
Setup and function

12

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12.1 Setup concepts

Generally accepted principles.

When setting up posterior teeth stability of the denture is a major goal applicable to all denture prosthetics. This should be kept in mind when addressing and overcoming the range of clinical difficulties encountered daily in denture construction.

Regardless of which concept is to be used, correctly determined centric relation is an essential and fundamental base from which to begin the work. The only possible exception may be when using teeth with zero degree cusps.

It makes no sense to try to conform to a single theoretical concept at any price without being aware of the practical consequences. This means that the suitability of a particular concept must be determined for each particular case.

Three concepts are described in the following and which can be utilized in virtually all cases.

12.1.1 Lingualised occlusion

VITA MFT®

The principle of lingualised setup.

In lingualised occlusion the lingual working cusps of the upper posterior teeth occlude into the central fossae of the lower posteriors.

The buccal cusps are out of contact. The lower posteriors are setup according to the alveolar ridge and curve of spee in order to obtain denture stability. Their occlusal surfaces appear horizontally aligned from a labial perspective.

The upper and lower posteriors are brought into contact in such a way that they articulate anatomically and functionally. Note: there is always a free space left between the upper and lower buccal cusps.

VITA MFT teeth are generally setup in a tooth to tooth relationship. Should it be necessary for some reason to set the teeth in a tooth - to - two - teeth relationship this is quite acceptable.

Advantages of lingualised occlusion.

The aim of lingualised occlusion is to stabilise the dentures while providing maximum space for the tongue.

The occlusal forces transferred to the oral mucosa and the underlying bone substance are thereby minimised.

This generally reduces the strain on the denture bearing area and can be an essential ingredient in the survival of implant cases.



Fig. 1

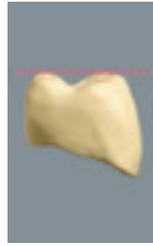


Fig. 2

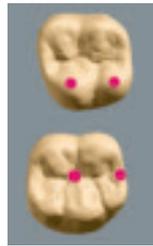
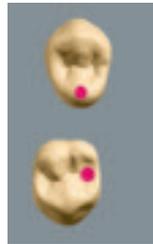


Fig. 3



Procedure:

1. Setup beginning with the first upper molar

Please note: with lingualised occlusion, the lower posteriors are setup vertically, i.e. are not lingually inclined (Fig. 1). The dominant mesio-lingual cusp of the first upper molar bites into

the fossa of the first lower molar (Fig. 2). The distolingual cusps come into contact with the distal marginal ridge of the first lower molar. The second upper premolar is then brought into contact with its antagonist. The palatal cusps of the latter should come into contact with the fossa of the second lower premolar (Fig. 3).



Fig. 4

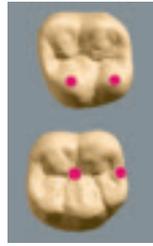


Fig. 5

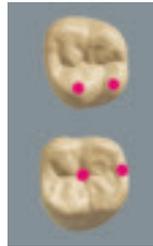


Fig. 6



The palatal cusp of the first upper premolar should now bite into the fossa area of the first lower premolar (Fig. 4). Finally, the second upper molar is setup. The palatal cusps grip into the fossa area of the second lower molar (Fig. 5).

The buccal cusps of all upper posteriors are situated slightly higher than, and out of contact with the buccal portions of their antagonists (Fig. 6).



Fig. 7



Fig. 8

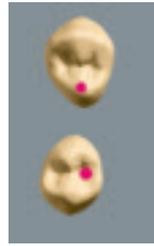


Fig. 9



2. Setup beginning with the first upper premolar. Please note that in lingualised occlusion, the lower posteriors are first setup horizontally, i.e. not lingually inclined (Fig. 7). The lingual cusp of the first upper premolar should now bite into the

fossa area of the first lower premolar (Fig. 8). The second upper premolar is then brought into contact with its antagonist. The lingual cusp of the latter should grip into the fossa of the second lower premolar only (Fig. 9).



Fig. 10

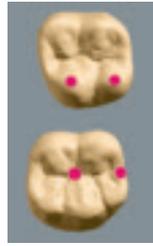


Fig. 11

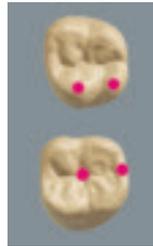


Fig. 12



The dominant palatal cusp of the first upper molar bites into the fossa of the first lower molar. The distolingual cusp meets the distal marginal ridge of the first lower molar (Fig. 10). Finally the second upper molar is setup.

The lingual cusps bite into the fossa area of the second lower molar (Fig. 11). The buccal cusps of all upper posteriors are always situated slightly higher, and out of contact with the buccal portions of the antagonists (Fig. 12).

Contact points

The red dots mark the centric contacts. Except in special cases, no occlusal grinding should be carried out before transferring the wax setup to acrylic resin.

Due to the functional design of their occlusal surfaces, VITA MFT posteriors require only a minimal amount of occlusal adjustment in excursion movements. Where necessary, the excursion movements can be carried out according to the following diagram.

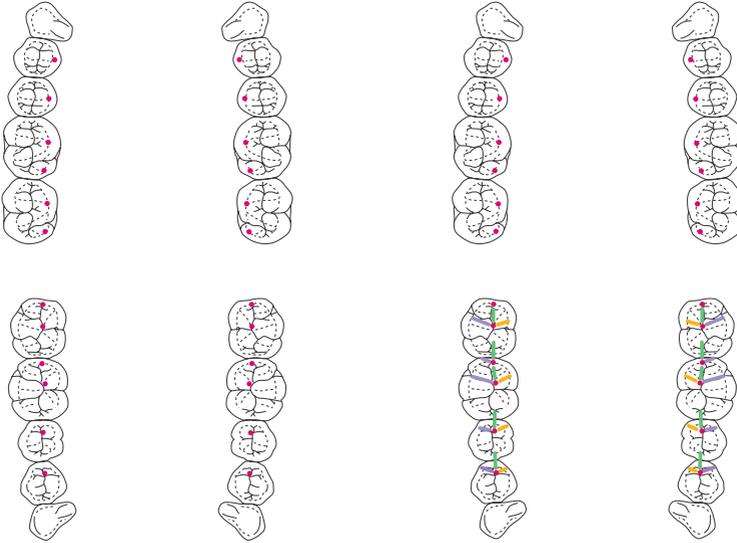


Fig. 13: Lingualised setup – centric contacts.

Fig. 14: The pattern of excursion movements.

Before removing the acrylic resin denture from the model, the articulation and occlusion can be perfected by grinding where necessary in the areas of the lower fossae and the cuspal ridges.

- Centric relation
- Protrusion
- Laterotrusion / working side
- Mediotrusion / balancing side

12.1.2 Anterior-canine guidance with ABC contacts

Dr Karl Hildebrandt, one of the founders of VITA in the early 1920's, was somewhat of a visionary and some say, ahead of his time. Dr Hildebrandt concluded that a "normal" bite is driven by neuromuscular guidance rather than tooth guided movements as was thought to be the case at the time.

When constructing full dentures for edentulous patients the clinician is presented with a series of problems which must be overcome if stable, comfortable and functional dentures are to result.

Two of the most common problems to overcome are divergent atrophy of both maxilla and mandible and the fact that the lower denture sits partially on a sloping incline (see section 1.8 / bone / arch atrophy).

This situation is not as nature intended and the reason the patient is in need of a "replacement." All the various forces acting on the dentures, particularly those occurring during masticatory movements, must be balanced out against one another.

This does not mean grinding the occlusion in order to obtain excursion movements but, as it were, "entry lanes", with corresponding canine guidance which culminate in group guidance. The dentures can therefore be returned to centric position from every dislocated position simply by clenching the teeth together.

Necessary posterior antagonist contacts to achieve occlusal stability.

Contacts with the opposing teeth (antagonist contacts) are generally classified into three types of positional relationships:

„A“ contacts:

Buccal cusps – upper and lower contacts. The shearing (non working) cusps of the upper teeth are in contact with the working cusps of the lower teeth (Fig. 15).

„B“ contacts:

Lower buccal cusps contact with lingual cusps of the upper. The working cusps of upper and lower are in contact (Fig. 15).

„C“ contacts:

Upper and lower lingual cusp contacts. The working cusps of the uppers and the shearing (non working) cusps of the lowers are in contact. As a rule, either A and B, or C and B contacts are sufficient. They provide stable occlusal and axial loading of the teeth.

A, B and C contacts can be present at the same time and this is fine. What is important is their uniform distribution.

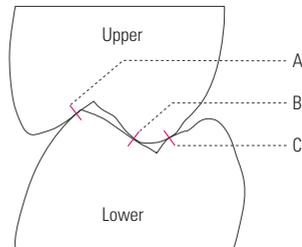


Fig. 15

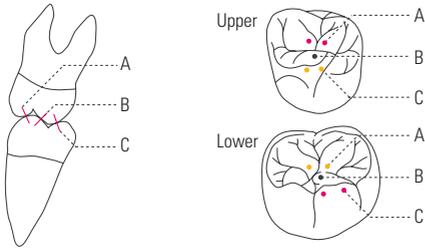


Fig. 16

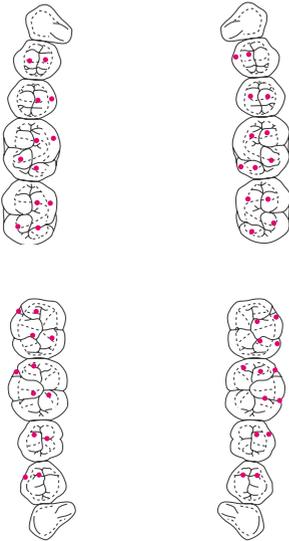


Fig. 17: Individual distribution of the ABC contacts.

In order to stabilise both the mandibular and the maxillary dentures, an A contact and a B contact, or a B contact and a C contact are required (see Fig. 16).

12.1.3 Setup according to generally accepted principles with buccal contacts

After the anterior teeth have been setup taking the sagittal overbite (overjet) into account as described in chapter 10.2, the posterior teeth can be set in position.

The following applies to the setup of all lower posteriors:

- They are generally positioned on the centre of the alveolar ridge.
- The central fissures should be in a straight line which runs between the tips of the canines and the centre of the retromolar triangle.
- The buccal cusps are situated on the tangent of the Bonwill circle, which reaches from the buccal limit of the first premolar to the buccal limit of the retromolar triangle.
- The lingual cusp tips are situated on Pound's line.
- The posteriors lingually inclined => tooth inclination increasingly towards the distal. (axial inclination of tooth crown towards the lingual in relation to axial inclination of tooth root, a characteristic of mandibular teeth).

The following applies to setting of the upper posteriors:

- If possible, they are positioned on the centre of the alveolar ridge.
- The central fissures are situated on an elliptical connection line between the tips of the canines and the tubera maxillae.
- Viewed from in front, less and less of the buccal surface can be seen from the first premolar to the second molar; this gives rise to the „buccal corridor“.
- They are buccally inclined.
- The first lower premolar is setup. The buccal cusp tips touch the occlusal plane.

- The second premolar is set. It is situated approx. 1 – 1.5 mm below the occlusal plane.
- The first lower molar must be setup in the area of the lowest point of the alveolar ridge. Taking into account the sagittal and transversal compensation curves.
- The buccal cusps tips are approx. 2 mm below the occlusal plane, rising towards the distal. If there is no danger of proglissement (lower denture forward displacement), the second lower molar can also be setup. Otherwise the sagittal progression of the curve in the area of the first molar should be compensated, i.e. distally raised.
- The first upper molar is brought into optimum intercuspation. Subsequently the second upper premolar and then the first upper premolar are inserted into the available space.
- If, as previously described, it is possible to set the second lower molar, the upper antagonists can then be added, and brought into intercuspation.

In the lower, the distobuccal cusps of the second molars touch the occlusal plane. If space is limited, premolars can be substituted instead. What is important ultimately is that no more teeth are not beyond the setup limit, i.e. no teeth are setup into the steep upward slope of the mandibular ramus – otherwise there is a risk of proglissement (lower denture forward displacement)!

In order to achieve a balanced occlusion, proceed as described in chapter 14.3.3.

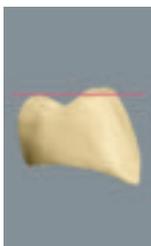


Fig. 17: Mesial view of setup.

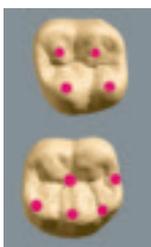


Fig. 18: Lingual view of setup.

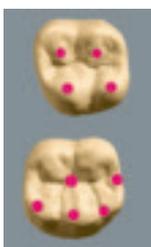


Fig. 19: Mesial view of setup.

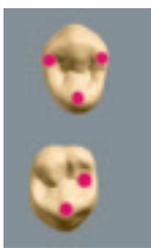


Fig. 20: Lingual view of setup.

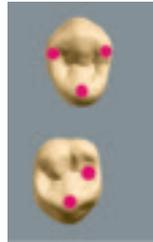


Fig. 21: Buccal view of second upper premolar and first upper molar.

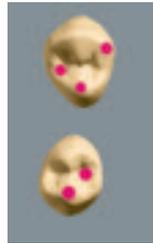


Fig. 22: Lingual view of first and second upper premolar and first molar ...

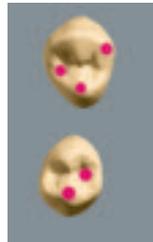


Fig. 23: ... and the buccal view.



Fig. 24: Lingual view of setup.

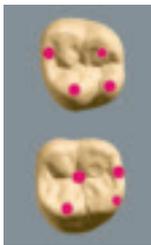


Fig. 25: Buccal view of setup.

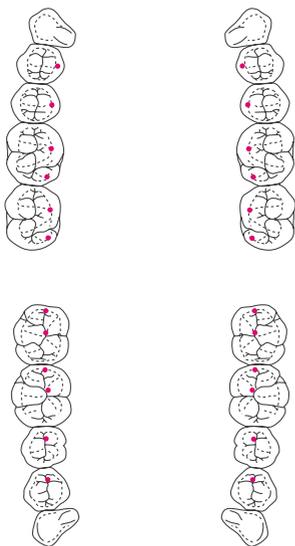


Fig. 26: Setup with buccal contacts according to generally accepted principles.

12.2 Important characteristics

12.2.1 Cheek contact

What is the purpose of cheek contact, and why is it so important?

In order to have the patient feel that their dentures are stable and comfortable it is necessary that the posterior teeth have contact with the cheeks.

It is also of key importance that the posteriors are positioned correctly on bone supported mucosa, preferably on the alveola ridge. (This is not always possible.) What remains important however is, osseous support of the mucosa.

The dentist should build out the wax flanges, until cheek contact is achieved. This assists in stabilising the wax up to some degree by having cheek contact on both left and right sides. It also contributes to centric stability.

Additionally, during mastication, the food bolus is automatically maintained on the posterior occlusal table until it is ready to be conveyed further. Without cheek contact the denture is less stable and the food bolus will accumulate between the cheek and denture which subsequently requires removal with the tongue or the finger.

The importance and function of cheek contact is commonly underestimated.

12.2.2 Different types of bite

In order to produce functionally stable dentures, the skeletal and dental parameters of each case must be considered. Such information must be accounted for in the planning and implementation of complete dentures.

For example, an unfavourable progression of bone atrophy makes it more difficult to produce a denture that is positionally stable under masticatory pressure.

By selecting the appropriate type of bite, denture stability problems caused by difficult skeletal conditions or unfavourable progression of bone atrophy can be overcome.

12.2.3 Normal bite

Whenever possible teeth should be setup in a normal bite, but not at any price!

If unfavourable interalveolar conditions presents, a cross bite or edge to edge bite is used, particularly in regard to partial dentures.

12.2.4 Crossbite

As already described in section 7 on model analysis, when the inter – alveola connection line has an angle of less than 80 degrees, the teeth are set in a cross bite in order to avoid or minimise problems of instability.

To this purpose the maxillary buccal cusps (i.e.; the shearing non working cusps) become working cusps which bite into the fossa of the lower posteriors. As a rule, the first premolar is set in neutral occlusion, then the second premolar is set in an edge to edge bite. (to this purpose the cusps must be ground) This is followed by the first or second molar which is set in a cross bite position.

12.2.5 Edge to edge bite

An edge to edge bite is normally not used in the posterior of a setup. An exception can be a “transitional tooth” such as a second premolar in a cross bite, which has been ground into an edge to edge bite relationship (refer section 12. 2. 3).

It is also possible to achieve an edge to edge bite with posteriors that have a flat occlusal table and without a definite centric position. This is not recommended however as the patient may experience a tendency towards “cheek biting”. In this circumstance a cross bite or a normal bite is usually possible.

Partial dentures can also present an exception to this but, depending on the particular situation a suitable compromise can be found.

Edge to edge bite relationships are most commonly found in the anterior region.

12.3 Vertical dimension / occlusal height

Determination of the vertical dimension is not a simple matter.

When the vertical dimension has not been determined correctly the patient’s dentures may cause a clackety – clacking sound when speaking. This is usually more pronounced with ceramic teeth than with acrylic teeth. The ceramic however is not the cause of the sound but rather an incorrectly set vertical dimension. In years past, instead of correcting the vertical dimension the ceramic teeth were sometimes replaced with acrylic teeth. This resulted in a lower volume of the sound but did not eliminate the cause. It was commonly thought by the general public that “crockery teeth” as they were known were the cause of the problem!

On the other hand, if the vertical dimension is insufficient, the effect will be less pronounced but the aesthetics will be poor. It is essential the vertical dimension be correct.

