution for individuals with missing teeth. FPD offers not only functional restoration but also addresses the aesthetic concerns associated with tooth loss. Unlike removable partial dentures (RPD), FPD is a fixed prosthetic device, providing patients with a stable and permanent solution for the replacement of one or more adjacent missing teeth. While RPDs offer a removable option, they come with certain disadvantages such as potential discomfort, reduced stability, and the need for regular removal and cleaning. FPD, on the other hand, provides a more seamless and natural feel, mimicking the appearance and function of natural teeth. This fixed nature eliminates the inconvenience associated with removable appliances, contributing to improved patient satisfaction. Patients often opt for FPD due to its ability to restore not only the functionality of their dentition but also the esthetic aspects, fostering enhanced self-confidence and a more natural smile. The desire for FPD stems from the longing for a durable and permanent solution that seamlessly integrates into their oral health routine. In this exploration of Fixed Partial Dentures, we delve into the intricacies of treatment planning, materials selection, and technological advancements, aiming to provide a comprehensive understanding of why FPDs are increasingly favored by both practitioners and patients alike in the realm of modern dental prosthetics. This simple overview gives an understanding for beginners about when FPD must be indicated in different edentulous conditions.

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### **Fixed Partial Denture:**

#### **DEFINITION:**

**Fixed Partial Denture** : any dental prosthesis that is luted, screwed, or mechanically attached or otherwise securely retained to natural teeth, tooth roots, and/or dental implants/abutments that furnish the primary support for the dental prosthesis and restoring teeth in a partially edentulous arch; it cannot be removed by the patient -GPT

**Fixed prosthodontics** : the branch of prosthodontics concerned with the replacement and/or restoration of teeth by artificial substitutes that cannot be removed from the mouth by the patient.-GPT

#### **Determination of the patient's need:**

- Successful treatment planning is based on the proper determination of patient needs.
- Treatment is required to achieve one or more of the following objectives:
- Correction of existing disease
- Prevention of future disease

- Restoration of function
- Improvement of appearance

#### Indications for Fixed Prosthodontics:

- One or two adjacent teeth are missing in the same arch.
- The supportive tissues are healthy.
- Suitable abutment teeth are present.
- The patient is in good health and wants to have the prosthesis placed.
- The patient has the skills and motivation to maintain good oral hygiene.

Certain investigations are mandatory in the treatment planning of FPD. The following radiographs are recommended according to the clinical condition.

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#### Radiography:

1. Periapical- Provides information regarding the quality of bone in implant site. It is also a valuable tool for monitoring crestal bone maintenance after implant placement.
2. Digital radiographs/radiovisiography (RVG)- Very useful during surgical placement to verify sequentially the location of implant in relation to critical anatomical structures.
3. Occlusal radiograph – Provides information regarding the width of bone and bone density.
4. Lateral cephalogram – Provides information regarding amount and angulation of bone in anterior regions and skeletal arch relationship
5. Orthopantomogram (OPG) – This is the most commonly used radiograph. It provides information about the height of available bone, its relation to critical structures and bone quality. It is commonly used with radiographic stents(10,11) .
6. Computed tomography (CT) – Both sectional and cone beam CT can be used. They are very accurate in providing information regarding bone width, height, quality and relation to critical anatomical structures . 3D models of the implant site can be fabricated using CT which help in making implant stents to guide accurate implant placement during surgery (surgical guides) (12,13).
7. Bone mapping – This is indicated in case of implant rehabilitation. This is a technique to determine the soft tissue thickness and indirectly the bone width and angulation, in the implant region. This is a useful diagnostic tool that can be used to determine the width of available bone. Dies are made on the diagnostic cast for the implant and neighboring areas, such that the area through the centre of the proposed implant site can be sectioned and removed. An acrylic template is fabricated to cover the edentulous area and adjacent teeth with equally spaced holes placed along the centre of the edentulous space extending buccally and lingually . An endodontic file with a stop- per is used to pierce the gingiva till it touches the bone . This will provide the width of the gingivae in that point. The procedure is performed on the crest of the ridge and a few points buccally and lingually. The width is simultaneously marked in the sectioned die corresponding to the point in the mouth . Joining the points will demarcate the thickness of gingiva in the implant site and the width of available bone.

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#### Treatment options:

##### Based on the Types of support

##### 1. *Tooth supported*

##### 1. Conventional FPDs taking support of natural teeth only

- A. Fixed Fixed Bridge
- B. Fixed movable Bridge
- C. Fixed removable Bridge (Andrews bridge)

##### Indications:

1. The necessity for a restoration with exceptional aesthetics.(1)
2. The requirement to reduce the wear of the opposing dentition.
3. The utilization of conservative intracoronal abutment tooth preparations.

4. The potential for bonding the prosthesis retainer to the abutment.
5. A preference for a non-metal, non-porcelain prosthesis (particularly in cases where metal allergies are present).

**Contraindications:**

1. Inability to maintain adequate fluid control (2)(e.g., patients with chronic or acute gingival inflammation or when margins would be placed deeply into the sulcus).
2. Long span restorations (i.e., two or more pontics).
3. Patients with unglazed porcelain or removable partial denture frameworks that would oppose the restoration.
4. Patients who abuse alcoholic substances.
5. Parafunctional habits exhibited by patients which may compromise treatment outcomes and longevity of restorative work done on their teeth and gums can also be considered contraindicative factors to consider during this type of dental procedure planning process as well.

**2 - Resin Bounded Bridge :**

A - Maryland Bridge

B - Rochette Bridge

**Indications:**

1. Edentulism of a single tooth, adjacent to intact dentition(3,4).
2. Aesthetic considerations are paramount.
3. Provisional fixed prosthetic appliance.
4. Anterior periodontal stabilization techniques.
5. Lingual inclines on maxillary canine teeth for the purpose of generating canine disclusion.

**Contraindications:**

1. Insufficient horizontal overlap between opposing dental arches.
2. Shortened teeth with insufficient lingual enamel coverage(5,6).
3. Pre-existing restorations or extensive areas of dental caries
4. Heavy anterior occlusal forces during lateral jaw movements
5. Excessive vertical overlap between upper and lower teeth
6. Hypersensitivity to nickel metal components
7. Significant differences in pontic width measurements
8. Extensive edentulous spans requiring implantation procedures.

**3 - Cantilever Bridge and Spring cantilever.**

4- Implant Support Bridge

**Indications(7,8,9)**

Unfavourable attitude toward RPD

Long span FPD questionable

Unfavourable no & location natural abutment

Single tooth restoration

Broad & flat ridge-dense bone

Dry mouth

#### **Contraindications**

- Poor quality of bone
- Medical
- Lack of experience Smoking
- Terminal illness
- Radiation
- Inadequate bone - site

#### ***ACCORDING TO POSITION***

- 1- Anterior FPD: It extends only between the anterior teeth, doesn't cross or cross the midline. (central, lateral, canine)
- 2- Posterior FPD: It extends only between the posterior teeth. (molar, premolar)
- 3- Complex FPD: It extends at one of its terminals beyond the canine.

#### ***ACCORDING TO MATERIAL***

1- Metallic :

a- precious alloy.

b- semi precious alloy.

c- non precious alloy.

2- non metallic: all resin, all ceramic

3- Combined: metallic with labial or buccal veneers metallic with lingual.

#### ***ACCORDING TO THE LENGTH OF SPAN***

- Short span (one missing tooth)
- Medium span (two missing teeth)
- Long span (more than two missing teeth)

#### ***ACCORDING TO THE CHRONOLOGY OF SPAN***

- Provisional bridge
- Temporary bridge.
- Immediate bridge
- Definitive bridge.

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#### **ACCORDING TO THE NUMBER OF TEETH MISSING AND THE NUMBER OF ABUTMENTS**

1. Simple (one missing tooth, two abutments)
2. Complex (two missing teeth, two abutments)
3. Complex (two missing teeth, more than two abutments)
4. Complex (pier abutment)
2. Implant supported: FPDs using osseointegrated implants as abutments .
3. Combination: FPDs taking support of both natural teeth and implants

a) When one or more teeth are missing or need to be extracted, FPD is suggested. Pontics, which are created to meet the practical and aesthetic needs of missing teeth, are used to replace these teeth in this situation. Pontics are coupled to retainers, which are repairs on teeth that serve as the abutment. The success rate of FPD is higher if it is created so that the forces are directed along the long axis of the teeth.

**b) Implant supported prosthesis:** Single or many lost teeth can be replaced with an implant-supported prosthesis using the effective Osseo integrated approach, which involves drilling a traumatic hole in the bone to accommodate precisely sized titanium cylinders(8). These are placed without any weight for a few months to allow the bone to grow, after which a prosthesis is used to restore function and appearance.

Span length : Prolonged span of FPD failure occurs due to excessive flexing during occlusal loads. The relationship between deflection and length depends on the length of the span cube. Pontics and connectors should be as bulky as possible to ensure optimal rigidity during the fabrication of long spans FPD without compromising gingival integrity.

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### Conclusion:

Effective treatment planning is critical to both patient satisfaction and treatment outcomes. It should be chosen after taking the demands of the patient into account. The number of missing teeth, the pros and cons based on material type, all affect how well fixed partial dentures function.

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