

Different Impression Materials Used for Complete Denture Fabrication – A Review

Running title: Different impression materials used.

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Abstract:

There are many impression materials that are used for the fabrication of complete denture. These materials are used to ensure the quality of impression obtained and also the techniques used while making the impression. Moreover, the combination of excellent physical properties and its handling features assures the stability of the impression material. This review is to emphasise the availability of different impression materials for complete denture fabrication.

Keywords: Fabrication, impression materials, quality, techniques, properties, stability.

Introduction:

An impression is a record, a replica of mouth tissues taken at an unstrained rest position or in various positions of displacement (Denen, 1952). In the case of an edentulous arch, this requires a unique combination of managing movable soft tissue corresponding with different materials and a technique for accurate reproduction (McCord & Tyson, 1997; Panichuttra et al., 1991). One or a combination of impression materials is not the solution for making acceptable impressions in differing situations. The

character and position of the tissues to be reproduced in the impression, the technique used, and the purpose for which the impression is made dictates the choice of the material (McCord & Tyson, 1997). A material should be selected because of its properties that are suitable to obtain specific results. Furthermore, the impression materials that harden by chemical reaction are plaster of Paris, zinc oxide eugenol paste, irreversible hydrocolloid alginate, mercaptan rubber, and silicone rubber (Booth & Malcolm Booth, 1956; Lu et al.,

2004) Other impression materials such as modeling compound, reversible hydrocolloid, and waxes are thermoplastic and thus require heat. When the material is in the process of hardening, the tissue side is the last to be affected. Not only that, but there are different impression techniques based on amount of pressure used, position of the mouth while making an impression and also based on the method of manipulation for border moulding.(Rahn et al., 2009; Walker et al., 2005)

Contents:

Different Impression Materials:

Gypsum Products

Plaster of Paris is a gypsum product, to which modifiers have been added to regulate the setting time and to control the setting expansion is used in impression making. Advantages in using plaster of Paris are minimal tissue distortion, accurate record of tissue detail, has a quick flow, absorption of palatal secretions during set, and it is easy for manipulation(Malachias et al., 2005; Panichuttra et al., 1991). The disadvantages are saliva waxes the material and distorts the surface when a mandibular impression is made, it is very untidy to handle, and the separation of the stone cast from the impression is tedious and time consuming(Malachias et al., 2005; Wadhwani et al., 2005).

Zinc Oxide Eugenol Paste

The basic composition of the zinc oxide and eugenol paste are the zinc oxide and eugenol. Plasticizer, fillers, and other additives are incorporated to alter certain properties such as the smoothness of the mix, setting time and more.(Lu et al., 2004) The advantage of using zinc oxide eugenol paste are, fluidity aids accurate recording of tissue details, minimal tissue distortion, ease in beading and boxing not washed out by saliva and it has a good property of dimensional

stability.(Alqattan&Alalawi, 2016; Masri et al., 2002) There are few disadvantages such as the setting time is not easily controlled by inexperienced operators, temperature and humidity influence the setting time, the paste does not absorb the secretions in the palate, hence the secretion are profuse.(Panichuttra et al., 1991)

Reversible Hydrocolloid Material

It is an impression material that is made from agar-agar. Hydrocolloids have the property of changing gels under certain conditions. Moreover, the application of heat to a reversible colloid material which is in a gel state returns to the solid condition and vice versa. Any material that must be seated with positive pressure and held rigidly until the material hardens or gels is capable of displacing soft tissues.(Panichuttra et al., 1991; Wadhwani et al., 2005) Another disadvantage is that, the gels are invariably subject to changes in dimension by syneresis and also imbibitions, therefore the impression must be poured in dental stone immediately upon the removal from the patient's mouth.(Connor, 1981) The primary advantage of this reversible hydrocolloid material is that it will reproduce accurate undercut areas for proper complete denture fabrication.(Wadhwani et al., 2005)

Irreversible Hydrocolloid Material

Solid is changed to the gel state by chemical reaction and when the reaction is complete, the material cannot be manipulated or changed to the solid state again, thus it is called irreversible hydrocolloid materials.(Walker et al., 2005) These chemical reaction does not damage the soft tissues nor, cause any discomfort to the patients. The soluble alginate dissolves in water and forms a viscous mix. Furthermore, the gelation takes place first when the material is in contact with the tissues. The advantages of these materials are it is easy for manipulation, less discomfort to the patient, better records of the

undercut areas.(Hyde et al., 2014; Malachias et al., 2005)

Modeling Compound

Modeling compound is a thermoplastic material that is made either as a tray or as an impression material. The impression material is (cake form) used primarily as a tray material, and the stick form is used as an impression material.(Alqattan&Alalawi, 2016) The tray material requires a higher heat to soften , the material is rigid when it is hardened but does not record details accurately. Impression material is less viscous when heated , soft at lower temperature and records detail accurately.(Booth & Malcolm Booth, 1956; Wadhvani et al., 2005) The terminal conductivity of modeling compounds is very low , therefore the outside softens first and then the inside. Failure to achieve a complete hardening of the compound prior to removing the impression may result in distortion. If the temperature is lower at the time of the impression is to be made , less error will occur from the linear thermal coefficient of expansion.(Wadhvani et al., 2005) Modeling compounds are subject to distortion during and after the removal from the patient's mouth. Some of the advantages are , the surface can be corrected , the impression can be reinserted in the mouth for evaluation of fit , the material can be beaded and boxed for cast pouring . The disadvantages are that prolonged heating makes the compound more brittle and grainy , manipulation of the compound when placing it in the impression tray may incorporate water thus there will be and increase in the flow of the material.(Harrison, 1977; Wadhvani et al., 2005)

Impression Waxes

The low fusing impression waxes are not sufficiently accurate for a final impression making for complete denture fabrication. As a corrective material for small areas and as a border refining material for a tray

, these impression waxes play a major role.(Harrison, 1977)

Impression Techniques May Be Classified As Below

- Amount of pressure used
- Based on the position of mouth while making an impression
- Based on the method of manipulation for border molding

Amount Of Pressure Used

- Pressure technique
- Minimal pressure technique
- Selective pressure technique

Based On The Position Of Mouth While Making And Impression

- Open mouth
- Close mouth

Based On The Method Of Manipulation For Border Molding

- Hand manipulation
- Functional movements

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