Preparation of the Mouth for Removable Partial Dentures

The preparation of the mouth is fundamental to a successful removable partial denture service. Mouth preparation, perhaps more than any other single factor, contributes to the philosophy that the prescribed prosthesis must replace what is missing and preserve the remaining tissues and structures that will enhance the removable partial denture.

Mouth preparation follows the preliminary diagnosis and the development of a tentative treatment plan. In general, mouth preparation includes procedures in four categories:

1. Oral surgical preparation.
2. Conditioning of abused and irritated tissues.
3. Periodontal preparation.
4. Preparation of abutment teeth.

The objectives of the procedures involved in all four areas are to return the mouth to optimum health and to eliminate any condition that would be detrimental to the success of the removable partial denture. These conditions could include untreated, periodontal disease, impacted teeth, or abnormal bony enlargements.

Naturally, mouth preparation must be accomplished before the impression procedures produce the master cast on which the removable partial denture will be fabricated. Oral surgical and periodontal procedures should precede abutment tooth preparation and should be completed far enough in advance to allow the necessary healing period. Surgical and restorative dentistry procedures should be provided at least 6 weeks, preferably 3 to 6 months. This depends on the extent of the surgery and its impact on the
overall support, stability, and retention of the prosthesis.

1. Oral Surgical Preparation

As a rule, all pre-prosthetic surgical treatment for the removable partial denture patient should be completed as early as possible. When possible, necessary endodontic surgery, periodontal surgery, and oral surgery should be planned so that they can be completed during the same time frame. The longer the interval between the surgery and the impression procedure, the more complete the healing and the more stable the denture-bearing areas.

a. Extractions

Planned extractions should occur early in the treatment regimen but not before a careful and thorough evaluation of each tooth in the dental arch is completed. Regardless of its condition, each tooth must be evaluated in terms of its strategic importance and potential contribution to the success of the removable partial denture. Removing nonstrategic teeth that would present complications or may be detrimental to the design of the removable partial denture is a necessary part of the overall treatment plan.

b. Removal of Residual Roots

Generally, all retained roots or root fragments should be removed. This is particularly true if they are near the tissue surface or if associated pathologic findings are evident. Residual roots adjacent to the abutment teeth may contribute to the progression of periodontal pockets and compromise the results of subsequent periodontal therapy. Removal of root tips can be accomplished from the facial or palatal surfaces without reducing alveolar ridge height or affecting adjacent teeth.

c. Impacted Teeth

All impacted teeth, including those in edentulous areas and those adjacent to abutment teeth, should be considered for removal. The periodontal implications of impacted teeth adjacent to abutments are similar to those for retained roots. These teeth are often neglected until profound periodontal consequences arise.

The skeletal structure of the body changes with age. Asymptomatic impacted teeth in older people covered with bone, with no evidence of a pathologic condition, should be left to preserve the arch morphology. If an impacted tooth is gone, this should be recorded in the patient's record, and the patient should be informed of its presence.

Any impacted teeth that can be reached with a periodontal probe must be removed to treat the periodontal pocket and prevent more extensive damage.

d. Malposed Teeth

The loss of individual teeth or groups of teeth may lead to extrusion, drifting, or combinations of malpositioning of remaining teeth. In most instances, the alveolar bone supporting extruded teeth will be carried occlusal as the teeth erupt. Orthodontics may help correct many occlusal discrepancies, but for some patients, such treatment may not be practical because of a lack of teeth for the anchorage of the orthodontic appliances or other reasons. In such situations, individual teeth or groups of teeth and their supporting alveolar bone can be surgically repositioned.

e. Cysts and Odontogenic Tumors

A panoramic film of the jaws is recommended to survey the jaws for unsuspected pathologic conditions. When a suspicious area appears on the survey film, a periapical movie should be taken to confirm or deny the presence of a lesion. All radiolucencies or radiopacities observed in the jaws should be investigated. Although the diagnosis may appear obvious from clinical and roentgenographic examinations, the dentist should confirm the diagnosis through appropriate consultation and, if necessary, perform a biopsy of the area and submit the specimens to a pathologist for microscopic study. The patient should be informed of the diagnosis and provided with various options for resolving the abnormality, as confirmed by the pathologist's report.

f. Exostoses and Tori

The existence of abnormal bony enlargements should not be allowed to compromise the design of the removable partial denture. Although modification of denture design can sometimes accommodate exostoses more frequently, this results in additional stress to the supporting elements and compromised function. Ordinarily, the mucosa covering bony protuberances is fragile and friable. Removable partial denture components near this tissue may cause *irritation* and *chronic ulceration*. Also, exostoses approximating gingival margins may complicate maintaining periodontal health and lead to the eventual loss of strategic abutment teeth.

g. Hyperplastic Tissue

Hyperplastic tissues are seen in fibrous tuberosities, soft, flabby ridges, folds of redundant tissue in the vestibule or floor of the mouth, and palatal papillomatosis. All these excess tissue forms should be removed to provide a firm base for the denture. This removal will produce a more stable denture, reduce stress and strain on the supporting teeth and tissues, and, in many instances, provide a more favourable orientation of the occlusal plane and arch form for the arrangement of the artificial teeth. Appropriate surgical approaches should not reduce vestibular depth. Hyperplastic tissue can be removed with any preferred combination of scalpel, curette, electrosurgery, or laser. Some form of surgical stent should always be considered for these patients to make the healing period more comfortable. An old removable partial denture appropriately modified can serve as a surgical stent. Although hyperplastic tissue has no great malignant propensity, all such excised tissue should be sent to an oral pathologist for microscopic study.

h. Muscle Attachments and Frenae

As a result of the loss of bone height, muscle attachments may be inserted on or near the residual ridge crest. The mylohyoid, buccinator, mentalis, and genioglossus muscles are most likely to introduce problems of this nature. In addition to the problem of the muscles' attachments, the mentalis and genioglossus muscles occasionally produce bony protuberances at their attachments that may also interfere with removable partial denture design. Appropriate ridge extension procedures can reposition attachments and remove bony spines, enhancing the comfort and function of the removable partial denture.

The maxillary labial and mandibular lingual frenae are the most common sources of frenum interference with denture design. These can be modified easily through any of several surgical procedures. Under no circumstances should a frenum be allowed to compromise the design or comfort of a removable partial denture.

i. Bony Spines and Knife-Edge Ridges

Sharp bony spicules should be removed, and knifelike crests should be gently rounded. These procedures should be carried out with minimum bone loss. If, however, correction of a knife-edge residual crest results in insufficient ridge support for the denture base, the dentist should resort to vestibular deepening for correction of the deficiency or insertion of the various bone grafting materials that have demonstrated successful clinical trials.

Augmentation of Alveolar Bone

Considerable attention has been devoted to ridge augmentation using autogenous and alloplastic materials, especially in preparation for implant placement. More considerable ridge volume gains necessitate consideration of autogenous grafts; however, these procedures are accompanied by concerns for surgical morbidity. Alloplastic materials have displayed short-term success; however, no randomized controlled trials have been conducted to provide evidence of long-term increases in ridge width and height for removable prostheses.

Clinical results depend on careful evaluation of the need for augmentation, the projected volume of required material, and the site and method of placement. Considerable emphasis must be placed on a sound clinical understanding that some alloplastic materials can migrate or be displaced under occlusal loads if not appropriately supported by underlying bone or contained by buttressing soft tissues. Careful clinical judgement with sound surgical and prosthetic principles must be exercised.

2. Conditioning of Abused and Irritated Tissues

Many removable partial denture patients require some conditioning of supporting tissues in edentulous areas before the final impression phase of treatment begins. Patients who require conditioning treatment often demonstrate the following symptoms:

1. Inflammation and irritation of the mucosa covering denture-bearing areas.
2. Distortion of typical anatomic structures, such as incisive papillae, rugae, and retromolar pads.
3. A burning sensation in residual ridge areas, the tongue, cheeks, and lips.

These conditions are usually associated with ill-fitting or poorly occluding removable partial dentures. However, nutritional deficiencies, endocrine imbalances, severe health problems (diabetes or blood dyscrasias), and bruxism must be considered in a differential diagnosis. Suppose the use of a new removable partial denture or the relining of a present denture is attempted without correcting these conditions. In that case, the chances for successful treatment will be compromised because the same old problems will be perpetuated.

A suggested home care program includes rinsing the mouth three times a day with a prescribed saline solution; massaging the residual ridge areas, palate, and tongue with a soft toothbrush; removing the prosthesis at night; and using a prescribed therapeutic multiple vitamins along with a prescribed high-protein, low-carbohydrate diet. Some inflammatory oral conditions caused by ill-fitting dentures can be resolved by removing the dentures for extended periods. However, few patients are willing to undergo such inconveniences.

3. Periodontal Preparation

Periodontal preparation of the mouth usually follows any oral surgical procedure and is performed simultaneously with tissue conditioning procedures. Ordinarily, tooth extraction and removal of impacted teeth and retained roots or fragments are accomplished before definitive periodontal therapy is provided. However, it is strongly recommended that a gross debridement be performed before tooth extraction when patients present with significant calculus accumulation.

This helps limit the possibility of accidentally dislodging a piece of calculus into the extraction socket, which could lead to an infection. Elimination of exostoses,

tori, hyperplastic tissue, muscle attachments, and free, on the other hand, can be incorporated with periodontal surgical techniques. In any situation, periodontal

therapy should be completed before restorative dentistry procedures are begun for any dental patient.

Objectives of Periodontal Therapy

The specific criteria for satisfying this objective are as follows:

1. Remove and control all etiologic factors contributing to periodontal disease and reduce or eliminate bleeding during probing.
2. Elimination of, or reduction in, the pocket depth of all pockets with the establishment of healthy gingival sulci whenever possible.
3. Establishment of functional atraumatic occlusal relationships and tooth stability
4. To develop a personalised plaque control program and a definitive maintenance schedule, complete periodontal charting that includes recording pocket depths, assessing attachment levels, and recording furcation involvements, mucogingival problems, and tooth mobility should be performed.

4. Abutment Teeth Preparation

Abutment Restorations

Equipped with the diagnostic casts on which a tentative removable partial denture design has been drawn, the dentist is able to prepare abutment teeth accurately. The information should include the proposed placement path, the areas of teeth to be altered, tooth contours to be changed, and the locations of rest seats and guiding planes.

During examination and subsequent treatment planning, in conjunction with a survey of diagnostic casts, each abutment tooth procedure is considered individually based on the type of restoration indicated. Abutment teeth presenting sound enamel surfaces in a mouth where good oral hygiene habits are evident may be considered a fair risk for use as removable partial denture abutments. Therefore, one must be conservative in evaluating the patient's oral hygiene habits in the future. Remember that clasps as such do not cause teeth to decay, and if the individual keeps the teeth and the removable partial denture clean, one need not condemn clasps from a cariogenic standpoint. On the other hand, more removable partial dentures have been condemned as cariogenic because the dentist did not provide for the protection of abutment teeth rather than because of inadequate care on the part of the patient.

Esthetic veneer types of crowns should be used when a canine or premolar abutment is to be restored or protected. Less frequently, the molar will have to be treated in such a manner, and except for maxillary first molars, the entire cast crown is usually

acceptable. A gold inlay may be indicated when proximal caries on abutment teeth with sound buccal and lingual enamel surfaces and a mouth exhibiting average oral hygiene and low caries activity. However, silver amalgam or composite for restoring teeth with proximal caries should not be condemned. However, one must admit that an inlay cast of a complex type of gold will provide the best possible support for occlusal rests while giving an esthetically pleasing restoration.

Even when the removable partial denture is removed, the toothbrush often misses these areas, allowing bacterial plaque and debris to remain for long periods. Because of this unique concern, special attention should be paid to these areas during patient education and follow-up. Caries risk is best managed through effective home care and professional follow-up procedures rather than through the placement of restorations.

All proximal abutment surfaces that serve as guiding planes for the removable partial denture should be prepared to be as nearly parallel as possible to the placement path.

A polished surface for the altered ceramic restoration may be restored using any of several polishing kits supplied by manufacturers.