Removable partial dentures, first session.

Clinical procedures:
Patient evaluation
Preprosthetic procedures
Preliminary impression

Laboratory procedures
Preliminary casts
Individual tray fabrication

Preliminary impression
Primary impression is made at least six weeks after any preprosthetic surgical procedures. Primary impressions are made using irreversible hydrocolloid (alginate) impression material. Alginate is chosen because it is economical, elastic, and easy to manipulate.

Preliminary casts
The alginate impression is poured using dental plaster. The resulting primary cast is used to design the prosthesis.

Designing the prosthesis.
This is the most important phases in the construction of a removable partial denture. Designing includes choosing the type of components for the partial denture, determining the location of various components, determining the path of insertion and choosing the type of material for each component etc. designing can be done using an instrument called Surveyor.

With red pencil we draw construction of future metal framework of RPD

- Rest seats.
- Retentive clasp arm
- Reciprocal arm
- Indirect retainers
- Major connectors
- Minor connectors
- Denture base

Preparation of individual trays
Primary cast is used to individual tray fabrication

Removable partial dentures, second session
Clinical procedure
Prosthetic mouth preparation

Secondary impression

Laboratory procedures

- Duplication and preparation of the refractory casts.

Prosthetic Mouth Preparation.

In this phase the oral structures are prepared to favour the placement of a denture. We know that certain parts of the RPD like rests, proximal plates, etc. require alteration in the oral structures for their placement. Mouth preparation procedures are done after designing a RPD prior to making the master impression.

Tooth modification by:

- Reduction
- Restoration

Prosthetic mouth preparation can be broadly classified into:

- Preparation of retentive undercuts.
- Preparation of guiding planes
- Preparation of rest seats.

Preparation of retentive undercuts.

We know that retentive undercuts are required to engage the retentive arm of the clasp and provide retention. Generally, all teeth have convex surfaces with natural undercuts below the height of contour. Some teeth get abraded and have straight surface without any undercut. In such teeth artificial retentive undercuts are prepared to produce retention for prosthesis.

There are common methods used to prepare a retentive undercut, namely:

- Crowns (metallic, metal-ceramic)
- Cast restorations (other than crowns- onlays, inlays(metalic, amalgam)
- Dimpling (Enameloplasty)

Crowns

Full veneer crowns are used to restore the contour of abraded, attrited and submerged teeth. Tooth reduction is done and the crown is fabricated as usual. But, before casting, the wax pattern of the restoration is surveyed with an analysis rod.

After analysing the pattern the guide planes are prepared using a wax carver tool of the surveyor. After contouring the guide planes on the wax pattern, the undercuts are checked. If there is no favourable retentive undercut, it is contoured directly on the wax pattern being surveyed. The wax pattern is invested and cast. The resulting prosthesis with proper contour is cemented to the tooth.

Cast restorations

A cast restoration (onlays) is placed instead of full veneer crowns when adequate tooth structure is present. The procedure for the preparation of an undercut on a cast restoration is similar to the
procedure described for a full veneer crown. Care should be taken to ensure that the retentive terminal engages the undercut on sound enamel than on the cast restoration. A cast restoration can be contoured such that the tooth surface below it becomes an undercut.

**Dimpling (enameloplasty)**

The intentional alteration of the occlusal surface of the teeth to change their form. The enameloplastic procedure done to produce a retentive undercut is known as dimpling. The preparation made on the tooth by dimpling is known as a dimple. A dimple is nothing but a gentle depression created on the enamel surface of the abutment teeth to provide a retentive undercut. It is done when the abutment tooth does not provide any surface undercut that can be utilised by some form of clasp. It can also be done to modify an existing undercut on the tooth surface and also on an existing cast restoration without a favourable undercut.

**Design**

- It is a gentle depression, not a pit or a hole.
- It is prepared close to and parallel to the gingival margin.
- It should be 0.25 mm deep when measured from a tangent parallel to the path of insertion extending over the surface of the tooth above the preparation.
- The preparation should be at least 2 mm occlusogingivally and 4 mm mediadistally.
- The surface of a dimple should be highly polished.

**Indications**

- Small non-retentive undercuts that require modification.
- Teeth with nearly vertical buccal and lingual surfaces.

**Procedure**

- A small round ended tapered diamond stone is used.
- The bur should be move in the anteroposterior direction near the line angle where the undercut is to be prepared.
- The depression should be very gradual and not steep.

**Guide plane preparation**

They are prepared by selective grinding of teeth (enameloplasty) or by appropriate shaping of wax patterns of abutment crowns.

**Rest seat preparation**

Rest seat preparation is done along with other mouth preparation procedures prior to making the master impression. The location position and extent of the rest seat is determined using a surveyor on a diagnostic cast. The procedure for rest seat preparation is different for enamel (natural structure) and for restorations.

**On Enamel**

- A depth orientation groove is drawn along the desired outline form to create an island of enamel.
- The island of enamel is removed using the same bur used to make the depth orientation grooves.
• Undercuts should be avoided. The shape and design of the rest seat is verified with that marked on the primary cast.
• Red beading wax or utility wax can be used to check for occlusal clearance.
• Sharp line angles are rounded with round steel bur
• Margins are also relieved by removing unsupported enamel
• The rest seat preparation must be highly polished.

Conclusion

Prosthetic mouth preparation should be done before making the secondary impression in which they should be recorded accurately.

Secondary impression

The secondary impression is made after prosthetic mouth preparation. The material of choice for this is alginate.

Laboratory procedures

Duplication and preparation of the refractory casts.

The blocked, relieved and beaded master cast should be duplicate so that the resultant refractory cast, is ideal to fabricate the framework.

The reason to duplicate a stone cast is to allow formation of an investment cast for framework fabrication. The careful preparation of the master cast for production of this investment cast involves consideration of the defined path of insertion, heights of contour, retentive, and stabilization areas designed into the mouth preparation. The framework produced should be carefully evaluated on the cast for fit.

Blockout should be accomplished on the master cast before making an investment cast. On this investment cast, the wax or plastic pattern is formed.

Duplicating flasks. The cast to be duplicated must be placed in the bottom of a suitable flask, called a duplicating flask. Numerous duplicating flasks are on the market.

The duplicating flask has two parts namely, the body and a reservoir ring or counter. The body of the duplicating flask forms the base of the flask where the cast to be duplicated is positioned. The reservoir ring is a dome shaped structure with vent holes through which the duplicating material can be poured in.

Duplicating materials include both colloidal and silicone materials. The colloidal materials are made fluid by heating and return to a gel while cooling.

After blockout and relief, the master cast is duplicated to form the refractory cast. As mentioned before the refractory cast will not be similar to the master cast.

Waxing. Waxing is nothing but fabricating the wax pattern for the framework. Commercially available wax or plastic patterns can be used to fabricate the framework pattern. Wax pattern for cobalt-chromium alloy frameworks should be waxed slightly heavier (thicker) that those for gold framework. Commercially wax and plastic patterns are available in a wide variety of shapes and gauges (thickness).

Investing. After fabricating and finishing the framework pattern, it should be invested and cast to obtain a metal framework.

Investing is defined as “the process of covering or enveloping, wholly or in part, an object such as a denture, tooth, wax form, crown, etc. with a suitable investment material before processing, soldering or casting”
Investing is done by placing the pattern with the cast in an investing ring. The pattern is surrounded by the investing medium. Sprues are attached to the wax pattern in order to create a path for the molten metal to reach the wax pattern, which is totally surrounded by the investment. Vacuum based pouring is advised, the investment material should be pored into the casting ring through its free end till it fills the entire casting ring.

**Burnout.** The burnout operation is done to:

- dry the moisture of the mould., to vaporize the moisture content in the investment.
- Expand the mould to compensate for solidification shrinkage of the metal
- Eliminate the pattern plastics and waxes by melting and vaporization.

**Casting.** The mould is ready for casting after complete burnout. The casting ring is placed and locked in position within the casting machine the centrifugal casting machine is prepared and locked.

The method of casting use force to quickly inject the molten metal into the mold cavity. This force may be either centrifugal or air pressure. In any case either too much or too little force is undesirable.

**Recovery.** Casting recovery is nothing but removing the adherent investment away from the cast metal.

**Finishing and polishing.** The sprues are cut using carborundum discs. Surface irregularities are removed with the help of a tungsten carbide bur. The casting is trimmed and finished using a mounted stone. Just before being polished (high-shine) chromium-cobalt casting are electropolished, which is a controlled deplating process. Polishing is done using rouge, which is coated on the polishing buff.

The portions of framework, which are difficult to access, are polished using rubber abrasive wheels and points. The clasp arms and other parts of framework that contact teeth are maximally finished to avoid surface decalcification of the abutment.

**Third session**

**Clinical procedures**

Framework try-in

Jaw relation

Mounting the casts

Denture base selection

Teeth selection

**Laboratory procedures**

Fabrication the temporary denture base

Preparing occlusal rims

Arranging the artificial teeth

**Framework try-in**

After finishing, the framework is tried in the patient’s mouth. The fit of the framework is the patient’s mouth. Even cast clasp arms can be altered to a certain extent. Pressure indicating paste (calcium carbonate + chloroform) should be coated on the tissue surface of the framework before insertion.
The pressure indicating paste indicates premature contacts in the framework. The framework is tried-in until all the premature contacts are eliminated. After try-in the framework is forwarded to the laboratory for the fabrication of the temporary denture base and occlusal rims.

Problems in framework try-in

The framework typically will fit the stone cast very tightly and may be quite difficult to remove from it. But the same framework may not seat in the patient’s mouth. Reasons for such problems include:

- Inaccurate impression
- Improperly poured cast
- The cast modified for dual impression is not altered properly
- Change in position of the natural teeth after impression making

Fabrication the temporary denture base

The temporary denture base is fabricated using the metal framework. The denture base is fabricated only over the saddle area of the prosthesis. The material of choice to fabricate a temporary denture base is acrylic.

Preparing occlusal rims

Base plate wax is adapted over the resin retention minor connector in the framework to form a base plate. Modeling wax is folded to form an occlusal rim and is fused to the base plate.

Jaw relation

After fabricating the occlusal rims, jaw relations are recorded. A brief description of the procedure is as follows:

- The base plates with the occlusal rims are inserted into the patient’s mouth
- The patient is asked to close on the occlusal rims with a gentle force so that the occlusal imprints of the opposing teeth are recorded
- The base plate is removed from the mouth and re-seated on the master cast
- The cast of the opposite arch is positioned to coincide with the recorded imprints
- This position is stabilized using sticky wax.

Mounting the casts

The stabilized master cast assembly is mounted. The maxillary cast is mounted using face-bow transfer and the mandibular cast is mounted using the interocclusal record (centric relation) in relation to the maxillary cast.

Denture base selection

An ideal denture base should fulfill the following properties:

- Provide support for artificial teeth.
- Contribute to the stability and retention of the prosthesis
- Comfortable to the patient
- Accurately extended into functionally developed borders
- Intimate adaptation with the underlying mucosa
- The base should neutralize twisting and tilting types of stress developed during function
- Transmit forces to both the abutments and residual ridges
• Good physical, mechanical and biological properties like strength, rigidity, tarnish and corrosion resistance, biocompatibility, castability, etc.

Teeth selection

Teeth selection can be broadly classified as:

• Anterior teeth selection
• Posterior teeth selection

After the jaw relation is completed, the cast are articulated, and teeth are arranged in the occlusal rim fabricated on the framework.

Arranging the artificial teeth

The framework with the occlusal rim is seated on the articulated master cast. The artificial teeth are arranged over the occlusal rim such that the occlusal relationship in the articulator is maintained. Articulating paper is used to check premature contacts on the occlusal surface.

Forth session

Clinical procedures

• Trial denture try-in

Laboratory procedures

• Processing

Trial denture try-in

Try in procedure includes the verification of the fit of the trial denture. Removable partial denture try-in can be broadly divided into anterior and posterior try-in.

Try-in of anterior teeth.

The artificial anterior teeth should be arranged according to the setting principles and tried-on the patient’s mouth before processing. The shade, position, mould size and patient acceptability etc should be checked during try-in.

Try-in of posterior teeth.

Posterior try-in includes occlusal verification. Aesthetic try-in of posterior teeth is not important as for anterior teeth. The denture should be inserted and the intercuspatation of posterior teeth is visually examined. Lingual occlusion cannot be visualized. Visually identifiable discrepancies in occlusion should be corrected. Thin strips of articulating paper is used to check the occlusion. The articulating paper is placed on the occlusal surface of the artificial teeth. The patient is requested to gently duplicate chewing/masticatory movements. The articulating paper is removed and the occlusal surfaces are examined for premature contacts. The occlusal surface of the artificial teeth are recontoured until all the premature contacts are eliminated. After completing the occlusal adjustment, the trial denture is forwarded to the laboratory for processing. Final occlusal correction is made during insertion.

Processing

After try-in, the waxed denture is
• flaked,
• dewaxed,
• packed
• and processed similar to a complete denture.

Fifth appointment

Insertion

Objectives of insertion appointment

• To insert the prosthesis and make it as comfortable as possible
• To teach the patient how to use the prosthesis
• Instruct the patient how to maintain the prosthesis and oral cavity

Appointment time

• Should be made early in the day so that the patient has enough time to call in the day or return to the office.
• The day should never be the end of the week, as the patient should be examined after 24-hour use.
• Patient should be instructed not to have social appointments immediately after insertion.

Before insertion

• The tissue surface or intaglio surface of the prosthesis should be checked critically for blebs, bubbles, blisters or artifacts either in metal or acrylic.
• Border should be checked to detect sharp edges.

During insertion the following procedures are completed

• Checking the framework
• Checking for retention by seating the prosthesis
• Providing good occlusion for the denture
• Check the flange extension
• Adequate relief for frenum

Checking the framework

The fit and function of the framework should be checked. All the procedures described in framework try-in are repeated.

Insertion of the prosthesis
The prosthesis should never be forced into position directly during the first attempt.

The prostheses should be propriocepted (felt) for any resistance to insertion due to the presence of undercuts.

The prosthesis should be relieved in the undercut areas. The pressure points, which require relief, are detected with the help of pressure indicating paste.

**Providing good occlusion**

This is one of the most important procedures carried out during insertion. Faulty occlusion can produce severe tissue reaction like excessive ridge resorption, damage to the TMJ, etc.

Sources for occlusal interference include:

- Denture extension
- Contact between the natural and artificial teeth (occlusion)

**Denture extension**

The heel or the posterior extension of the mandibular partial denture should be examined for interference with maxillary or the tuberosity. In such cases, the acrylic resin of the maxillary denture base should be reduced first without thinning or weakening the structure. If the interference still exists, the mandibular flange should be adjusted and shortened till there is no interference during excursive movements.

**Equilibration of occlusion**

Adjustment of occlusion can be done in two ways:

- Laboratory remount after processing: after processing, the partial denture is remounted in the articulator and adjusted.
- Intraoral adjustment: this is done by using articulating paper and simulating mandibular movements intraorally.

**Criteria to be followed before adjusting occlusion**

- It is best to consider one arch as an intact arch so that the other one can be adjusted according to the intact arch
- If one partial denture is tooth supported and the other tissue supported, the tooth supported arch is first adjusted and is considered as the intact arch for adjustment of the tissue supported denture
- If both partial dentures are entirely tooth borne, the one occluding with the most natural teeth is adjusted first, and considered as the intact arch.
- If both dentures are tissue supported, the final adjustment of occlusion on opposing tissue-supported base is usually done on the mandibular denture, since this is
the moving member. Hence, even if the mandibular denture opposes more natural teeth and is considered as the intact arch, the final occlusal adjustments are made only on it.

**Flange extension**

Flange extension should be examined for evidence of overextension by simulating muscle movements.

**Frenum relief**

- The notch-like frenum relief inspected in the denture to ensure adequate clearance
- The margins of the relief should also be examined to avoid tissue injury.
- Excessive frenum relief will allow air entry between the denture and the tissues leading to loss of peripheral seal.

A periodic recheck of occlusion at intervals of 6 months is advisable to avoid traumatic interference resulting from changes in denture support or tooth migration.
Patient medical evaluation, examination.

The purpose of this step is
- To evaluate the patient
- Review the patient’s chart and note the “chief complaint”
- Make a diagnosis
- Discuss it with the patient

Diagnosis is the determination of the nature of the disease.
Diagnosis can be broadly classified as clinical diagnosis and post-clinical or derived diagnosis.
Clinical diagnosis includes personality evaluation, clinical examination and radiographic examination.
Post-clinical or derived diagnosis deals with the evaluation of the patient’s condition using the diagnosis data collected during clinical diagnosis.

Anamnesis
- Social history
- Medical History
- Dental History

Social history
- Patient’s age
- Occupation
- Family situation

Medical History
- Note relevant medical conditions. If necessary, obtain additional information from the patient or patient’s physician.
- Debilitating Diseases like diabetes, blood decreases and tuberculous.
- Cardiovascular Diseases

It is always advisable to consult the patient’s cardiologist before treatment. Cardiac patients will require shorter appointments.
- Diseases of the Joints. The most common diseases of the joint in old age is osteoarthritis. When mouth opening is limited and there is a painful movements of the jaw, it becomes necessary to use special impression.

Dental History
The complaints can be chief and secondary
- Chief complaint. It should be recorded in the patient’s own words. It gives ideas about patient’s psychology.
- Expectations

The patient should be asked about his/her expectations. The dentist should evaluate the patient’s expectations and classify them as realistic and unrealistic.
- Period of Edentulousness

This data gives information about the amount and pattern of bone resorption. The cause for the tooth loss should be enquired.

Pre-treatment Records
- The pre-treatment record is very valuable information. It includes information about the previous denture, current denture, pre-extraction records (radiographs, photographs, etc), diagnostic casts.

Patient examination
It can be extraoral and intraoral

Extra oral Exam
Examination of the patient should begin by careful observation of the head and neck structure for any pathological condition.
the skin condition and lesions, symmetry or asymmetry of the face, condition of the lips neuromuscular activity are noted.

It also includes facial examination, examinations of muscle, lips, TMJ.

**Intraoral exam**

It can be visual and **digital (manual) evaluation**

Oral visual examination should be done with a good light and dental mirror. It should include

- lips
- hard and soft palate
- Saved teeth and alveolar ridges (the arch size, shape, ridge contour)
- Floor of the mouth
- Retromolar pad area
- Tongue and lingual tonsils, its size and position

The condition, colour and thickness of the mucosa should be examined. The viscosity of the saliva should be determined.

Visual examination should be completed by digital palpation of the teeth, ridges, lesions and other structures.

Digital examination of the teeth surrounding tissue do with mouth mirror, explorer, periodontal probe

It is also necessary to determine the vitality of critical teeth and exam of casts correctly oriented on a suitable articulator.

The stability of tooth and prosthesis position is the goal of such an evaluation.

**Examination of teeth, investing structures and residual ridges**

The teeth, periodontium and residual ridges can be explorer by

- Instrumentation
- visual means.

**Visual examination will detect many of the signs of dental disease:**

- susceptibility of caries,
- the number of restored teeth present,
- signs of recurrent caries,
- evidence of decalcification.

**Clinical evaluation of the existing teeth**

This is very important for the success of a partial denture. The remaining teeth are the primary supporting structures for most removable partial dentures. The following factors should be evaluated on the remaining natural teeth.

Periodontal health.

The periodontal condition of the existing teeth should be examined. Clinical signs of periodontal health like inflammation of the gingival, bleeding on probing, periodontal breakdown, and mobility of the teeth etc. should be evaluated.

Oral hygiene is evaluated using the oral hygiene index, gingival inflammation and bleeding are evaluated using the gingival index. Mobility of teeth can be measured using instruments. All these indices are diagnostic procedures carried out to collect diagnostic data, which will be analysed later to arrive at a derived diagnosis. For example, oral hygiene index is used to measure the amount of debris that is accumulated on the clinical crown based on which prosthodontic prognosis is predicted.

The periodontal health can also be determined radiographically. The amount of horizontal or vertical bone loss is measured on a radiograph. After evaluating the periodontal health, the clinician should decide whether to retain or extract a periodontally weak tooth. Accordingly, periodontal therapy or extraction of the tooth is carried-out during the pre-prosthetic phase of treatment.
Occlusion of the existing teeth. The existing teeth should be examined for occlusion. The teeth should have a good cusp to fossa relationship. Improper occlusal contacts should be corrected during the preprosthetic mouth preparation phase.

Some teeth may be tilted and/or malaligned which makes them unfit to support the prosthesis. Such teeth can either be extracted if they produce severe interference to the prosthesis or orthodontically realigned so that they can be used to provide support for the prosthesis.

One other factor that should be examined under occlusion is trauma from occlusion. Trauma due to excessive occlusal force is characterized by the presence of premature contacts (high points), mobility of teeth, and buttressing bone formation, wear facets, etc.

Conservative and endodontic status of the existing teeth. The existing teeth should be examined to rule out the presence of caries lesions like pit and fissures, deep caries, gross teeth decay etc. The depth of the lesion and the vitality of the pulp should be checked. Appropriate treatment should be instituted during preprosthetic mouth preparation phase.

The teeth should also be examined for cracks, chipped corners and fractures. If the pulp is not vital, endodontic therapy is completed during the preprosthetic mouth preparation phase.

Retained root stumps should be extracted unless a post and core preparation is decided. Post and core can be designed to accept occlusal load from the partial denture.

Radiological examination of existing teeth. The clinical findings are augmented by and correlated with a complete intraoral radiographic survey.

The objectives of a radiographic examination are:
1. to locate areas of infection and other pathosis that may be present.
2. to reveal the presence of root fragments, foreign objects, bone spicules, and irregular ridge formations
3. to display the presence and extend of caries and the relation of carious lesions to the pulp and periodontal attachment
4. to permit evaluation of existing restoration for evidence of recurrent caries, marginal leakage, and overhanging gingival margins
5. to reveal the presence of root canal fillings and to permit their evaluation as to future prognosis
6. to permit an evaluation of periodontal conditions present and to establish the need and possibilities for treatment
7. to evaluate the alveolar support of abutment teeth, their number, the supporting length and morphology of their roots, the relative amount of alveolar bone loss suffered through pathogenic processes and the amount of alveolar support remaining.

The radiograph of choice for the examination of the patient is panoramic radiograph. A panoramic x-ray will show all the bony areas, and along with a clinical exam can uncover any hidden problems and allow for a proper diagnosis.

The periodontal bone loss and the structure of the basal bone in the denture bearing area should be evaluated. Presence of periapical bone loss and furcation involvement should be examined. Last, but not the least, presence of impacted teeth and submerged root stumps are also verified.

Derived or post-clinical diagnosis is the determination of the nature of the disease by analyzing the diagnostic data obtained from the patient.

Derived diagnosis for removable denture includes the evaluation of diagnostic data like diagnostic casts. The diagnostic cast is one of the most important diagnostic data from which
final diagnosis is derived. The diagnostic cast also help to develop an outline of the treatment plan. Other diagnostic data (used for diagnosis) include pre-extraction records, like radiographs, photographs, diagnostic casts made by the previous clinician etc.

The diagnostic cast is obtained from a diagnostic impression. Pouring the diagnostic cast. Trimming the diagnostic cast. Evaluating the diagnostic cast.

Evaluating the diagnostic cast.

As a part of determining the treatment plan a DC is made from a diagnostic impression (alginate). The DC are mounted using a tentative jaw relation record. The inter-arch space and occlusal contacts are evaluated using the mounted DC.

After making the diagnostic casts, they should be evaluated to determine the problems that the clinician might face during the fabrication of the denture in other words to determine the derived diagnosis.

The diagnostic casts (DC) can be evaluated using 2 procedures both of which are essential: 1. surveying the DC using a surveyor 2. mounting the DC in an articulator.

The DC are mounted in an articulator using tentative jaw relation records (orientation, vertical and centric). The methods of recording jaw relation are similar to the procedures described in fabrication of a complete denture.

The uses of mounting DC are:

- As an adjunct to clinical examination: Extruded teeth, overhanging tuberosities, lack of interarch space, malaligned teeth, abnormal occlusal contacts, improper restorations etc., can be examined more accurately on the mounted diagnostic casts.
- For a detailed analysis of patient’s occlusion. The lingual view of the occluded teeth can be examined only on mounted casts. This helps to select and design the type of prosthesis required for a patient.
- Patient education: they help to educate the patient about his oral condition and emphasize on the need for treatment.
  Diagnostic casts also help to explain the treatment plan to the patient.
- It is valuable legal pre-treatment record.

Treatment planning

Treatment plan is a result of evaluating the diagnostic data. The patient’s oral condition is evaluated along with diagnosis. While doing so, the dentist will develop a mental picture about the type of denture that will best suit the patient. The clinician should re-evaluate the case to rule out any better treatment possibilities.

After evaluating the clinical and derived diagnosis, the mode of treatment that would best suite the patient is determined. The outline of treatment is framed before starting the treatment.

Prosthodontic treatment for partially edentulous patient’s consists from the following steps:

- Collection and evaluation of diagnostic data (diagnostic impression), determining the type of prosthesis to be fabricated, patient motivation.
- Preprosthetic mouth preparation
- Making primary impression
- Designing the RPD
- Prosthetic mouth preparation and making the final impression
- Fabrication of the RPD
- Insertion
- Post-insertion management
Periodic recall and review.

The treatment outline or plan created by the clinician should be explained to the patient. This is done to give him/her an idea about the procedures that are to be completed as a part of treatment.

Advantages of treatment plan
- Improve the patient’s cooperation and motivation
- Helps to communicate between 2 clinician
- Records from the previous dentist give an idea about the current status of the patient and the outcome of treatment
- Provides treatment coordination between recall visits
- Acts as a reminder to complete all procedures enlisted for treatment.

Once the treatment plan is completed, the results of your findings and proposed treatment plan should be discussed with the patient. The discussion also includes your prognosis

Preprosthetic mouth preparation
The term mouth preparation includes all the procedures done to modify the existing oral condition of the patient to facilitate proper placement and functioning of the prosthesis.

Mouth preparation is classified into preprosthetic mouth preparation and prosthetic mouth preparation. Preprosthetic mouth preparation involves the preparation of the oral cavity to remove any hindrance of prosthetic treatment (for example, frenectomy, excision of tori etc.). It is done along with diagnosis and treatment planning. Prosthetic mouth preparation is done to facilitate prosthetic treatment (for example, preparing rest seats etc.). It is done after partial denture design.

Preprosthetic procedures
Generally the term “preprosthetic” indicates all the non prosthetic procedures done prior to the beginning of prosthetic treatment in order to eliminate interference and/or as an adjunct to the success of the prosthetic treatment.

Preprosthetic procedures include removing dental calculus, extractions, periodontal treatment, orthodontic realignment of abutment teeth, conservative and/or endodontic treatment of damaged teeth.

Preprosthetic mouth preparation procedures are carried out in the following order:
1. relief of pain and infection
2. oral surgical procedures
3. periodontal therapy
4. conditioning of abused and irritated tissues
5. correction of occlusal plane
6. reshaping teeth

Relief of pain and infection
- potential emergency conditions like acute pain, abscess etc.
- carious teeth with pain and discomfort
- asymptomatic teeth deep carious lesions are excavated and filled with an intermediate restorative material
- gingival diseases, gingival abscess, etc.
- calculus and plaque accumulations should be removed and preventive dental hygiene programs should be initiated and monitored.
Radiographs should be taken to detect cysts, tumors, exostoses, tori, hyperplasia, etc. The muscle and frenal attachments should be examined. The ridges should be palpated for bony spicules and knife edged ridges, which must be removed or rounded. The soft tissues should be examined for pathological lesions. Ridge augmentation and vestibular extention procedures are done if required.

**Oral surgical procedures**
These procedures should be done at least 6 weeks before impression making. This time period is to ensure complete healing of the surgical wounds. They include extraction of teeth with poor prognosis, removal of residual roots, extraction of impacted and severely malposed teeth, when teeth interfere with the placement of a major connector, etc. The RPD cannot be supported adequately by tissue that is easily displaced. In preparing the mouth this tissue should be recontoured or removed surgically.

Periodontal therapy: removing the calculi around the teeth, root planning and curettage are done to improve the gingival health; elimination of periodontal poskets and gingival inflammation using flap surgery; bone resection or reconstruction to create the normal alveolar architecture; oral hygiene instructions and maintenance therapy.

**Conditioning of abused and irritated tissues**
They should be treated before primary impression making because the tissue contour may change according to tissue healing. The patient should be treated for the following symptoms:
- Inflammation and irritation of the soft tissues in the denture bearing areas
- Distortion of the normal anatomical structures like incisive papillae, rugae and the retromolar pads.
- Burning sensation in the residual ridge, tongue, cheeks and lips.

**Correction of occlusal plane**
During the examination not only each arch but also its occlusal relationship with the opposing arch must be considered separately. A situation that looks simple when the teeth are apart may be complicated when the teeth are in occlusion. The occlusal plane in partially edentulous patients is usually uneven. This is due to supra-eruption of the teeth opposing the edentulous space, mesial migration and tipping of the teeth adjacent to the edentulous spaces.

The lesion should be cured and the tissue should be given adequate rest for sufficient healing. The patient should be advised to stop wearing the existing movable prosthesis.

After completing all the preprosthetic procedures, the RPD is designed on the primary cast. If the patient does not require any preprosthetic procedures, the diagnostic cast is directly used as the primary cast for design the RPD.
Partially edentulous mouth, etiology, classification, clinical picture. Treatment of partially edentulous mouth with Removable partial denture

Removable prosthodontics is defined as, “The replacement of missing teeth and supporting tissues with a prosthesis designed to be removed by the wearer.

It can be broadly classified as:
Removable complete denture prosthodontics
Removable partial denture prosthodontics

Indications for removable partial denture:

1. Long edentulous spans
2. Absence of adequate periodontal support
3. Structurally and anatomically compromised abutments
4. Need for cross-arch stabilization
5. Distal extension
6. Need to restore soft and hard tissue contours
7. Anterior esthetics
8. Age and health
9. Attitude and desires
10. Ease of plaque removal

1. Length of edentulous span
   Removable partial denture are preferred for longer edentulous arches.
2. Absence of adequate periodontal support
   The periodontal membrane is the structure which transfers all the load from the teeth to the underlying bone. When the periodontal support of the remaining teeth is poor, a fixed partial denture is contraindicated and a removable partial denture is preferred, because it requires less support from the abutment teeth. Removable partial denture also act like splints to support remaining teeth.
3. Need for cross-arch stabilization
   When the remaining teeth have to be stabilized against lateral and anterior-posterior forces, a removable partial denture is indicated. In removable partial denture, the major connectors help to provide cross-arch stabilization. The forces acting on one side of the arch are stabilized distributed by the denture base on the opposite side.
4. Distal extension
   Fixed partial denture can be used only if there is a posterior tooth support. When there is no tooth posterior to the edentulous space to act as abutment, a removable partial denture is indicated.

Anterior esthetics
Removable partial dentures provide better aesthetics because the denture base gives the appearance of a natural tooth arising from the gingiva.

Age and health
In patients under the age of 17 years, a fixed partial denture is contraindicated because they have large dental pulps. In old age, the reduced life expectancy and frequently failing health contraindicate the use of expensive fixed partial denture.

Removable Partial Denture is Generally preferred in the following clinical conditions.

When more than two posterior teeth or four anterior teeth are missing.
When there is no distal abutment tooth. Even single cantilever is not generally preferred.
Presence of multiple edentulous space.
Teeth with short clinical crowns (insuitable for fixed denture)
Insufficient number of abutments
Severe loss of tissue on the edentulous space.
Old patients
Removable Partial Denture is Generally Avoided in the following clinical conditions.
Patients with a large tongue which tends to push the denture away.
Patient attitude: mentally retarded patients cannot maintain a removable prosthesis.
Poor oral hygiene: In such cases, any prosthesis is better avoided.

Kennedy’s Classification
Dr Edward Kennedy of New York proposed this classification in 1923. This is the most popular classification of partially edentulous arches.

Class I: Bilateral edentulous areas located posterior to the remaining natural teeth i.e., there are two edentulous spaces located in the posterior region without any teeth posterior to it.
Class II: Unilateral edentulous area located posterior to the remaining natural teeth i.e., there is a single edentulous spaces located in the posterior region without any teeth posterior to it.
Class III: Unilateral edentulous area with natural teeth anterior and posterior to it i.e., this indicated a single edentulous area which does not cross the midline of the arch.
Class IV: Single bilateral edentulous area located anterior to the remaining natural teeth. This is a single edentulous area, which crosses the midline of the arch, with remaining teeth present only posterior to it.

Parts of removable partial denture
To a great extent, the forces occurring through a removable prosthesis can be widely controlled (distributed, directed, and minimized) by the selection, the design, and the location of components of the RPD.

The components of a removable partial denture are:
- Major connector
- Minor connector
- Rest
- Direct retainer
- Indirect retainer
- Denture base
- Artificial tooth replacement

Major connector
- A part of a removable partial denture which connects the components on one side of the arch to the components on the opposite side of the arch. The major connector functions to connect all the other component parts of the prosthesis.

General requirements for Maxillary and mandibular Major Connector
- Rigidity: A major connector should not be flexible. It should be rigid to uniformly distribute the occlusal forces acting on any portion of the prosthesis without undergoing distortion.
- It should provide vertical support and protect soft tissues.
- It should be comfortable to the patient.
- It should not allow any food accumulation.
- It should be self-cleansing

Design Consideration for all major Connectors
- The border of the major connector should be 6 mm away from gingival margins in the maxillary arch in order to avoid any injury to the highly vascular marginal gingiva.
- In the mandible, the border of the major connector is placed 3 mm away from the marginal gingiva.
- The borders of the major connector should be parallel to the gingival margins.
- The borders of the major connector should be rounded to avoid interference to the tongue.
- The major connector should cross the palate in a straight line.
- The anterior border of the maxillary major connector should end in the valley of the rugae and should be designed such that it never lies on the crest of the rugae. It is better to avoid covering the rugae area in order to prevent any discomfort during speech.
The major connector should not extend over bony prominences like tori. Relief is given for a small tori, surgical excision is done for a large one.

**Maxillary Major Connector**

Major connectors used in the fabrication of a maxillary prosthesis. A maxillary major connector should be fabricated based on the above mentioned design concepts. It should fulfill the following additional requirements:

A beading (rounded thick border) should be given to the posterior margin of the maxillary major connectors to provide a seal with the soft tissue in their margins. The beading will slightly displace the soft tissue when the denture is in position and hence prevent the entry of small food particles between the denture and the soft tissues. The size of the beading should thin out 6 mm near the marginal gingiva.

**Types of Maxillary Major Connector**

- Single posterior palatal bar
- Palatal strap
- Double or anterior-posterior palatal bar
- Horseshoe or U-shaped connector
- Complete palate

**Single posterior palatal bar**

It is a bar running across the palate. It has a narrow half-oval cross section.

**Indication**

For interim partial denture.

**Disadvantages**

- Poor bony support from the hard-palate due to a narrow anterio-posterior width.
- Can be used only when 1 or 2 teeth are to be replaced (Kennedy’s class III) on each side because it has poor vertical support.

**Palatal strap**

It is the most versatile major connector. It comprises of a wide band of metal plate that runs across the palate. Width can be decreased depending on edentulous span. It should be at least 8 mm wide for adequate rigidity.

**Indications**

- Unilateral distal extension partial denture.
- Bilateral short span edentulous spaces in a tooth supported prosthesis (Kennedy’s class III)

**Disadvantages**

- Large palatal coverage
- Posterior border should end before the junction of hard and soft palate to avoid discomfort.
- Can cause papillary hyperplasia.

**Double or anterior-posterior palatal bar**

It is a combination of an anterior palatal strap and a posterior palatal bar.

**Indications**

- When anterior and posterior abutment teeth are widely separated.
- Cases with large inoperable palatal tori.
- Patient who wants to avoid complete palatal coverage.
- Long edentulous span in class II
- Class IV conditions

**Advantages**

- Rigid
- Strong
- Limited soft tissue coverage

**Disadvantages**

- Limited support from palate.
- Uncomfortable as it has multiple borders, which provides areas of interference to the tongue.

**Horseshoe or U-shaped connector**
It has a thin metal band running along lingual surface of posterior teeth. The posterior border extends 6-8 mm onto the palatal tissue. The entire surface and the borders should be smooth and gently rounded.

**Indications**
Used when many anterior teeth are to be replaced.
Used in presence of tori extending to the posterior border of the hard palate or a prominent median suture.

**Advantages**
Reasonable strength
Has moderate retention and support.

**Disadvantages**
Cannot be used for distal extension denture bases.

**Complete palate**
This major connector covers the entire palate. Anterior border should be 6mm away for the gingival margin. The posterior border of complete palate should extend to the junction of the hard and soft palate.

**Indications**
Used when many posterior teeth are replaced.
For patients with well-developed muscles of mastication or presence of all mandibular teeth.
In such cases, there will be excessive load and displacing forces, which can only be distributed by a complete palate.

**Disadvantages**
Soft tissues reactions like inflammation and hyperplasia.
Interference with phonetics.

**Mandibular Major Connectors**
The mandibular major connectors are used in mandibular partial dentures. Mandibular major connector should have adequate clearance for the tongue.

There are two common types of mandibular major connectors.
Lingual bar.
Lingual plate

**Lingual bar.**
It is the most commonly used mandibular major connector. Here, there must be a minimum of 8 mm vertical clearance from the floor of the mouth. The upper border of pattern should have a 3 mm clearance from marginal gingiva to avoid any soft tissue reaction. The minimum height of the major connector should be at least 5mm.

**Advantages:**
It is easy to fabricate.
It has mild contact with oral tissues and contact with teeth.

**Disadvantages**
Cannot be used in cases with tori.
In cases with limited vestibular depth, the bar will be thinned out and tends to flex.

**Lingual plate**
It is similar to the lingual bar but the superior border extends up to the cingulum of the lingual surface of the teeth.

**Indications**
When most posterior teeth are lost and additional indirect retention is required.
When there is no space for lingual bar.
Presence of inoperable mandibular tori.
When patient has bilateral distal extension edentulous areas and resorbed ridges and when anterior teeth lack bony support.
When one or more incisor teeth have to be replaced in the future. The lingual plate is preferred because additional teeth can be added by attaching retention loops to it.

**Advantages:**
- Most rigid and stable.
- Additional tooth replacement can be easily added.

**Disadvantages**
- Decalcification of tooth structure due to food and plaque accumulation.
- Irritation of oral mucosa.

The lingual bar is the design of choice whenever possible because of simplicity and minimal tooth and mucosa contact, which:
1. Reduces interference with mouth functions.
2. Reduces food and plaque accumulation.
3. Simplifies fabrication procedures.

**Minor connectors**

The connecting link between the major connector or base of removable partial denture and other units of the prosthesis such as clasps, indirect retainers and occlusal rests. Minor connectors are strong and rigid parts of a removable partial denture and connect other units, such as rests, with the major connector.

**Functions of the Minor Connector**

Minor connectors are strong and rigid parts of a removable partial denture and connect other units, such as rests, clasps with the major connector.

It transmits the forces acting on the prosthesis to the edentulous ridge and the remaining natural teeth.

**Rest**

The part of a removable partial denture that provides primarily vertical support on the abutment teeth. The rest must direct functional forces in the long axis of the tooth. The most destructive situation is that a rest produces lateral forces on supporting structures.

Rest Seat is the prepared surface of the tooth (only on enamel) into which the rest fits. The rest seat should be shallow and saucer-shaped.

**General Considerations**

The rest acts as a vertical stop to prevent injury to soft tissue under partial denture. It helps to hold clasp assembly in position. There should be slight movement within the rest seat (like ball) to dissipate horizontal forces and protect the abutment teeth.

Rest should be placed on the proximal surfaces of all the teeth adjacent to the edentulous space.

Based on the position of the rest on the abutment it can be classified:
- Occlusal rest: Placed on occlusal surface of a posterior tooth.
- Cingulum or lingual rest: Placed on the lingual surface of a tooth, especially in a maxillary canine.
- Incisal rest: Placed on the incisal edge of a tooth, usually in a mandibular canine and incisors.

**Requirements of posterior (occlusal) rests**

All aspects are rounded, with no sharp angles. The end of the rest is slightly deeper and rounded (spoon shaped).

It is a minimum of 1-1.25 mm thick, and as wide as 1/3 or 1/2 of the buccal-lingual dimension of the tooth between the cusp tips.

1/3 to 1/2 the mesiodistal width of the tooth.

Ideal rest seats can also be provided by fabricating crowns.

The angle between the line drawn along the proximal surface of the tooth and the floor of the rest seat should be less than 90°.

**Cingulum or lingual rest**
This rests are prepared on the lingual surface or above cingulum of anterior teeth and canine. They are usually fabricated on maxillary canine.

Lingual rest seat preparation on the enamel is prepared only if:
- The cingulum is prominent.
- The patient practices good oral hygiene
- The caries index is low.

**Incisal rest**
Incisal rests are less desirable than lingual rests.
- They are used when the lingual anatomy of the tooth is not appropriate to the cingulum rests.
- Incisal rests are mainly used as indirect retainers (auxiliary rests)
- They are frequently used on mandibular canines and rarely on maxillary canines (for aesthetic reasons).

They are placed on mesioincisal or distoincisal angle. It is prepared on the incisal edge 1.5-2.0 mm away from the proximoincisal angle. 1/3-1/2 width of incisal edge.

**Direct retainer**
A clasp or attachment applied to an abutment tooth for the purpose of holding removable denture in position.

Flexible parts of the framework that is deliberately designed to enter undercuts on abutment teeth to resist removable of RPDs.

A direct retainer is the part of the fixed partial denture, which helps to prevent the displacement of the denture.

Direct retainers are broadly classified as:
- Extracoronal direct retainers (Clasps)
- Intracoronal direct retainers (Attachments)

Extracoronal direct retainers (Clasps): A part of removable partial denture which acts as a direct retainer and/or stabilizer for the denture by partially encircling or contacting an abutment tooth. The component parts of a clasp may be rigid or flexible. The flexible components are designed below the height of contour so that they provide retention when they engage the undercut at the same time they can flex and pass through the height of contour without requiring much effort during insertion or removal. In a conventional clasp design, the tip of the retentive arm is the only flexible component. All the other parts are rigid and hence, placed above the height of contour (widest circumference of the contour).

**Retentive arm.** A flexible segment of a removable partial denture which engage an undercut on an abutment and which is designed to retain the denture.

**Reciprocal arm.** A clasp arm or other extension used on a removable partial denture to oppose the action of some other part or parts of the prosthesis. It is located on the side of the tooth opposite to the retentive arm. It resists the lateral forces exerted by retentive arm when it passes through the height of contour during placement and removal of the RPD.

It always placed above the height of contour.

The clasps consist of three parts: shoulder, body, rest.

**Principles of Clasp Design**
1. The clasps should obtain more than 180° of continuous contact for Aker’s clasp and minimum of 3-point contact for Roach clasps.
2. Each retentive terminal should be opposed by a reciprocal component.
3. The reciprocal elements should place at the height of contour and the retentive element below the height of contour.

**Types of clasps are:**
- Circumferential or Aker’s clasps. (Suprabulge retainer)
- Vertical projection or bar or Roach clasps. (Infrabulge retainer)

Circumferential or Aker’s clasps.
A clasp that embrace more than half of the abutment tooth.
All cast circumferential clasps should never be used to engage the mesiobuccal undercut of an abutment adjacent to the distal edentulous space.

Types of cast Circumferential Clasps
1. Simple circlet clasp. It approaches the undercut from the edentulous space (in the case of III class)
2. Reverse, circlet clasp. This clasp is used when the retentive undercut on the abutment tooth is located adjacent to the edentulous space.
3. Embrasure clasp. It is a combination of two simple circlet clasps joined at the body. It is used on the side of the arch where there is no edentulous space.
4. Ring clasp. Consider a distal edntulous condition with a distolingual undercut where a reverse circlet clasp cannot be placed (no buccal undercut). In such cases, the retentive arm is extended all around tooth from the distobuccal end to terminate in the distolingual undercut across the mesial side of the tooth.

Vertical projection or bar or Roach clasps.
These clasps approach the undercut gingivally.

Advantages:
- It is more aesthetic, as it cover less tooth structure.
Disadvantages
- It has increased flexibility but reduced bracing and stabilization.

Types Bar Clasps
Bar clasps have been classified based on the shape of the retentive terminal.
- T clasp
- Y clasp
- I clasp

Intracoronal Direct Retainers (Attachments)
Intracoronadirect retainers are called so because a part or the the whole of retentive components are located within the anatomocal contour of the abutment teeth. generally all attachments have male and female componets.

Advantages:
- Elimination of visible retentive components.
- Elimination of visible vertical support element through a rest seat
Disadvantages:
- Preparation of abutments
- Complicated clinical and lab procedures.
- Least effective in teeth with small crowns.
- Cost

Indirect retainer:
A part of a remavable partial denture which assists the direct retainers in preventing displacement of distal extention denture bases.

Denture Base
That part of a denture which rests on the oral mucosa and to which teeth are attached.

Artificial tooth replacement

Removable partial denture design

Surveying
Denture design is defined as” A planned visualization of the form of dental prosthesis arrived at after study of all factors involved. After preprosthetic mouth preparation a primary cast is made and the RPD is designed using this cast. Designing A RPD includes determination the path of insertion of the denture and also the location, position and type of components to be used in the prosthesis. A RPD is designed using an instrument known as surveyor.

Surveying
The procedure of locating or delineating the contour and position of the abutment teeth and associated structure before designing a removable partial denture.

Surveyor.
A surveyor is defined as “An instrument used in the construction of a removable partial denture to locate and delineate the contours and relative positions of abutment teeth and associated structures. The surveyor is parallelometer.

Objectives of Surveying.
1. To design a RPD such that it’s rigid and flexible components are appropriately positioned to obtain good retention and bracing.
2. To determine the path of insertion of a prosthesis such that there is no interference to insertion along this path.
3. To mark the height of contour of the area (hard and soft tissues) above the undercut.
4. To mark the survey lines. (height of contour of a tooth)
5. To mark the undesirable undercuts into which the prosthesis should not extend.

Parts of a Surveyor

Surveying platform: It is a metal plate parallel to the floor where a cast holder can be placed.

Cast holder/surveying table
It is a stand placed over the surveying platform. This stand has a base and a table to place a cast. The cast can be locked in any position on the table with the help of locking device. The table is attached to the base with the help of a ball and socket joint. This joint facilitates to tilt the table.

Vertical arm.
It arises vertically from the surveying platform. It supports the superstructure(horizontal arm and surveying arm)

Horizontal arm
It extends horizontally from the top of the vertical arm. It is designed to support the surveying arm at its free end.

Surveying arm
It extends vertically from the the free end of horizontal arm. It is parallel to vertical arm. It can move upward and downward. The lower end of this arm has a mandrel into which, tools used.

Surveying tools
These are tools attached to the mandrel of the surveying arm and are used for surveying. They are different types: analyzing rod, carbon marker wax knife and undercut gauges.

Analyzing rod: It acts like tangent to the convex surface of the object being surveyed. It helps to analyze the location of the height of contours, the presence and absence of favorable and unfavorable undercuts for a path of insertion. It is a solid metal rod.

Carbon marker: They resemble the lead point available for the micro-tip pencils. The cast mounted on the surveyor is rotated against the carbon marker. This will produce a line along the most convex area of the object being surveyed(teeth). The resultant line formed by the carbon marker is known as a survey line. These survey lines help us in positioning the various component parts a removable partial denture.

Undercut gauges: A gauge is a high precision instrument used to measure the linear dimension of any structure. Undercut gauges are used to measure the depth and location of the undercuts on the analyzed tooth. There are three undercut gauges at 0,25mm, 0,5mm, 0,75mm. All these gauges have the same shank only the size of the tip varies.
**Wax knife:** They can be attached to the mandrel of the surveying arm. They are used to directly trim the excess wax while surveying the wax patterns and also eliminate undesirable undercuts parallel to the path of insertion.

**Survey line:** A line produced on a cast of a tooth by a surveyor marking the greatest height of contour in relation to the chosen path of insertion of a planned restoration.

**Set up for Surveying**

Setup for surveying includes mounting the primary cast on a cast holder, locking it in position with “zero” degree tilt. The cast holder placed on the surveying platform. After mounting the cast, the horizontal arm is positioned in the surveyor. Once the proper position of the horizontal arm is determined, it is locked to the vertical arm.

Analyzing the cast.

The analyzing rod is the first surveying tool that should be used during any surveying procedure. The cast is rotated against the analyzing rod to analyze the presence of undercuts. Favourable undercuts should be present on the abutment teeth to place the retentive components of a clasp. Unfavourable undercuts (soft tissue, bony undercuts) should be eliminated. The removal of soft tissue undercuts is done during preprosthetic mouth preparation. If favourable undercuts are absent during analyzing, it should be created. Favourable undercuts can be created by preparing crowns over the abutment teeth, or enameloplasty (enamel is contoured using a bur, or by slightly tilting the cast.

**Surveying the teeth.**

The teeth surveyed for the following reasons:
1. To determine the height of contour
2. To determine the depth of the undercut.
3. To determine the location of undesirable undercuts
4. To determine the parallelism of the abutment.
5. To determine the path of insertion of the denture.

To determine the height of contour: Based on the height of contour, the clasp of a RPD is designed. The rigid components of the clasp should lie above the height of contour and the flexible parts of the clasp should be placed below the height of contour. The height of contour is marked using the flat surface of a carbon marker.

To determine the depth of the undercut: This is done using undercut gauges.

To determine the location of undesirable undercuts: Unfavourable undercuts should be blocked out to avoid interference. Block out is done using wax.

To determine the parallelism of the abutment. The parallelism of the abutment teeth to one another should be also is determined. The path of insertion of a RPD is usually parallel to the long axis of the abutment teeth.

To determine the path of insertion of the denture. While surveying to check for the parallelism of the abutment teeth, the cast is tilted till the long axis of the abutment tooth to the vertical axis. This tilt gives the angle of path of insertion of the denture. Tilting can be done in anterior, posterior, right or left directions. The established tilt should not exceed 10°. If the established tilt exceeds 10°, the designed RPD would require excessive mouth opening for insertion.

**Guiding Planes.**

Guiding planes are defined as’’Two or more vertically parallel surfaces of abutment teeth so oriented as to direct the path of placement and removal partial denture. They are prepared on the proximal surfaces of abutment teeth. The surface of the body of the clasp or direct retainer is known as the proximal plate of the direct retainer. The surface of the teeth along which the proximal plates slide is called a guide plane. When the denture is seated in place, the guiding plane and the proximal plate will be in intimate contact. This contact can be on the occlusal third of the tooth. They are usually 2-3 mm in occluso-gingival height parallel to the path of insertion. They should be flat and contain no undercuts.
1.3/ In which clinical conditions is preferred Removable Partial Denture?
1. Presence of multiple edentulous space
2. There is no distal abutment tooth
3. When no more than four anterior teeth are missing
4. Old patient
   a) 1, 2, 4
   b) 3, 4
   c) 1, 2, 3
   d) 1, 2, 3, 4

2.3/ What is major connector?
1. The major connector functions to connect all the other component parts of the prosthesis.
2. It should be placed on the proximal surfaces of all the teeth adjacent to the edentulous space.
3. It helps to hold clasp assembly in position.
4. It connects the components on one side of the arch to the components on the opposite side of the arch.
   a) 1, 2, 4
   b) 3, 4
   c) 1, 2, 3, 4
   d) 1, 4

3.2/ Choose the wrong answer? Design consideration for all major connectors
a) The major connector should cross the palate in a straight line.
   b) The borders of the major connector should be parallel to the gingival margins.
   c) In the mandible, the border of the major connector is placed 1 mm away from the marginal gingiva.
   d) The borders of the major connector should be rounded

4.3/ Types of maxillary major connector:
1. Single posterior lingual bar
2. Complete palate
3. Double or anterior-posterior palatal bar
4. Lingual plate
   a) 1, 2, 3
   b) 3, 4
   c) 2, 3
   d) 1, 2, 3, 4

5.2/ Choose the wrong answer? Requirements of posterior (occlusal) rests
a) It should be placed on the vestibular surface of a posterior tooth
   b) The angle between the line drawn along the proximal surface of the tooth and the floor of the rest seat should be less than 90°.
   c) The end of the rest is slightly deeper and rounded (spoon shaped)
   d) It should be 1/3 to 1/2 the mesiodistal width of the tooth.

Right answers
1. a
2. d
3. c
4. c
5. a
Temporary removable partial dentures (TRPD)

Advantages of movable prosthesis
1. they can be used when there are defects of any size and location
2. more hygienic
3. they can undergo cool sterilization

Temporary prostheses may be indicated as a part of total treatment for:
1. Sake of appearance
2. maintenance of a space
3. reestablishment of occlusal relationships
4. to condition teeth and residual ridges
5. interim restoration during treatment
6. to condition the patient for wearing a prosthesis

TRPD consist of
- base
- artificial teeth
- retentive elements (clasps)

STRUCTURE OF THE BENT CLASP
- arm
- body
- processus

The requirements for retentive arm
- It should be located from the buccal or labial side of the tooth, positioned between the neck (cervix) and equator of the tooth.
- It should touch the surface of the tooth at maximum points
- It should possess a springy (elastic) property.
- It should be passive.
- It should be rounded, polished to not damage the mucous membrane of the lip and the cheek during insertion and removing of the prosthesis.

Disadvantages of the TRPD
- The mastication pressure is transferred mainly to the mucous membrane
- During the mastication it plunges into the underlying tissues, and retention clasp slides along the surface of the tooth to the gingival and can injure it.
- The pressure on the abutment tooth falls under the angle, which can lead to overloading of these abutment teeth
- This type of prosthesis is broken more often than others
- We can often observe microbial colonizations
- Thermal, tastes and tactile senses are impaired
- Gingivitis develops and pathological pockets appear.

Appearance
For the sake of appearance, a TRPD may replace one or more missing anterior teeth or it may replace several teeth, both anterior and posterior. Such a restoration is usually made of resin, which is produced either by a sprinkling method, by the visible light-cured method, or by
waxing, flasking, and processing with either autopolymerizing or heat polymerizing resin. It retains by bent clasps.

Space maintenance
When a space result from recent extractions or traumatic loss of teeth, it is usually prudent to maintain the space while tissue heals. In younger patients the space should be maintained until the adjacent teeth have reached sufficient maturity to be used as abutment for fixed restorations or so that an implant can be placed. In adult patients the maintenance of the space can prevent undesirable migration and extrusion of adjacent or opposing teeth until definitive treatment can be accomplished.

Reestablishing occlusal relationships
TRPD are used for the following reasons:
1. to establish a new occlusal relationship or occlusal vertical dimension
2. to condition teeth and ridge tissue for optimum support of the definitive removable partial denture with follow.

TRPD may be used as occlusal splints in much the same manner as cast or resin occlusal splints are used on natural teeth.

Conditioning teeth and residual ridges

Interim restoration during treatment
In some instances an existing RPD can be used with modifications as an interim RPD. Such modifications may include relining and adding teeth and clasps to an existing denture. In other instances an existing RPD may be converted to a transitional complete denture for immediate placement while tissue heals and an opposing arch is prepared to receive a RPD. Sometimes a TRPD must be made to replace missing anterior teeth in a partially edentulous arch, which are ultimately to be replaced with fixed restorations.

To condition the patient for wearing a prosthesis
A temporary restoration may be made to aid the patient in making a transition to complete dentures when the total loss of teeth is inevitable. Such a RPD also may be considered a valid part of the treatment, because the patient is at the same time being conditioned to wear a removable prostheses. It should be considered strictly a temporary measure that provides the patient with a restoration for the remaining life of the natural teeth when further restorative of those teeth impractical or economically or technically impossible.

It is imperative that a distinction is made between temporary restorations and a true RPD service and that the patient be advised of the purposes and limitations of such restorations.

Clinical procedure for placement.
It is important to consider proper fitting of the prosthesis to assure comfortable use during the temporary phase of treatment. To obtain this we are needed in careful attention to a planned use of the teeth for support, stability, and retention without undue stress from gingival tissue contact or improper occlusal loading.

To assure proper use of the remaining natural teeth, the prosthesis must be completely seated in the arch. Once seated it is important to check that no undue pressure to the marginal gingival region is present. Stability and retention are improved when it is possible to have the prosthesis contact portions of the teeth superior to the height of contour because of the tooth-d dictated control of movement.
Once fully seated and relieved appropriately, the occlusion should contribute to the remaining natural dentition (as in a definitive prosthesis) and harmonize with natural tooth-dictated function. Typically the prosthesis should not be the sole source of occlusal contact. In such situations the functional forces are concentrated at the acrylic resin to tooth junction and, predictably, a change in orientation occurs allowing tissue ward movement and both a change in occlusion and an increase in soft tissue contact.