Introduction of Removable Partial Denture

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Aims & Objectives

What are the aims of providing a RPD?

Discuss the Advantages and Disadvantages of providing RPD

Clinical and lab stages involved

- Describe the Components and their Function of RPD
- Define Support, Retention and Stability
- Define the Kennedy Classification of edentulous spaces
Removal partial Denture:
An appliance worn in the mouth, which replaces missing teeth and gums.

Functions:

to improve oral functions, aesthetic and preservation of remaining tissue.
Replace missing teeth. Why?

- **Aesthetics / Appearance**
- **Function**
  - Mastication
  - Speech
  - Maintaining the health of the masticatory system
  - Preventing undesirable tooth movement
  - Improving distribution of occlusal load
  - Preparation for complete dentures

- **Preservation of what remains (soft tissue and hard tissue).**
  - Prevent movement of remaining teeth opposing teeth
  - Over eruption
  - Tilting
  - Mesial/distal drift
  - Prevent excessive wear on remaining teeth
Consequences of tooth loss

- Overeruption.
- Drifting
- Altered occlusion
- Unaesthetic
- Reduces in function and speech
Advantages

- Removable
- Can replace many teeth
- Can be used in free end saddles cases
- Can replace hard and soft tissues defects
- Cost – cheap when compared to bridges or implant.
- Quick & simply can be made
- Easy for modification and addition or repaired
Disadvantages

- Removable
- Limited loading potential
- Increased bone resorption
- Increased plaque accumulation
- Poor clasping & support - tooth overload
- Wear of denture teeth/teeth
- Limited lifetime
**Type of denture**

- Full denture
- Partial denture – acrylic or Co-cr
- Immediate denture – acrylic (commonly)
- Overdenture – acrylic or Co-cr
- Implant supported denture
- Sectional denture
Stages of RPD acrylic

- Examination and diagnosis
- Impression 1°
- Tooth preparation
- Impression 2°
- Jaw record
- Try In
- Issued denture
- Review and Maintenance
Stages of RPD Co-Cr

- Examination and diagnosis
- Impression 1°
- Tooth preparation
- Impression 2°
- Try in Co-Cr
- Jaw record
- Try In
- Issued denture
- Review and Maintenance
Clinical Phases in Treatment

- Examination, Diagnosis and Treatment Planning
- Mouth Preparation
- Master Impressions
- Occlusal Records
- Insertion
- Maintenance
Phase 1
E&D, Treatment Planning

- Gathering informations
- Analyse
- Derive diagnosis
- Consider prognosis
- Construct treatment plan
  - Discuss with patient
  - Obtain consent (if necessary)
Gathering information

- Patient’s information
- Chief complaint
- History
- Attitudes - Assess attitudes, expectations and motivation
- Examination
- Radiographs - OPG, PA, BW
- Study models
- Special tests – saliva test, biopsy etc.
- Consultations
Examination

- Extra oral and Intra oral
  - General
  - Soft tissues
    - intra and extra-oral
  - Alveolar ridges, vestibules
  - Occlusion
  - Prostheses
  - Dentition
  - Periodontium
Risk/Benefit Analysis

Consider patient’s:
- experience, attitudes
- motivation, abilities
- plaque and caries levels
- bone and mucosa
- periodontal apparatus
- type of RPD
- design considerations
- appearance
- occlusion
- masticatory efficiency
- Saliva
Risk/Benefit Analysis

If the risks are greater than the benefits you will probably need to consider not to construct a RPD to the patient.
Finalise Treatment Plan

- Discuss treatment options with patient
- Discuss costs involved
- Outline your responsibilities and those of the patient
- Set appointment times
- Obtain consent
1º Impression

Study models for:

- Diagnosis purposes
- Treatment plan
- Dental record
- Surveying
Custom (special) tray

Fabricate custom (special) – for $2^\circ$ impression
Phase 2 - Mouth Preparation

you should prepare the mouth by:

• eliminating disease (perio and caries)
• completing restorations
• re-evaluating the treatment plan
• modifying teeth to receive the RPD
Phase 3 - Master Impressions

Objective -

- to record accurate impressions of the teeth and soft tissues so that quality dentures can be achieved
Articulated and surveyed study models
Phase 4 - Occlusal Records

Objective –

• to establish the correct relations record between the maxilla and the mandible.

• When placement of artificial teeth, so that the final denture will be aesthetically pleasing, comfortable and compatible with the masticatory system.

• The clinical steps involved can be simple to complex.
Occlusal records

Clinical steps include:
- review laboratory work
- verify quality of impression by checking extensions, retention and stability of base
- fit the RPD frame
- record centric occlusion/relation
- select tooth colour and form
- determine tooth position
Clinical steps include:

- review laboratory work
- verify quality of impression and check the denture by checking extensions, retention and stability of base
- record centric occlusion/relation. Sometime you need to check to freeway space for complex cases.
- fit the RPD frame
- phonetic, patient comfort
- determine tooth position (aesthetic, midline, tooth position and tooth colour and lip support)
- discussion of trial denture with patient
Prepare metal frame

- Study models with denture designs, master cast.
Phase 5 - Insertion

The objective-

to insert the prosthesis and provide sufficient information so that the patient is able to insert and remove the RPD.

Patient must understands

• when it is to be worn and not to wear the denture
• how the denture and the oral tissues should be cleaned
• Limitation of the denture and how the denture perform
• and possible complications associated with a new denture and how to deal with them.
Insertion

**Review:**
quality of finished RPD and correct extensions, retention and stability occlusion - including neutral zone, IOD, occlusal contacts and articulation

**Adjust as required**

**Discuss**
appearance with patient
use and care of RPD and oral tissues limitations and possible difficulties
Phase 6 – Post-insertion and Maintenance

Objective:

• to review the outcome of treatment

• to assist the patient through the learning period and when the patient is wearing the denture comfortably to provide a regular recall service

• problem arise and eventually to adjust, repair, rel ine/rebase or remake the RPD
Things to remember!

1. Saddles (yellow)
2. Support (red)
3. Retention (green)
4. Bracing and reciprocation (blue)
5. Connector (black)
6. Indirect retention.
**Definitions:**

- **Saddles:** The part of a partial denture which replaces the edentulous space (missing teeth). Bounded saddles have teeth either end; Free end saddles do not distal abutment tooth. (can be acrylic or subframe of metal overlaid by acrylic).

- **Support:** The ability of a denture to resist to vertical forces directed towards mucosa.

- **Stability:** The ability of the denture to resist displacing forces during function.
**Indirect retainer:** a component of the denture that resists rotational or tilting movements of the denture.

**Major Connector:** these join the edentulous saddles of the denture together and provide cross arch bracing.

**Minor connector:** these components join the rests, clasps, reciprocals etc to the major connector.
Retention (Direct Retention):
The ability of a denture to resist movement away from the supporting tissues, i.e. away from the teeth or mucosa. Direct retention can be provided by engaging the undercut on the tooth.
Components of a denture

Clasps: these shaped pieces of metal (cast Cr/Co, gold or stainless steel) are used to keep the partial denture in place.

Rests: these are parts of the denture base that fit onto the (prepared) surfaces of the teeth close to the edentulous saddle to take some of the masticatory load away from the mucosa onto these teeth.

Reciprocals: a part of the denture that resists the action of a clasp on a tooth as the denture is inserted or removed from the mouth.
Clasp - retention

Support (rest)

saddle

Major connector

bracing
Things to remember!

1. Saddles *(yellow)*
2. Support *(red)*
3. Retention *(green)*
4. Bracing and reciprocation *(blue)*
5. Connector *(black)*
6. Indirect retention.
Kennedy Classification of Edentulous Saddles

- Kennedy Classification I: Bilateral Free End Saddles
- Kennedy Classification II: Unilateral Free End Saddle
- Kennedy Classification III: Unilateral Bounded Saddle
- Kennedy Classification IV: Bounded Saddle Across the Midline

Modifications to this classification for extra missing teeth and their edentulous saddles is permitted for Kennedy Classes I, II and III But NOT Class IV
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Support

- **HOW:** Mucosa and underlying Bone
- Rests on Teeth: occlusal; cingulum; incisal; telescopic copings, precision attachments

- **WHY:** Increase masticatory efficiency

- **WHERE:** Adjacent to the saddle it has to support (commonly).
Support (rest)

Clasp - retention

saddle

Major connector

bracing
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**DIRECT RETENTION**

- Clasps: provide direct retention by engaging the undercut area on the tooth.
- Types: Gingivally or Occlusally Approaching
- Names: Ring, Circumferential, I-bar, T-bar, L-bar, Reverse.
- Should includes a rest, a clasp arm and a reciprocal arm.
Retention will depend on:

- Dept of undercut: 0.25 mm - cast cobalt chrome: 0.5 mm - ss
- 0.75 mm – gold.
- Position of undercut: ex: high survey line – gingiva approaching clasp
- Position of the tooth
- Occlusion
- Shape of the sulcus
- Periodontal health
- Material of denture base
Things to remember!

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Connectors

- **Major:** to join the Saddles Areas together
  - Mandibular: Lingual bar, Lingual plate, Sublingual bar.
  - Maxilla: Full palatal coverage; Anterior palatal bar, Posterior palatal bar, Anterior and horseshoe connector.

- **Minor:** to join the rests, clasps and reciprocal elements to the major connector.
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**Indirect retention:**

Indirect retainer derived by placing components so as to resist ‘rotational or ‘tipping’ forces of the denture around the retainers ex: by position of clasps and rest and type of the connector.
F = Fulcrum — indirect retainer, a component which obtains support.
R = Resistance — retention generated by the clasp.
E = Effort — displacing force, eg a bolus of sticky food.

Ex: If the design is modified by placing a rest on the premolar tooth, this rest (indirect retainer) becomes the fulcrum of movement of the saddle in an occlusal direction causing the clasp to move up the tooth, engage the undercut and thus resist the tendency for the denture to pivot.
It can thus be seen that to obtain indirect retention, the clasp normally be placed between the saddle and the indirect retainer.
Things to remember!

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2. Support *(red)*
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5. Connector *(black)*
6. Indirect retention.
Reciprocals: a part of the denture that resists the action of a clasp on a tooth as the denture is inserted or removed from the mouth.
The lateral forces in particular are capable of inflicting considerable damage on the periodontal tissues and alveolar bone in the edentulous areas.

Bracing on teeth may be achieved by means of rigid portions of clasp arms (1) or plates (2). Bracing on the ridges and in the palate is obtained by means of major connectors and flanges (3).
Preparation of wax pattern for Co/cr denture
Construction of a base metal alloy frame for a RPD
Prepare metal frame

- Study models with denture designs, master cast.
Setting the teeth and waxing

Process and finish dentures
Key to Successful Treatment

- Risk estimation
- Good pre-operative planning
- Appropriate case selection
- Appropriate treatment selection
- Good prosthetic design
- Patient education
- Recall and maintenance
QUIZ
SUMMARY

- *Choice of treatment depends*: 
  - Type of case 
  - Cost of the treatment 
  - Medical condition of the patient 
  - Material available/experties
References:

- British dental journal 2000 (RPD).
- Oxford handbook of clinical dentistry, 1999