
Preparatory working steps

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5.1 Custom made impression trays

Impressions taken with custom made trays serve to fine tune the primary impressions taken using stock impression trays. During the secondary impression taking, it is important to reproduce as precise an impression of the patient's tissues as is possible. Care must be taken in regard to registration of the various muscle ligaments and maintaining as uniform thickness of impression material as possible. The customised tray must extend only to those parts of the mucosa which provide osseous support.

The aim of the functional impression is to maximize the rest area of the denture base taking the musculature functions into consideration. It is also essential to obtain retentive suction between the denture base and mucosal tissue. This is achieved by means of cohesive and adhesive forces acting within a peripherally sealed border. In order to maintain this suction effect during speech and masticatory function, it is necessary to have a well muscle trimmed periphery to provide the necessary seal. Prior to secondary impression taking the denture bearing tissue must be in a "recovered" state, i.e.: the previous denture must not have been worn for at least 24 hours.

Prior to making custom impression trays on the primary models, the dental technician should be informed concerning the viscosity and/or, flowability of the impression material to be used, so that he can provide relief in particular areas of the model or a spacer if considered necessary.

Materials with low viscosity require an accurately fitting tray and materials with a high viscosity may require a spacer between the tray and model on which they are made.

Most important is that the tray be rigid and not at all flexible.

Note:

Be careful with impression tray materials that may be dimensionally unstable and not sufficiently rigid!

5.1.1 Expanse

The expanse of customised trays should be smaller than the future denture bearing area. Sufficient clearance for muscle trimming must be left around the lip, cheek and tongue tendons.

The borders of the tray are trimmed so as not to extend quite as far as the final periphery of the finished denture.

In the post dam area the tray should extend 2 mm beyond the subsequent finish line of the denture.

The borders of custom trays should have a uniform thickness of about 2 mm.



Fig. 1: Upper and lower custom trays on primary models.

5.1.2 Impression tray handle

Impression tray handles must provide lip support during impression taking but must not hinder lip and tongue function.

Handles must be designed symmetrically and serve as a locating guide for the dentist to correctly position the tray in the mouth. The handle



Fig. 2: Oral view of impression tray handle.



Fig. 3: Labial view of impression tray handle.

must be grippable so that the impression can be easily removed from the patients mouth.

The lip and cheek tendons are exposed in such a way that they are not distorted by the impression tray (see Fig. 5 + Fig. 6).

During the secondary impression taking procedure the periphery of the tray is lined with a thermoplastic reversible but rigid material (Compound/greenstick). This facilitates the muscle trimming procedure and is the first stage in establishing the peripheral seal. This muscle trim-

ming is progressively carried out until the entire periphery is completed. Finally the impression material is added to the tray and the final impression is obtained. This final periphery must be maintained throughout the remaining denture construction procedures as it provides the seal for the suction which is essential for retention of the denture.

5.2 Bite registration rims (bite blocks)

Bite blocks are necessary for the dentist to establish the upper and lower centric relationship. Preferably they should be made of an acrylic base with attached wax rims. The wax should be of a firm consistency.

It is also possible to use a wax instead of an acrylic base but this is recommend against as a rigid, well fitting base of acrylic provides much greater stability and also significantly more control for this most important procedure.

The peripheral border is most important. It must not be over extended nor have any sharp edges. The wax bite rim should be positioned on the centre of the alveola ridge. The occlusal plane runs parallel with the upper alveola ridge. The same progression is limited in the lower by the upper third of the retromolar triangles.

In both upper and lower anterior areas both bite blocks can be bulked out by the dentist to obtain the desired degree of lip support.

The height of the individual bite rims – measured from the mucolabial fold – is reduced to obtain a measurement of, 20 – 22 mm for the upper and 18 – 20 mm for the lower.

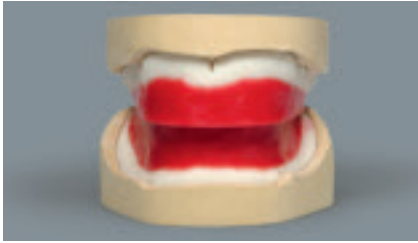


Fig. 4: Labial view of upper and lower bite blocks.



Fig. 5: Upper base plate.

Research has demonstrated that these are the upper limits. Dentists generally prefer to remove rather than have to add wax.

The most important points are as follows:

- The anterior regions of bite rims are not bulky and allow for maximum tongue space.
- The design of the bite block periphery must accommodate the functional muscles. Tendons and muscle attachments must be exposed.
- The labial and buccal extensions should correspond with that of the finished dentures. The width of the wax rims should be about 6 mm in the bicuspid areas and about 8 mm in the molar areas.
- The wax rims should be positioned on the centre of the alveola ridge. An exception can be made in the upper anterior region where the wax rim is positioned to accommodate aesthetic considerations. The bite rim can be more towards the anterior to provide lip support corresponding with the anterior tooth setup.
- The incisal edge of the upper centrals should be situated approx 7 mm anterior of the incisal papilla (see Fig. 8).



Fig. 6: Lower base plate.



Fig. 7: Buccal view of upper and lower bite blocks.



Fig. 8: Upper bite block.



Fig. 9: Lower base plate with wax bite rim.

- The height of the upper wax rim should be approx 20 – 22 mm measured from the mucolabial fold in the area of the lip tendon, to the upper limit of the wax rim.
- The height of the lower wax rim should be approx 18 mm measured from the mucolabial fold, in the area of the lip tendon, to the upper limit of the wax rim. The distal height of the upper and lower can be adjusted by softening of the bite rim with a rim former.
- The distal height should correspond with the upper third of the retromolar triangle.
- The flattened wax surface of the upper and lower bite rims should fit neatly together.
- The total height of the bite blocks should not exceed 40 mm.

Final countouring of the bite rims is usually carried out by the dentist in the patients mouth.

The dentist aligns the occlusal plane to the pupil line and Camper's plane using the bite fork. He also builds up the buccal area with wax until optimum cheek contact is reached.

All such information is required by the dental technician and can be recorded by means of a plaster or silicone key. This enables continuous checking during the setup as to whether cheek contact according to the wax bite record is correct or otherwise.

Dentist markings on the bite registration block.

Midline, middle of face

This line is not necessarily identical to the upper and lower lip tendons or the midline of the model.

Canine line

This determines the width of the upper anteriors, also where the tips of the canines are to be positioned. Also, their positioning can be determined on the basis of the corners of the mouth or a vertical extension of the outer nasal wings.

Smile line

This is decisive for the length of the upper anteriors. The tooth necks should normally be above this line.

Occlusal plane

It follows the upper edge of the lower wax bite rim, i.e.: between the lower incisal edges in the anterior area and the distobuccal cusps of the lower second molar. It intersects the midline which is the fix point for the incisal pin, and runs parallel with Camper's plane.

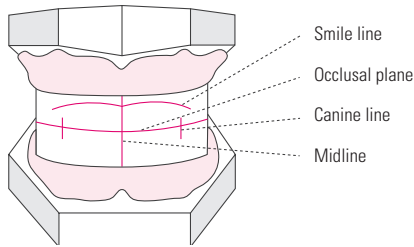


Fig. 10: Dentist's markings on the models and bite rims.



Fig. 12: Lower stone model.

5.3 Model fabrication

For full denture secondary models we use a class 1V hard stone. In a case with severe undercuts in the alveola ridge, a class 111 hard stone can be used. Regardless, it is essential that the functional periphery area of the models remain intact.

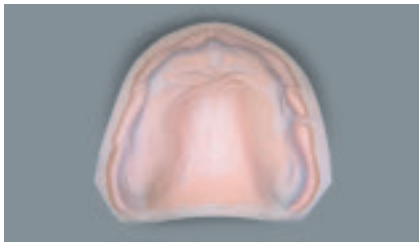


Fig. 11: Upper stone model.

For this purpose we attach a strip of adhesive wax to protect the peripheral area.

In order to maintain the stone's physical properties, it must be mixed under vacuum in the prescribed water powder ratio. The pouring of the model must be bubble free.

The functional periphery area shows:

In the upper:

- The mucolabial fold
- The alveolar ridge with the areas of the maxillary tuberosities and palate
- The transition from hard to soft palate and (post dam area)
- The lip and cheek tendons

Lower:

- The alveolar ridge with the areas of the retro-molar triangle
- The mucolabial fold and sublingual areas
- The muscle and tendon insertions of the tongue and cheek musculature
- The lip and cheek tendons

When manufacturing the functional models, it is essential to ensure that the functional margins remain completely intact. This is because the functional margins form the valve borders (marginal seal) of the area in which a suction effect between the denture basis and the oral mucosa is created.

5.4 Mounting of models in the articulator

Correct determination of the centric relationship of the upper and lower arch is essential for the functional success of complete dentures.

It is the method for the three dimensional determination of the positional relationship of upper and lower arches. It is achieved by means of the bite blocks and the resulting bite records.

For this purpose, the condylar joints should be in their cranial and not their laterally shifted positions in the articulator fossae.

A distinction is made between:

1. The relationship of the lower to the upper (maxillomandibular relationship)

This refers to the definition of the transversal and sagittal relationship.

The vertical dimension (occlusal height) is generally 2 – 5 mm less than the interocclusal distance between the upper and lower. The transversal and sagittal relationship is determined with the aid of a gothic arch or by manual bite taking.

2. Position with reference to a cranial plane

Correct determination of the upper and lower arch relationship is essential for the mounting of the models on the articulator with reference to a cranial plane. The cranial orientation of both upper and lower models is transferred to the articulator by means of a face bow. If a face bow reading has not been taken, an elastic band can be used to represent the Camper's line and Bonwill triangle for the purpose of mounting of the models. For this purpose the den-

tist must first intraorally align the wax bite rims to the Camper's line.

5.5 The vertical dimension

The vertical dimension is determined chairside by the dentist. Any modification to this dimension can have significant consequences. If in any doubt however, it is preferable to reduce the vertical dimension rather than increase it.

The vertical dimension naturally has a great influence on the function and the Freeway Space of the prostheses.

A patient with Angle Class 2/Division II occlusion will certainly require more Freeway Space than a patient with Angle Class 1. In figures, the approximate values for the speaking distance (e.g. for the pronunciation of „s“ sounds) is as follows:

Overbite: 2 – 3 mm

Edge-to-edge bite: 1 mm

Cover-bite: 4 mm

Notes



