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FIGURE 1: The uncompressed ridges. Implants are present in this case, however the technique is identical for conventional complete dentures.



FIGURE 2: The mobility of the tissues is tested and mobile areas noted. Here the anterior region is mobile.



FIGURE 6: Mounting plaster is fast setting and suitable for edentulous impression.



FIGURE 7: The impression is cast in plaster and set in a base former.

## A build-up impression technique for the edentulous mandible using various viscosities of silicone impression material

The mandibular edentulous arch can be a most difficult impression to make during complete denture construction. Ill-fitting lower complete dentures are often a source of discomfort for patients. While implant retention helps to achieve vertical stability, unless a completely implant-supported denture is being made, the denture must have good tissue contact and correct anatomical extension. An impression technique is required that captures the denture-bearing areas, but also allows compression of the tissues in accordance with their relative nobilities.<sup>1,2,3</sup> Loose tissues require a mucostatic (uncompressed) technique, whilst immobile

tissues are best utilised with a mucocompressive (loaded) impression technique. This leads to a denture that differentially loads the area best able to support masticatory forces. There are a number of means to achieve this selective pressure. The use of impression compounds and Zinc Oxide Eugenol impression materials are classically advocated. However, in a busy practice, the use of various viscosities of polyvinylsiloxane (PVS) is convenient, accurate, dimensionally stable, fast setting, easily adjusted and added to, elastic when drawn over undercuts, dimensionally stable during transport, well tolerated by the patient, and time efficient.<sup>4</sup>



FIGURE 3: A stock edentulous tray is sized.



FIGURE 4: A good but overextended primary impression.



FIGURE 5: The boarders are removed from the impression to ensure the custom tray will be short of the borders.



FIGURE 8: Once set, the cast is marked for proper tray extension.



FIGURE 9: The tray material is rapidly adapted to the cast and trimmed.



FIGURE 10: A curing light is used to polymerise the material. Note the shape of the handle so as not to interfere with moulding movements intraorally.

Below is a step-by-step method for building up of an accurate, functionally extended mandibular impression. This technique also works equally well for maxillary impressions and impressions for partial dentures. This technique is similar to that published by Massad,<sup>5</sup> however the "Massad technique" utilises prefabricated stock trays. It is this author's opinion that using rapidly fabricated custom trays gives the dentist greater control, less use of impression material, and leads to less overextension and less distortion of the dimensions of the sulcus. No particular brand of impression material is advocated, so long as various viscosities are used. All PVS materials will bond to each other when dry.

**STEP 1** Primary and secondary impressions are taken at the same visit. The patient is instructed to discontinue wearing any existing prosthesis for 12-24 hours prior to the appointment, to allow the oral tissues to rebound and ensure an accurate impression of uncompressed tissues. If the existing denture is causing tissue problems, tissue conditioners or reline material may be used to restore health. The ideal representation of the denture bearing areas is borne in mind throughout the procedure, however, patients rarely conform exactly to this ideal, unless the dentist overextends the impression material (Figure 1).

**STEP 2** The patient's oral mucosa is examined. Two blunt instruments are used to measure the relative mobility of tissue areas. Compressible or mobile areas are noted (Figure 2).

**STEP 3** An alginate impression is made in a correctly sized edentulous stock tray. This impression will certainly be overextended and minimal efforts should be made to functionally mould this impression. Some tray show through is normal, but highly-inaccurate impressions or poorly-seated impressions should be discarded (Figures 3 and 4).

**STEP 4** In order to quickly achieve a custom tray that is short of the anatomical boarders, the alginate is cut back with a scalpel 3-4mm circumferentially. This impression is cast with fast-setting stone. Mounting plaster is extremely fast to set, especially when mixed with warm water. It comes in individual sachets, which is convenient for the general dental surgery. Excess plaster should be allow set in the mixing bowl and not discarded down a sink, unless a plaster trap *in situ* (Figure 5).

**STEP 5** After five minutes the stone will be set and warm to the touch. The impression is removed. A pencil is used to mark the extension of the custom tray. Any large undercuts can be blocked out with blu-tack or wax. Tray material should extend to the base of the sulcus on the cast, half way up the retromolar pad, and into the sublingual space. A sheet of light-cured custom tray material is adapted to the cast and pressed into the sulcus. The pencil mark will be visible through the tray material, and a scalpel is used to trace around the pencil line. The excess tray material is removed, rolled into a sausage shape and adapted to the tray as both a vertical handle and reinforcement (Figures 6 to 10).



FIGURE 11: The tray is trimmed and smoothed.



FIGURE 12: Occlusal registration silicone used to space the tray.



FIGURE 13: Spacers are trimmed away from borders.



FIGURE 17: The tray is returned to the mouth and boarder moulded many times until the PVS is fully set.



FIGURE 18: The final impression.



FIGURE 19: The final denture.

**STEP 6** A composite curing light will rapidly set the tray material. The tray will not stick to the cast once set. The pencil mark will transfer to the set tray material and the tray can be trimmed to ensure the borders are not overextended. The final tray should be left unpolished to help retain impression material. Perforations are not placed in the tray. The tray should be disinfected (Figure 11).

**STEP 7** The patient is returned to the dental chair, having been waiting 10-15 minutes for tray construction. The tray is tried into the patient's mouth to ensure it is comfortable and not overextended during functional movements. Tissue stops are necessary to space the tray away from the tissues. Bite registration silicone is useful for this. Three small amounts are expressed onto the tray (spots of PVS adhesive can be used to ensure it sticks) and the tray seated into the mouth with as little pressure as possible. After setting, the silicone stops are trimmed into neat areas away from the borders (Figures 12 and 13).

**STEP 8** A heavy viscosity (heavy body or putty consistency) silicone is mixed into a disposable syringe. PVS adhesive is painted around only the borders of the tray. The silicone is injected only around the borders and seated carefully in the mouth. The functional movements are made to capture the border extension. Upon removal, excess is trimmed with a scalpel. Further heavy bodied silicone can be added to areas and remoulded in the mouth if necessary. Folds, voids, and air blows in this increment are irrelevant. If the tray shows

through the boarder, cut back the tray in that area and move to the next step (Figures 14 and 15).

**STEP 9** Any exposed areas of tray are covered with PVS adhesive. Light viscosity silicone is added to the tray in the incompressible areas and ultralight silicone in any compressible areas. The tray is re-seated with force in the mouth and the functional movements carried out repeatedly until the material is set. If there are any deficiencies, another wash of ultralight can be made over the entire impression. Avoid adding only small areas of silicone. A total wash over the impression will avoid uneven seating of the tray, the differential elasticity of the deeper layers will maintain the selective pressure (Figures 16 and 17).

**STEP 10** The final impression is dried and inspected. All the denture bearing areas should be captured and the borders should be rounded and narrow. Any areas that do not conform to the image of an idea impression should be inspected in the mouth to see if they accurately represent the patient's anatomy. If there are major issues with the impression, peel the PVS from the tray and start over (Figure 18).

**STEP 11** The dentist should prescribe the laboratory box and bead the impression to transfer the impression accurately. This is particularly important in regard to capturing the sulcus width. Figure 19 shows the final prosthesis and recreated the borders in all dimensions.



FIGURE 14: Heavy viscosity PVS is syringed around the adhered borders.



FIGURE 15: Borders moulded intraorally.



FIGURE 16: Ultralight PVS used in the mobile regions and light bodies in the immobile regions. Two guns are required to express the material rapidly enough to avoid premature setting.

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