

Introduction to Partial Dentures

Definitions

➤ **Prosthodontic:** is that branch of dentistry which deals with the restoration and maintenance of oral function by the replacement of missing teeth and other oral structures by artificial devices.

➤ **Prosthesis:** is the replacement of an absent part of the human body by an artificial substitute, such as eye, limb or teeth.

The replacement of missing teeth in a partially edentulous arch is accomplished by partial denture.

Partial denture (PD) is defined as a prosthesis that replaces one or more, missing natural teeth and supporting structures. It is supported by teeth and/or the mucosa and it could be fixed (i.e. bridge) or removable.

✓ **Fixed prosthesis (FPD):** is prosthesis that used to replace missing or damaged teeth. It is referred to as fixed because they cannot be removed by the patient and being bonded to the natural teeth or to artificial roots.

✓ **Removable partial denture (RPD):** is a prosthesis that supplies teeth and associated structures on a partially edentulous jaw and that can be readily removed and replaced from the mouth by the patient.

RPD may be either entirely **tooth supported**, which means derives its support from teeth at each end of the edentulous areas, or it may be **tooth-tissue supported**, which derive its support from both the teeth and the tissue of the residual ridge.

There are several types of RPD; all of them used standard plastic denture teeth as replacements for the missing natural teeth. The differences between them are the materials used to support the denture teeth and retain the RPD in the mouth:

1) Cast Metal RPD's: The most common type of RPD consists of high-quality replacement teeth on a rigid cast metal frame. Modern frameworks are cast from an extremely strong alloy called chrome cobalt which can be cast very thin and are much less likely to break than the all plastic variety. They are also much less noticeable to the tongue. With proper care, a cast metal RPD can last for many years.

2) Acrylic RPD's: They are generally considered less optimal than a cast metal partial denture. The main reason is that the replacement teeth are set in a pink acrylic base which must be thick and bulky to minimize the risks for breakage. In spite of the fact that they are considered as a temporary solution, many people keep this type of appliance for many years, because as long as they are properly maintained, they look outwardly as good as the more expensive permanent appliances described before.

3) Flexible RPD's: These dentures are used when the patient is allergic to acrylic material or if there is discomfort to the metal and acrylic bases. They made from a thin, heat sensitive type of plastic (the most common name brand is ValPlast).

ValPlast is more durable than acrylic and won't absorb stains or odors, can be built quite thin, lightweight and can form not only the denture base, but the clasps as well. This type of partial denture is extremely stable and retentive, and the elasticity of the flexible plastic clasps keeps them that way indefinitely.

Indications: 1. Bilateral undercuts. 2. Bruxism 3. Space maintainer. 4. Presence of tori 5. Obturators.

Contraindications: 1. Poor soft tissue support or few remaining teeth (long span distal extension base) 2. Quality of teeth is too poor to support flexible denture 3. Low vertical dimension 4. Flat ridge or knife edge ridge.

The objectives of prosthodontic treatment of partially edentulous individuals with removable restorations are:

1. To eliminate oral disease to the greatest possible extent and prevent tooth migration.
2. To preserve the health and relationship of the teeth and the health of the oral and para oral structures.
3. To restore the oral functions with an esthetically pleasing end results.

The success of RPD can be obtained by following these guide lines:

1. Establish a genuine rapport to promote trust and confidence.
2. Thoroughness in diagnosis and treatment plan.
3. Identify problems and their causes.
4. Make the patient fully aware of the correlation between dental and general health as adjuncts to total well-being.
5. Explain the suggested treatment plan and alternate plans including time commitments for treatment.
6. Make the patient fully aware of their responsibilities in the success of the treatment by conscientious home care and periodic recall visits.
7. The cost should be explained at the beginning because some can afford expensive treatment, others cannot.
8. The dentist should avoid an overly optimistic prognosis.

Acrylic Removable Partial Dentures

Acrylic RPD is a dental prosthesis which artificially supplies teeth and associated structures in a partially edentulous arch. It consists of an acrylic resin denture base, artificial teeth and wrought wire clasp or cast clasps. It's usually constructed as a part of total prosthodontic treatment.

Advantages of Acrylic RPD

- 1- Not expensive.
- 2- Simpler design
- 3- Light in weight.
- 4- Easily constructed and easily added if more teeth are lost.
- 5- Easily relined if bone resorption occurs and easily repaired if fractured.
- 6- Good appearance because its color resembles that of gingiva.

Disadvantages of Acrylic RPD

- 1- Less patient response and to tolerance for acrylic than metallic.
- 2- Poor thermal conductivity.
- 3- Tendency for warpage of overheated during polishing.
- 4- Lower strength so it is easily broken and must be constructed in thick section.

Types of acrylic partial denture

1- Temporary RPD: a removable prosthesis used temporarily for a period of time until a more definite prosthesis can be provided. This denture is used in patient where tissue changes are expected and where permanent prosthesis cannot be fabricated till tissue stabilize.

2- Transitional RPD: a temporary prosthesis to which more artificial teeth will be added as more natural teeth are lost and then it will be replaced by a definite prosthesis after complete healing of the supporting tissues (during the period shift from PD to complete denture).

It is used when some or all the remaining natural teeth have periodontal poor prognosis but the immediate extraction of them are not indicated for physiological and psychological reasons.

3- Interim RPD: a dental prosthesis used for a short period of time to provide aesthetic and mastication until definitive prosthesis is fabricated.

Indications:

- In young patients: it is important to maintain the space until adjacent teeth have fully erupted to be used as abutments for fixed prosthesis.
- Traumatic loss of teeth (accidents).
- After extractions before sufficient healing has occurred.

4- Treatment RPD: a dental prosthesis used for purpose of treating or conditioning the tissue which are called upon to support and retain a denture base.

Indications:

- ❖ As a vehicle for carrying tissue treatment material for the abused oral tissue.
- ❖ To re-establish the vertical dimension of occlusion (occlusal splint) and to condition the teeth and ridge tissue to support the present restoration better.
- ❖ As a splint following surgical correction in oral cavity (to improve healing).
- ❖ As a night guard or mouth protective device: It is a protective device for the mouth that covers the teeth and gums to prevent and reduce injury to the teeth ,arches ,lips and gums . Mouthguards are most often used to prevent injury in contact sports ,as a treatment for

bruxism or temporomandibular joint disorder (**TMD**), or as part of certain dental procedures, such as tooth bleaching. An effective mouth guard should be comfortable, resist tears, be durable and easy to clean, and should not restrict breathing or speech.

- ❖ Used as an obturator to close a congenital or acquired tissue opening.

5- Immediate RPD: is prosthesis used to replace one or more teeth and is inserted on the day of extraction of teeth. It is constructed before the extraction of un-wanted teeth and is inserted immediately after their removal. Usually this type of prosthesis is done for patients, who are in a daily contact with public.

Advantages of immediate RPD

The most important advantage of immediate dentures is that patient never needs to appear in public without any teeth. Other advantages include:

1. The form, size and arrangement of natural teeth can more closely be duplicated when some teeth remain in mouth.
2. When immediate dentures are inserted, they act as a bandage and help to reduce bleeding.
3. Immediate dentures protect the tissues at the sensitive extraction sites from irritation which might result from the tongue and food.
4. Immediate dentures can enable the patient to establish speech patterns more easily.
5. With immediate dentures the patient can chew better than without teeth during the normal waiting period for conventional dentures.
6. If dentures do not replace the natural teeth within a short time, the cheeks tend to fall in (The contours of lips and face can be maintained by immediate denture).

Disadvantages of immediate RPD

1. More visits are required during the first few months, due to changes in the gum and in mouth function. Also the original good fit and occlusion of the denture will be lost as healing takes place.
2. Because of changes in the tissues after removal of the teeth, immediate dentures usually need to be re-fitted by a dentist within several (usually six months), this involves additional expense.
3. In the areas where the last remaining teeth will be removed, immediate dentures will not always fit quite as accurately as conventional dentures made at a later date, after gums have healed.
4. Because some of teeth are still in place, the patient cannot see how the dentures will look in mouth until after the natural teeth have been removed (no try-in stage).
5. Immediate dentures are usually more expensive because of the additional time required for their construction.

Note: immediate denture will need relining to compensate for bone resorption; the frequency of need for relining depends on rapidity of alveolar bone resorption.

Indications and Contraindications for RPD

Removable partial denture should be used where a fixed prosthesis is contraindicated

Fixed prosthesis is preferred on the removable prosthesis for the following **reasons:**

- 1) Loading in a fixed restoration is vertical on the abutment teeth which is similar to the natural teeth loading while in the removable restoration the loading on the abutments is horizontal or oblique which cause tooth movement.
- 2) A fixed restoration is more hygienic than removable in which plaque accumulation on the abutment teeth takes place.
- 3) A fixed restoration is more esthetic than RPD as there are no clasps and metals.
- 4) A fixed restoration is more acceptable by the patient as there is no movement and no removal from the mouth.

1) Length of edentulous span:

Generally, a unilateral tooth bounded edentulous space should be restored with a fixed partial denture cemented to one or more abutments at either ends. In case of long edentulous space, fixed prosthesis is contraindicated as the abutments cannot withstand the trauma of the occlusal forces. Therefore RPD with cross arch stabilization is required to prevent the torque and leverage on two abutments and to distribute the forces on the edentulous ridge evenly.

2) Need for cross arch stabilization:

Usually RPD for CI III is better supported and stabilized when a modification area is present on opposite side of arch. This area is best restored by fixed prosthesis but since it is essential for the design of RPD for cross arch stabilization then it should be restored by removable prosthesis.

Any missing anterior teeth in a partially edentulous arch (except in a Kennedy Class IV arch in which only anterior teeth are missing), are best replaced by means of a fixed restoration except in case of excessive tissue and bone loss.

3) Periodontal support of remaining teeth

When the periodontal support of the remaining teeth is poor, fixed prosthesis is contraindicated and RPD is used. This is due to the act of the RPD as a splint to support the remaining weakened teeth.

4) Non replacement of missing molars:

The decision for replacing unilateral missing molars by a removable prosthesis requires a major connector joining the edentulous side to retentive and stabilizing components located on the non edentulous side of the arch. Leverage factors are frequently unfavorable, and the retainers used on the non edentulous side are often unsatisfactory.

5) Distal extension situation:

Replacement of missing posterior teeth is often best accomplished with a removable partial denture especially when implant treatment is not feasible for the patient. The most common partially edentulous situations are the Kennedy Class I and Class II. With the latter, an edentulous space on the opposite side of the arch is often conveniently present to aid in required retention and stabilization of the removable partial denture.

6) Immediate teeth replacement after extraction:

Replacement of teeth after recent extraction is accomplished by RPD due to the tissue changes during healing period and bone resorption. Therefore removable prosthesis is made as a temporary restoration which can be easily relined and remade after tissue changes then permanent prosthesis with fixed PD is done.

7) Excessive bone loss:

The pontic of fixed prosthesis must be related to the residual ridge in such a manner that the contact with mucosa is gently. When excessive bone loss occurred, the artificial teeth which are supported by a denture base are arranged and positioned in more acceptable buccolingual position than fixed prosthesis. Therefore, RPD can provide good lip and cheek support in addition to good aesthetic.

8) Age: Young individuals who are under 21 years old are indicated for RPD because:

- The presence of wide pulp chamber which makes the teeth preparation difficult. Also, there is high possibility of pulp exposure.
- Bone growth: there is unstable foundation for making fixed restoration.
- Teeth have not been fully erupted to give final length of crown (lack sufficient clinical crown height).

9) Abutments with guarded prognosis: If the prognosis of an abutment tooth is questionable, or if it becomes unfavorable during treatment, it might be possible to compensate for its impending loss by a change in denture design. So we use removable partial denture.

10) Patient desires: Patients sometimes insist on RPD rather than fixed prosthesis due to the following reasons:

- Avoid the operative procedures on sound healthy teeth.
- For economic reasons.

Infection Control

Dental patients and Dental health care workers potentially may be exposed to a variety of microorganisms. Exposure can occur via blood and/or oral or respiratory secretions. The microorganisms may include viruses and bacteria that infect the upper respiratory tract in general, as well as cytomegalovirus, HBV, HCV, herpes simplex virus types 1 and 2, HIV, *Mycobacterium tuberculosis*, staphylococci, and streptococci. The transmission of infection in the dental operatory can occur through several routes. These include direct contact (blood, oral fluids, or other secretions), indirect contact (contaminated instruments, operatory equipment, or environmental surfaces), and contact with airborne contaminants present in droplet spatter or in aerosols of oral and respiratory fluids. For infection to occur via any of these routes, the “chain of infection” must be present. This includes a susceptible host, a pathogen with sufficient infectivity and numbers to cause infection, and a portal through which the pathogen may enter the host. For infection control procedures to be effective, one or more of these “links” in the chain must be broken.

The recommended infection control practices are:

1. Gloves should be worn in treating all patients.
2. Masks should be worn to protect oral and nasal mucosa from splatter of blood and saliva.
3. Eyes should be protected with some type of covering to protect from splatter of blood and saliva.
4. Sterilization methods known to kill all life forms should be used on dental instruments. Sterilization equipment includes steam autoclave, dry heat oven, chemical vapor sterilizers, and chemical sterilants.
5. Attention should be given to cleanup of instruments and surfaces in the operatory. This includes scrubbing with detergent solutions and wiping down surfaces with iodine or chlorine (diluted household bleach solutions).
6. Contaminated disposable materials should be handled carefully and discarded in plastic bags to minimize human contact. Sharp items, such as needles and scalpel blades, should be contained in puncture-resistant containers before disposal in the plastic bags.