PLACEMENT, ADJUSTMET, AND SERVICING OF THE REMOVABLE PARTIAL DENTURE

At the initial placement stage of the definitive Co/Cr fabricated removable partial denture (RPD), a procedure of certain preclinical and clinical steps should be followed to produce a biologically acceptable prostheis. This procedure includes several steps that are performed in a specific sequence:

- First: Final inspection of the prosthesis before insertion
- Second: Verifying the framework fit.
- Third: Assessment of acrylic resin denture base adaptation.
- Fourth: Assessment of peripheral extension of the denture base.
- Fifth: Evaluating occlusion.
- Sixth: Adjusting retentive clasp assembly, if needed.
- Seventh: Providing instructions for the patient how to use and care the prosthesis.

First: Final inspection of the prosthesis

Prior to the insertion appointment, the dentist should check and adjust the following:

l. Nodules or spicules of acrylic resin on the tissue surface of the prosthesis: The simplest way to locate these nodules is to run a finger over the intaglio surface (tissue side) of the prosthesis. Once identified and marked, the nodules can then be removed with a small, acrylic bur mounted in a slow - speed hand piece. When the nodules have been removed, do not polish the intaglio (tissue) surface; leave the surface finish as processed against the master cast.

2. Surface and internal porosity in the acrylic resin reduces both the quality and ultimate strength of the completed RPD. A porous surface will be difficult to keep free of denture plaque. A rebase of the RPD is recommended.

3. Examine denture teeth for any fractures that may have occurred during the processing or finishing procedures. Replace fractured teeth before the RPD is inserted.

4. Evaluate the denture tooth - acrylic resin junction. If the junction of the denture tooth and acrylic resin denture base is improperly contoured and finished after

processing, any crevices left in this area will become a potential site of food entrapment or staining.

5. Examine the acrylic resin/metal framework junction. The junction should be a butt (90°) joint with no overlap of the acrylic resin onto the metal framework. All acrylic resin flash should be removed so there is a smooth, continuous exactly duplicate the borders recorded in the transition between the two materials.

6. Finally, inspect the finish and polish of the RPD. A poorly finished and - polished prosthesis may unfavourably affect the patient's attitude towards the dentist and diminish patient - dentist rapport. The polished surface contours should have a smooth, high lustre appearance without surface defects (a brand-new appearance).

Store the RPD until the insertion appointment in a plastic bag partly filled with sterile water or diluted denture-soaking solution. This will keep the prosthesis moist to prevent dehydration and possible distortion of the acrylic resin base until the prosthesis is inserted.

Second: Verifying the framework fit

It is highly recommended to check the fit of the cast metal framework intraorally before try-in and insertion appointments. Nevertheless, the completed RPD should be carefully inserted into position on the abutment teeth. If there is considerable resistance to seating, stop and check for the following problems:

I. Clasp assemblies or other components of the framework may have been bent or distorted.

2. Acrylic resin may have been cured into undercuts adjacent to the abutment teeth, preventing the uniform seating of the prosthesis.

3. A layer of acrylic resin flash may be covering part of the metal casting.

Remove the acrylic resin before attempting to seat the RPD. A sharp dental explorer or dental floss can be used to check for the complete seating of the occlusal rests. There should be an intimate fit between the teeth and retentive clasp assembly.

If the occlusal rests on the prosthesis do not seat completely in their respective rest seat preparations, a minor discrepancy in the cast metal framework can be identified and corrected.

Third: Evaluation of denture base adaptation

When the cast metal framework has been fully seated, check the fit of the acrylic resin portions of the prosthesis. An accurately fitting acrylic resin denture base is a primary consideration in the comfort and acceptance of an RFD. Excessive pressure may lead to discomfort, pain, and soft - tissue damage. A common contributor to excessive pressure is the dimensional changes that occur in the acrylic resin denture base during processing. Apply pressure indicator paste (PIP) evenly on the intaglio (tissue) surface of the prosthesis with a stiff, short, coarse - haired brush. A coarse brush will leave thin brush marks on the acrylic resin surface that displace under pressure. Apply an even, thin layer of PIP to register pressure areas. Currently, there are a variety of pastes that may be used in denture base evaluation. These materials, known as pressure indicator pastes, consist principally of zinc oxide powder combined with a medium consistency vegetable fat. Other ingredients are added to improve the flavour and consistency of the paste. The brush can be used to place a distinct stroke pattern in the paste. The removable partial denture is then inserted, firmly seated, removed, and carefully inspected. Where no contact between the denture base and the soft tissues has occurred, the brush strokes will remain in place where moderate contact has occurred, the brush stroke pattern will be indistinct or obliterated where heavy contact has occurred, the pink denture base material will clearly show through the white paste. Areas of heavy contact should be relieved using appropriate rotary instruments.

Pressure areas most commonly encountered are as follows:

In the mandibular arch—(l) the lingual slope of the mandibular ridge in the premolar area. (2) the mylohyoid ridge, (3) the border extension into the retromylohyoid space, and (4) the distobuccal border near the ascending ramus and the external oblique ridge.

While in the maxillary arch—(l) the inside of the buccal flange of the denture over the tuberosities. (2) the border of the denture lying at the malar prominence. and (3) the point at the pterygomaxillary notch where the denture may impinge on the pterygomandibular raphe or the hamulus. In addition. bony spicules or irregularities in the denture base that will require specific relief may be found in either arch.

Fourth: Assessment of denture base peripheral extensions

The peripheral borders of the denture base have a direct effect on retention, stability, and patient comfort. Overextension of the prosthesis denture borders may cause the following:

The muscles and frenum will tend to dislodge the RPD during function. The resultant dislodging force may be transferred to the abutment teeth by the retentive clasp assemblies. These forces may be especially destructive when the denture base borders of a bilateral distal - extension RPD are overextended. The longer the distal-extension base, the longer the lever arm, and the greater the potential for transmitting destructive forces to the supporting structures of the abutment teeth.

Denture base overextension may cause ulceration, pain, and swelling of the vestibular tissues. If this is not corrected, over an extended period of time, redundant tissue (denture hyperplasia) may form in the vestibule as a response to chronic irritation.

Impingement on the muscles of mastication may interfere with muscle function during mastication and speech.

Denture border extensions of modification spaces may interfere with the complete seating of the RPD.

Under extended denture borders may cause the following:

- Inadequate distribution of masticatory force. The lower denture base should cover the retromolar pads and buccal shelf area to the external oblique ridges to obtain maximal support for the RPD.
- Food may collect under the tissue surface of an RPD and be an annoyance and/or an irritation.
- The prosthesis may lack stability under extended denture borders will not satisfactorily resist lateral or horizontal stresses.

Evaluating the denture base extension

Extension of acrylic resin denture flanges plays an important role in the support and stability of a removable partial denture. Maximum flange extension, within physiologically tolerable limits, provides optimal support and stability for the prosthesis. Extension of denture flanges into the facial vestibules and lingual sulci enhances resistance to horizontal displacement. Therefore, acrylic resin denture

base flanges should not be arbitrarily reduced. Rather, they should be critically evaluated and adjusted only when physiologic limits have been exceeded.

Visual and digital evaluation of the resin flanges should be performed during the insertion appointment for purposes of examination, the buccal tissues should be held between the thumb and index finger and moved apically, laterally, and then occlusally. Soft tissue movement adjacent to each denture flange should be noted. Restriction of soft tissue movement can lead to irritation. Over extension of the borders also may result in the application of dislodging forces by the movable soft tissues. Therefore, while maximum tissue coverage is essential to support and stability, it is equally important to avoid overextension of denture borders.

Mandibular lingual and distolingual flange lengths may be evaluated using physiologic movements of the tongue and floor of the mouth. Clinical evaluation is accomplished by placing an index finger on the occlusal surfaces of the denture teeth on one side of the patient's mouth. The patient is then instructed to extend the tongue straight forward and then into the cheek on the opposite side of the mouth. If lingual or distolingual flanges are overextended, the denture base will lift away from the supporting tissues. This displacement is readily identified by pressure against the operator's index finger, allowing necessary flange adjustments to be made.

Where it is difficult to observe border extensions, disclosing wax can be placed on denture base flanges to help identify areas of overextension .Unfortunately, the flow characteristics of disclosing wax are not well suited to this application. Mixing petroleum jelly with the disclosing wax improves the flow characteristics of the disclosing material. This mixture is more reliable when used routinely to disclose regions of flange overextension. Any areas of overextension will be visible where the wax has been flattened or displaced by muscle action. The use of disclosing wax is especially effective on the distobuccal border of a mandibular RPD, which is controlled by the masseter muscle.

The most common areas of overextension of a maxillary RPD are the tissue side of the distobuccal flange and continuing through the pterygomaxillary notch area.

Contouring the anterior denture base flange

When designing a denture base for the anterior portion of the mouth, consideration must be given to the esthetic requirements of the patient. Slight overextension or over-contouring of the labial flange may cause a successful prosthesis to be esthetically failed. The first step in anterior denture base adjustment is the application of pressure indicator paste to the intaglio surface of

the resin. The removable partial denture is then positioned in the mouth and seated with gentle pressure. As resistance to the seating of the labial denture base flange is encountered, the partial denture is removed. Careful evaluation of the pressure indicator paste often will reveal excessive tissue contact along the border of the denture base.

Correction of this interference involves vertical reduction of the flange length to the point of contact with the edentulous ridge. Following adjustment, the pressure indicator paste and grinding residue are wiped from all denture surfaces and fresh paste is applied. This procedure is repeated until the removable partial denture can be completely seated without encountering resistance, producing blanching of the soft tissues, or causing patient discomfort.

Fifth: Occlusal adjustment

Teeth arrangement of the prosthesis should be accomplished to provide bilateral simultaneous contact at the maximal intercuspal position (MIP). At the try-in visit, the maxillomandibular relationships and the esthetic, phonetic and arrangement of the denture teeth are verified. Therefore, the occlusal adjustment of the RPD following processing of the denture bases should involve only minor processing changes. Processing changes can be corrected with a laboratory remount of the prosthesis before removal of the master cast. Minor interceptive occlusal contacts can be corrected by selective grinding adjustments, which are made after the contacts are marked with articulating paper. If gross premature occlusal contacts are noted, a new interocclusal (centric relation) record should be made. Remount the RPD on a dental articulator and make the necessary occlusal corrections by selective grinding at an acceptable vertical dimension of occlusion. This is accomplished outside of the mouth and away from the patient. The same method is used for opposing prostheses. The clinical remount is the most efficient method of adjusting occlusion because it allows direct observation during adjustment.

The master cast is usually destroyed when the RPD is finished and polished.

To obtain an accurate remount cast to correct occlusal disharmonies, make an intraoral irreversible hydrocolloid (alginate) impression of the prosthesis correctly positioned 'on the supporting tissues; that is, a pickup impression.

To remount removable partial dentures in an articulator, it is necessary to secure casts of both the dental arch restored by the removable partial denture and the opposing arch. An irreversible hydrocolloid impression is made with the removable partial denture completely seated in the patient's mouth. In most instances, the prosthesis will remain in the impression when the impression is

removed from the mouth. If the prosthesis remains in the mouth, it must be retrieved and carefully repositioned in the impression. Undercuts within the removable partial denture are then blocked out using baseplate wax, clay, wet paper towels, or wet facial tissues.

Dental stone is mixed and vibrated into the impression. When the dental stone has hardened, the cast is recovered and trimmed in preparation for mounting procedures. A cast of the opposing dentition must also be fabricated, at this stage of the procedure; the maxillary cast is mounted on the articulator using a face bow record. The mandibular cast is mounted using jaw relation record.

After the occlusion of the RPD has been refined on the articulator, appropriate occlusal anatomy is restored using fine burs and a low speed hand piece.

Criteria to be followed before adjusting occlusion:

- It is better 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 has more natural teeth and is considered as the intact arch, the final occlusal adjustments are made only on it.

Sixth: Adjusting retentive clasps

In the practice of removable partial prosthodontics, two pliers are generally sufficient. These are the No. 139 or "bird-beak" plier, and the No. 200 or "three-prong" plier. Proper technique for adjusting a clasp involves holding the clasp stationary between the beaks of a No. 139 plier and applying a bending force with the fingers of the opposite hand. This results in a gentle curvature of the clasp arm and minimizes the likelihood of clasp fracture. Clasp adjustment may also be performed using a No. 200 Plier. This is accomplished by engaging the clasp arm with the beaks of the plier and gently squeezing the handles until the desired bend has been achieved.

Seventh: Patient Instructions

Oral hygiene:

Providing the patient with appropriate oral hygiene instructions is extremely important. The patient must understand that meticulous home care is a prerequisite to removable partial denture success. Inadequate home care will hasten the destruction of the remaining teeth.

*Though provided earlier in the patient education stage, instructions regarding the care and maintenance of the remaining natural teeth and oral soft tissues must now be reviewed. Proper brushing techniques and the use of dental floss as a routine part of the patient's home care should be emphasized.

*The patient must accept the need for periodic dental evaluation of oral tissues and dental prostheses. The interval between successive examinations will vary depending on the oral conditions and type of prosthesis, but should not exceed 1 year.

*Use of plaque-disclosing tablets is an excellent way to shed the light on the need for thorough attention to oral hygiene. Areas that are susceptible to plaque accumulation are readily visualized. The patient should be instructed to chew the disclosing tablets with the partial denture in the mouth. The denture can then be removed and examined for areas of plaque accumulation, although accumulation on the removable partial denture will not be evident at the insertion appointment, the disclosing tablet technique should be demonstrated so the patient can periodically check the effectiveness of home care efforts.

*Appropriate methods for denture hygiene should be demonstrated. Emphasis should be given to physically brushing the denture on a daily basis, rather than relying on a cleaning or soaking agent to remove debris. The use of common toothpastes should be avoided since these pastes often contain abrasive particles.

*Scouring powders and abrasive household cleaners should also be avoided because of their potential for damaging both acrylic resin and metal components of a removable partial denture.

*The patient must understand that the denture should never be brushed while in the mouth. Instead, the prosthesis should be removed to permit access to all surfaces.

*The patient should also be instructed to clean the denture over a partially filled basin of water so as to prevent denture fracture if the denture is dropped.

*The patient should be cautioned against using any cleansing solution containing chlorine. If a chromium-based metal framework is soaked in this solution, the chlorine will irreparably damage the metal.

*The patient should also be instructed to remove the prosthesis (or prostheses) before going to bed at night. The soft tissues covered by the denture bases and the major connectors must be given the opportunity to recover from constant mechanical stresses applied when the prosthesis is in place. While in place, the removable partial denture prohibits the beneficial bathing effects of saliva, which flush food and bacterial debris from the hard and soft supporting tissues. The risk of enamel decalcification and soft tissue inflammation is greatly increased when the prosthesis is worn for long periods. If a patient has only a few remaining natural teeth and has a history of bruxism, less damage may be done to the remaining natural teeth if the denture is worn at night. If night-time denture wear is necessary, the patient must identify several hours each day when the prosthesis can be removed from the mouth.

*The patient should also be told to store the prosthesis in water when it is not in the oral cavity. Failure to do so may result in drying, cracking, and warpage of acrylic resin components. This is extremely damaging to the prosthesis and may necessitate repair or refabrication.

Prosthesis placement and removal:

-Teaching the patient how to insert and remove a dental prosthesis is essential. The patient's ability to adequately manage this task depends to some extent on his or her manual dexterity, muscular coordination, visual acuity, and physical condition.

-Additionally, design of the removable partial denture, the number and position of direct retainers, and the total amount of retentive force affect the ease with which the prosthesis can be removed from the mouth.

-Insertion of a removable partial denture is generally less of a problem than is denture removal. The patient should be positioned in front of a wall-mounted mirror while the dentist inserts the prosthesis. It is important that the patient understand the need to properly align the removable partial denture over the abutments before applying seating pressure. The patient should be cautioned about trapping soft tissues of the cheeks, lips, or tongue between a clasp and its abutment. The amount of force needed to seat the prosthesis should be demonstrated, and the patient warned that if excessive pressure is required, alignment of the denture is probably incorrect. Seating the denture with biting

pressure should be discouraged because damage to the denture, natural teeth, or soft tissues can easily result.

-After the patient has observed insertion of the removable partial denture, its removal also should be demonstrated. The most convenient method for engaging the prosthesis is to position a fingernail or thumbnail apical to a facial clasp arm on each side of the dental arch and to move the clasp occlusally. This method is acceptable when *cast circumferential clasps* are readily available. However, if only wrought-wire clasps are available, this technique should be avoided. Wrought-wire clasps are easily distorted when using this technique. When *wrought-wire clasps* are present, the patient should grasp the acrylic resin denture bases on each side of the arch and carefully remove the removable partial denture from the mouth.

-For a prosthesis that incorporates one or more *infra-bulge clasps*, positioning a fingernail apical to the approach arm and forcing the clasp occlusally is not an acceptable method of removal. This technique may lead to laceration of the adjacent soft tissues by the patient's fingernail. Additionally, this approach tends to force the retentive terminus of the clasp toward the abutment, making removal of the prosthesis even more difficult.

-The best method of removing a denture of this design is to engage the non-retentive portion of the T-clasp and apply occlusal pressure. The denture will disengage easily. Before leaving the office, the patient should be asked to demonstrate the proper methods of removable partial denture insertion and removal for the dentist.