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Impression materials and techniques for RPD

Making the master impression for fabrication of a removable partial denture (RPD) prosthesis is accomplished once the remaining teeth in the partially edentulous arch have been modified. The modifications, including intracoronal and extracoronal restorations and/or enameloplasty to enhance extracoronal contours, should follow the treatment plan derived after careful analysis, design, and prescription for the prosthesis.

Classification of impression technique

1. PRIMARY IMPRESSION

An impression made for the purpose of diagnosis or for the construction of a tray.

2. **Secondary or definitive impression**

An imprint that record the entire functional denture bearing area to ensure maximum support, retention and stability for the denture during use.

Primary purpose to record accurately the tissues of the denture bearing areas, in addition to recording functional width and depth of the sulci.

Secondary impression CLASSIFIED INTO:-

1. Conventional techniques
2. Selective pressure techniques
3. Functional techniques
4. Reline and rebases techniques

Conventional technique also known as Anatomical or Mucostatic impression techniques:-the surface contour of the ridge is recorded at its resting form (no occlusal load) (soft or less viscous alginate impression material)

Disadvantages: In free end saddle dentures, distal end will show tissue ward movement under occlusal recommended for tooth supported partial dentures Kennedy class III and IV these are bounded saddles.

Selective pressure technique

Techniques to achieve selective pressure impression Kennedy Class I. Altered cast technique

Functional dual impression technique or Applegate

Selection of impression material

It is important to make an accurate impression in order to ensure the accuracy of the resulting master cast. The elastomeric impression materials available for use for the final impression include a range of materials from irreversible hydrocolloid (alginate) to vinylpolysiloxane or polyether impression materials. The range of choices varies according to the preference of the clinician.

Impression material

1. Rigid Impression material

a. Plaster of Paris

Now elastic materials have completely replaced the impression plaster,

Modified impression plasters are used by many dentists to record maxillomandibular relationships. Also used for recording impression of edentulous area without under cut.

b. Metallic Oxide Paste

They are not used as primary impression materials and should never be used for impressions that include remaining natural teeth. They are also not to be used in stock impression trays.

Metallic oxide pastes, being rigid substances, can be used as secondary impression materials for complete dentures and for extension base edentulous with custom acrylic impression tray which has being properly designed and attached to the partial denture framework.

Metallic oxide pastes can also be used as an impression material for relining distal extension denture base

2. Thermo-plastic impression material

It cannot record minute details accurately because they undergo permanent distortion during with drawl from undercut

Modeling Plastic

This material is most often used for border correction (border molding) of custom impression trays for Kennedy Class I and II removable partial denture bases.
Modeling plastic is manufactured in two different colors the red (red-brown) material in cake form record impression for edentulous area & green modeling plastics are obtainable in stick form for use in border molding an impression

Impression Waxes and Natural Resins
use in recording the functional or supporting form of an edentulous ridge.
The impression waxes also may be used to correct the borders of impressions made of more rigid materials

3. Elastomeric impression Materials include the following

1. Polysulphide
2. Polyether
3. Silicone
   a. Additional polymerizing silicone
   b. Condensation polymerizing silicone.

polysulphide Impression Material used for removable partial denture impressions and especially for secondary corrected or altered cast impression

Reversible Hydrocolloids (agar-agar):-

1. It is used primarily as impression materials for fixed restorations. They demonstrate acceptable accuracy when properly use
2. Fluid at high temp and gel on reduction temperature
3. Acceptable accuracy when properly used.
4. border control of impressions made with these materials is difficult
   Main use is in fabrication of refractory cast in duplication procedure.
   It required special equipment (cooling tray) if being used as an intra-oral impression material.

Irreversible hydrocolloid

1. Irreversible hydrocolloids are used for making diagnostic casts, orthodontic treatment casts, and master casts for removable partial denture.
2. Dimensionally unstable, it can be used in presence of moisture are hydrophilic;
3. A pleasant taste and odor; and are nontoxic, no staining.
4. These material have allow strength provide less surface details than other material

Differences between reversible and irreversible hydrocolloid

The principal differences between reversible and irreversible hydrocolloids are as follows:

1. Reversible hydrocolloid converts from the gel form to a sol by the application of heat. It may be reverted to gel form by a reduction in temperature. This physical change is reversible.

2. Irreversible hydrocolloid becomes a gel via a chemical reaction as a result of mixing alginate powder with water. This physical change is irreversible.

use of irreversible hydrocolloid material — alginate — has been advocated based on multiple factors such as: the material is used widely in most dental practices, there is ease of handling and manipulation by support personnel, and it is relatively inexpensive and does not require special equipment in the office in most instances.

The key disadvantage in use of this material relates to the handling characteristics, in that there is a relatively short time period in which the material is accurate. The short period of time for predictable accuracy of alginate is based on the physical properties such as syneresis; the loss of fluid occurs in a short period of time and can affect the accuracy of the master cast. If managed properly, alginate impression material is cost - effective when pouring the master cast can be accomplished immediately after the impression is removed and disinfected. This implies the master cast is poured in the office in a timely fashion — less than 12 – 14 minutes from removal — rather than shipping the impression to an off - site dental laboratory for fabrication of the master cast at a later time.

The vinylpolysiloxane or polyether impression materials may be the impression material of choice since under the right conditions, either maintains accuracy for a longer period of time when compared to alginate impression material. The ultimate goal is to obtain an accurate cast for fabrication of a removable partial denture prosthesis.

Important Precautions to Be Observed in the Handling of Hydrocolloid Impressions

1. Impression should not be exposed to air because some dehydration will inevitably occur and result in shrinkage.
2. Impression should not be immersed in water or disinfectants, because some imbibition will inevitably result, with an accompanying expansion
3. Impression should be protected from dehydration by placing it in a humid atmosphere or wrapping it in a damp paper towel until a cast can be poured. To prevent volume change, this should be done within 15 minutes after removal of the impression from the mouth
4. Exudates from hydrocolloid have a retarding effect on the chemical reaction of gypsum products and results in a chalky cast surface. This can be prevented by pouring the cast immediately or by first immersing the

impression in a solution of accelerator, if an accelerator is not included in the formula.

STEPS IN IMPRESSION MAKING

a. Position of patient & dentist (Dentist should stand & patient should sit upright)
b. Tray selection
c. Mixing the material & loading into the tray
d. Impression making & removal
e. Inspecting, cleaning & disinfecting the impression

Occlusal plane should be parallel to the floor

MAXILLARY IMPRESSION- dentist should stand at the right rear of the patient.

MANDIBULAR IMPRESSION- dentist should stand at the right front of the patient.

Tray selection

The choice of an impression tray can include stock impression trays both made of metal or the more rigid plastics available. The use of rigid plastic impression trays can be advantageous since most are intended to be disposable and do not require additional dental assistant time for cleaning after use. Stock impression trays are available as rim - lock or other mechanical retention design such as perforated trays, and both can be modified for use intraorally to meet the anatomical features of the patient. The prime consideration in tray selection is to choose one with the absolute rigidity that must be afforded by the tray material.

The step-by-step procedure and important points to observe in the making of a hydrocolloid impression are as follows:

1. Select a suitable, sterilized, perforated or rim-lock impression tray that is large enough to provide a 2- 4 to -mm thickness of the impression material between the teeth and tissues and the tray.

2.. Build up the palatal portion of the maxillary impression tray with wax or modeling plastic to ensure even distribution of the impression material and to prevent the material from slumping away from the palatal surface. At this time, it is also helpful to pack the palate with gauze that has been sprayed with a topical anesthetic. This will serve to anesthetize the minor salivary glands and mucous glands of the palate and thus prevent secretions as a response to smell or taste or to the physical presence of the impression material. If gelation occurs next to the tissues while the deeper portion is still fluid, a distorted impression of the palate may result, which cannot be detected in the finished impression. This may result in the major connector of the finished casting not being in contact with the underlying tissues. The maxillary tray frequently has to be extended posteriorly to include the tuberosities and the vibrating line region of the palate. Such an extension also aids in correctly orienting the tray in the patient's mouth when the impression is made.

3. The lingual flange of the mandibular tray may need to be lengthened with wax in the retromylohyoid area or to be extended posteriorly, but it rarely ever needs to be lengthened elsewhere. Wax may need to be added inside the distolingual flange to prevent the tissues of the floor of the mouth from rising inside the tray.

4. Place the patient in an upright position, with the arch to be impressed nearly parallel to the floor.

5. When irreversible hydrocolloid is used, place the measured amount of water (at 70°F) in a clean, dry, rubber mixing bowl (600-mL capacity). Add the correct measure of powder. Spatula move rapidly against the side of the bowl with a short, stiff spatula. This should be accomplished in less than 1 minute. The patient should rinse his or her mouth with cool water to eliminate excess saliva while the impression material is being mixed and the tray is being loaded.

6. In placing the material in the tray, avoid entrapping air. Have the first layer of material lock through the perforations of the tray or rim-lock to prevent any possible dislodgment after gelation.

7. After loading the tray, remove the gauze with the topical anesthetic and quickly place (rub) some of the impression material on any critical areas using your finger (areas such as rest preparations and abutment teeth). If a

maxillary impression is being made, place the material in the highest aspect of the palate and over the rugae.

8. Use a mouth mirror or index finger to retract the cheek on the side away from you as the tray is rotated into the mouth from the near side.

9. Seat the tray first on the side away from you, next on the anterior area, while reflecting the lip, and then on the near side, with the mouth mirror or finger for cheek retraction. Finally, make sure that the lip is draping naturally over the tray.

10. Be careful not to seat the tray too deeply, leaving room for a thickness of material over the occlusal and incisal surfaces.

11. Hold the tray immobile for 3 minutes with light finger pressure over the left and right premolar areas. To avoid internal stresses in the finished impression, do not allow the tray to move during gelation. Any movement of the tray during gelation will produce an inaccurate impression.If, for example, you allow the patient or the assistant to hold the tray in position at any time during the impression procedure, some movement of the tray will be inevitable during the transfer and the impression will probably be inaccurate. Do not remove the impressionfrom the mouth until the impression material has completely set.

12. After releasing the surface tension, remove the impression quickly in line with the long axis of the teeth to avoid tearing or other distortion.

13. Rinse the impression free of saliva with slurry water, or dust it with plaster, and rinse gently; then examine it critically. Spray the impression thoroughly with a suitable disinfectant and cover it immediately with a damp paper towel. A cast should be poured immediately into a disinfected hydrocolloid impression to avoid dimensional changes and syneresis. Circumstances often necessitate some delay, but this time lapse should be kept to a minimum. A delay of 15minutes will satisfy the disinfection

requirements and should not be deleterious if the impression is kept in a humid atmosphere