

VITA PHYSIODENS®

Setup guide according to the concept of BIO-Logical Prosthetics (BLP)



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The setup of complete dentures with
VITA PHYSIODENS anteriors and posteriors
following the concept of BIO-Logical Prosthetics (BLP)

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**Setup following nature's example,
according to the principles of physiological occlusion**

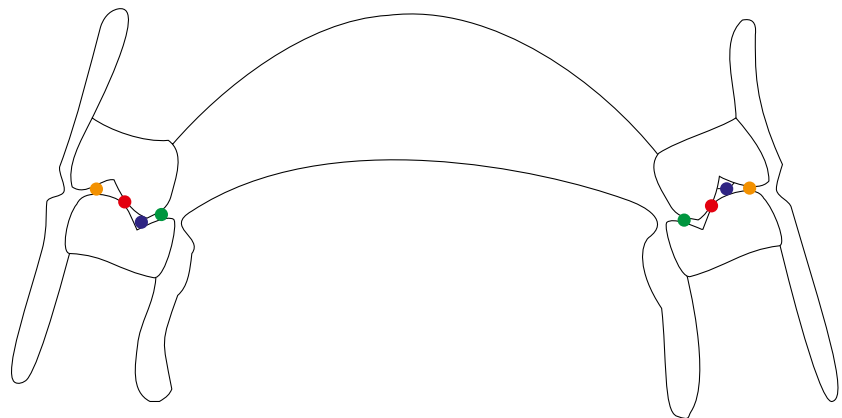
Physiological occlusion is the underlying principle of the static and dynamic occlusion of natural, intact healthy dentition. This universally applicable occlusion concept works for the entire prosthodontics sector, including restorations for dentate patients, implant-borne restorations, removable partial and complete denture prosthetics, as well as a wide range of combinations of these.

In natural dentition we find:

- no maximum multi-point contact and no tripodization of all supporting cusps in strict interdigitation, according to gnathological concepts
- no point-area contacts in long centric or freedom in centric
- no lingualized occlusion
- no generalized ABC contacts
- and no other system of contact points following a theoretical concept

**With physiological points of contact
with six characteristic features, we find:**

1. Virtually homogeneous and simultaneous points of contact in a characteristic distribution, which vary from tooth to tooth and patient to patient
2. On average, 10 contacts per quadrant, ranging from six to 14 points
3. The contact points are situated at different heights, mainly on the inner slopes of the working cusps.
4. There are fewer marginal ridge contacts.
5. There are fewer contacts on the inner slopes of the non-working cusps.
6. On average, the anterior teeth have five light touch contacts.

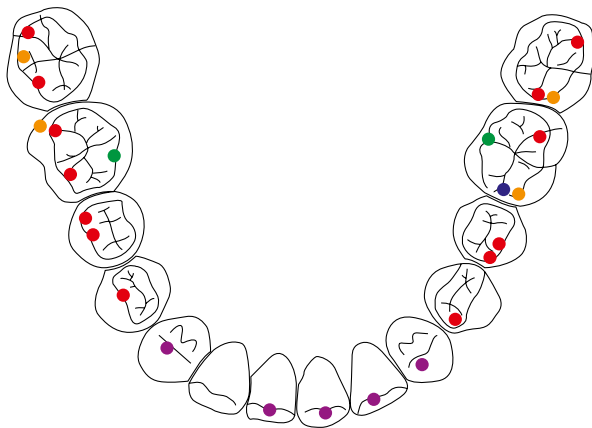
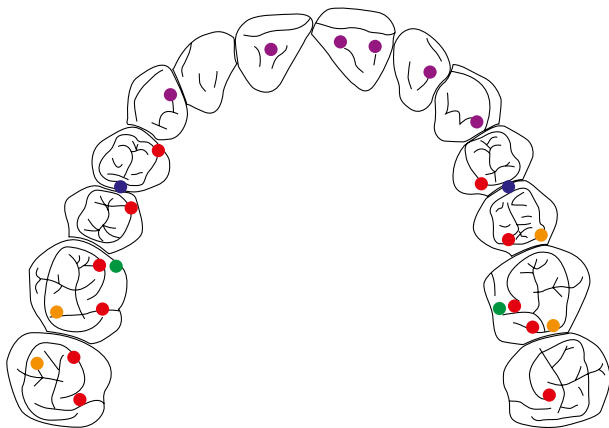


● = Working contacts

● = Oral non-working contacts

● = Vestibular non-working contacts

● = Marginal ridge contacts



Characteristic intra- and interindividual variation in contact points

- The first premolars have 1 to 2 contacts
- The second premolars have 1 to 2 contacts
- The first molars have 3 to 4 contacts
- The second molars have 2 to 3 contacts
- On average five contact points are found on anterior teeth

- no tripodized multi-point contacts
- no point-area contacts
- no maximum multi-point contacts



Fig. 1: The lower jaw of an 18-year-old patient



Fig. 2: The upper jaw of a 20-year-old patient



Fig. 3: The lower jaw of a 30-year-old patient



Fig. 4: The lower jaw of a 40-year-old patient



Fig. 5: The upper jaw of a 50-year-old patient



Fig. 6: The upper jaw of a 60-year-old patient



Fig. 7: The upper jaw of a 70-year-old patient

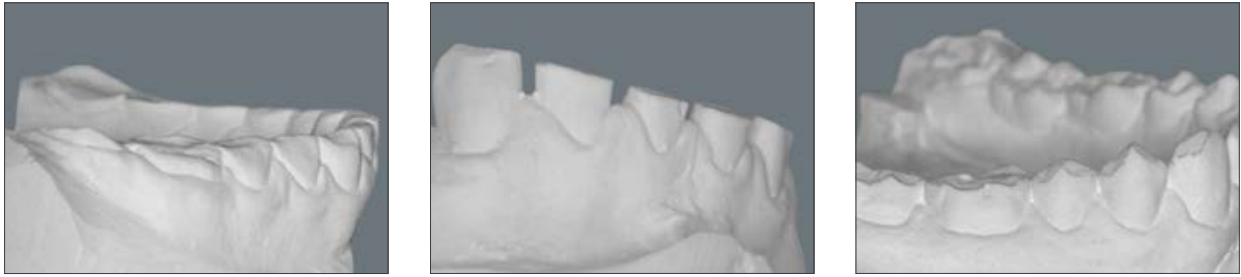


Fig. 8: The upper jaw of an 80-year-old patient

Chewing, swallowing, speech, laughter, yawning and all mimetic movements (i.e., all physiological movements of the mandible do not lead to the loss of tooth morphology). This has been shown by intact dentitions of subjects of all ages from youth to old age. Physiologically speaking, tooth morphology is conserved to enable the teeth to fulfil their function.

The physiological movements of the mandible are not initiated by the teeth and temporomandibular joints, but are guided neuromuscularly, consciously or unconsciously, by the central nervous system.

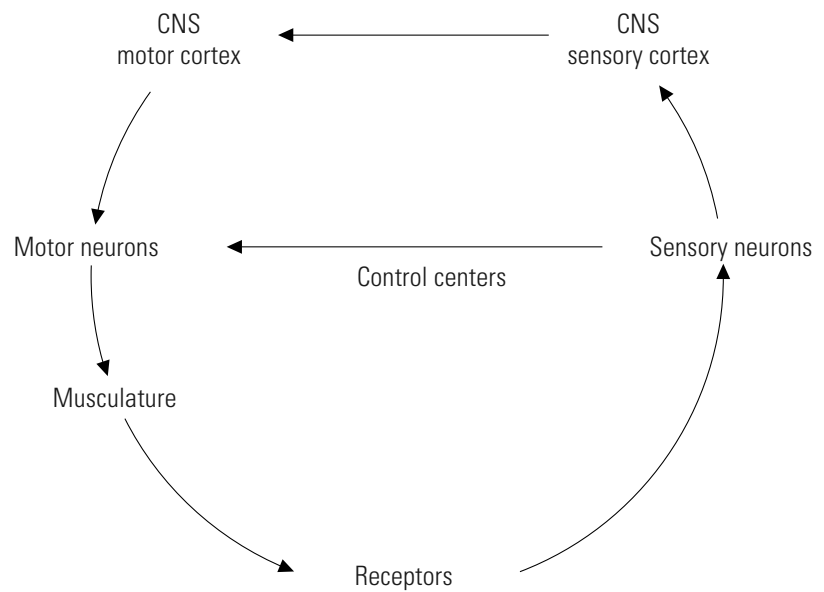
The conservation of tooth morphology is a result of the physiological functioning, which takes place out of tooth contact. The converse is also true: The proper functioning of physiological procedures is possible only under conservation of all morphological structures involved.



Movements of the mandible under tooth contact lead to loss of tooth substance.

All movements of the mandible under tooth contact are unphysiological movements.

Like the physiological movements of the mandible, these too are controlled by the central nervous system and are neuromuscularly guided. In the case of bruxism, these can impair tooth morphology and lead to partial or complete abrasion.



The cybernetically controlled regulatory mechanisms of our masticatory system are designed for the preservation of the structures involved. The occurrence of dysfunctional factors results in unphysiological loading of the other partners in this system. This leads to pathological developments in certain individual structures, or in various participating structures.

BIO-Logical Prosthetics is the only setup system based on nature's own occlusion concept.

This system, which has evolved over many years, has been proven and established for its excellence.

The static and dynamic occlusion of the human masticatory system is unique. Although they vary individually, the masticatory movements depend on the food consistency, and vary from patient to patient. The basic movement cycle, however, always exhibits the same characteristic pattern. The chewing pattern is acquired during childhood, is cortically stored, represented and monitored, and remains retrievable on a permanent basis. For this reason, it does not matter whether the patient has his/her natural dentition, fillings, crowns or bridges, a combination of fixed and removable restorations, implant-borne dentures or is a complete denture wearer.

Humans are vertical chewers, who shear and crush the food in the final phase of the chewing cycle, shortly before contact occurs. In the opening phase, the mandible is moved downwards, and almost perpendicularly by 14 to 18 mm on average. Tracing a droplet-shaped curve, it now begins the closing movement at approximately 4 to 6mm towards the working side. The conclusion of the masticatory movement and of swallowing takes place with extraordinary precision, in a three-dimensional functional space of approximately 1 mm. The mandible naturally, reaches this space only when the food consistency has become sufficiently thin for the teeth rows to be approximately 1 mm apart. The masticatory movement typically ends shortly before contact occurs, but also during swallowing with contact. The energy potentials of the closing musculature occur at the end of the closing movement in a rest phase lasting approximately 108 milliseconds, and then, with the aid of the levator muscles, begins a new cycle of mastication following the same pattern. Contact is mostly avoided. The teeth operate with virtually no contact. However, when contact occurs, it does so only within this functional space of approximately 1 mm, and for a duration of only 120 milliseconds during chewing, and one second during swallowing. This functional space of approximately 1 mm is the physiological centric position, which in a fully functioning mastication system, corresponds to habitual intercuspatation.

The physiological movements of the mandible are not guided by the teeth and the temporomandibular joints, but are controlled entirely neuromuscularly, consciously or unconsciously by the central nervous system. They do not - and cannot - take place under tooth contact, either in a spatial or a temporal sense. No tooth guidance, whether anterior/canine or group guidance, and no bilateral balancing occurs during physiological movements of the mandible.

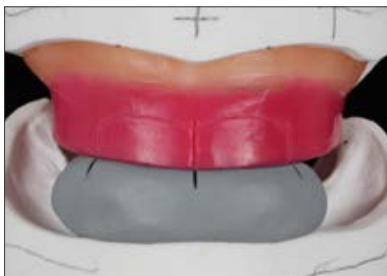
Lost tooth substance must be restored in terms of the shape, the size, the position, the function and the quality, according to nature's example.

VITA PHYSIODENS® and BLP fulfil these requirements.



The dentist has now modeled the anterior area of the upper bite rim, according to esthetic and phonetic requirements (Chapter 4.1.6. on the BLP DVD).

The anterior teeth must be positioned in the space formerly occupied by the patient's natural teeth. They are not set up in accordance with static criteria.



The anatomical situation is best transferred to the model using an anterior key (Chapter 4.1.9 on the BLP DVD). The indentations made by the wax rim on the anterior key give the dental technician the precise position of the upper anteriors. They are mostly positioned, following the atrophy of the upper jaw, in front of the alveolar ridge with their labial surfaces above the vestibule.



The central incisors and the canines touch the occlusal plane in the upper jaw. The occlusal plane runs parallel to Camper's line and the bipupillary line. When mounted in an average-value articulator, it also runs parallel to the workbench plane.



The anterior teeth are not set up with the intention of achieving tooth guidance, whether with anterior/canine guidance, unilateral group guidance or bilaterally balanced tooth contacts.

No tooth-guided excursion movements occur anywhere in the entire setup.

The concept of BIO-Logical Prosthetics states that all movements which occur under tooth contact are unphysiological.



To ensure a natural appearance of the anterior setup, the following points should be observed:

Looking at the setup from the anterior view, the axes of the central incisors are upright, those of the lateral incisors cervically are laterally inclined, those of the canines are once again, more upright, and the tooth necks more vestibularly inclined.



Seen from the lateral view, the labial surface of the central incisors should be positioned as uprightly as possible. As seen from the occlusal viewpoint, the dental arch should show a harmonious contour shaped like the vertex of an ellipse.

The anterior key depicts the vertical and sagittal position of the anterior teeth (Chapter 4.2. on the BLP DVD).



The central incisors are the dominant teeth. The lateral incisors can be set up more individually. These are positioned individually at a distance of approximately 1 mm above the occlusal plane. The canines are positioned on the cuspid line markings. Only the mesial facet of the canine should be visible from the anterior view. The distal facet forms the beginning of the buccal corridor.



The correct setup of the anterior teeth is the key to the successful setup of all teeth.



The lower anterior teeth to match the upper anterior teeth can be found in the VITA PHYSIODENS mould chart.



The lower anteriors are positioned more on the alveolar ridge, or slightly anteriorly of it, since the alveolar ridge does not atrophy much in this area sagittally. Their labial surfaces are positioned as far above the vestibule as possible. The teeth are positioned correctly in this area also with regard to esthetics and function (Chapter 4.3 on the BLP DVD).



The incisal edges of the central and lateral incisors are usually situated more labially than the tooth necks. Looking at the setup from the labial view, the lower incisors are completely upright. The mandibular teeth are positioned between the upper lateral incisor and canine. Their tooth necks are more labially inclined, the tooth axes perpendicular, or more mesially and lingually inclined. Only the mesial facet of the canine should be visible from the anterior view. Its distal facet, as in the upper jaw, forms a transition to the labial surfaces of the posteriors.



It contradicts physiological, dynamic occlusion to postulate a horizontal and vertical shoulder of 1 - 3 mm for the purpose of bilateral or unilateral balancing, or anterior positioning in order to achieve anterior guidance.



The vertical overbite results from the occlusal plane, which runs approximately through the centre of the retromolar triangle parallel to Camper's line and the bipupillary line to the incisal edges of the lower anteriors. The edges of the incisors and the tips of the canines reach this occlusal plane, as in natural dentition. They may be slightly below, or slightly above the occlusal plane, depending on individual variations.

It is helpful to set up the lower anteriors out of contact in the wax setup. This gives the necessary scope to the dental technician after polymerization, and to the dentist for the seating of the prosthesis to achieve the goal of BLP, i.e., light contacts in the anterior area.

The incisal edges of the lower anterior teeth must be set up in harmony to the incisal edges of the upper anterior teeth. This also makes them parallel to the bipupillary line.



The selection of the posterior tooth moulds, as in the case of the anterior teeth, can be selected from the VITA PHYSIODENS mould chart.

For physiological, as well as practical reasons, it makes sense, after setting up the anterior teeth, to first set up all the teeth of the lower jaw.

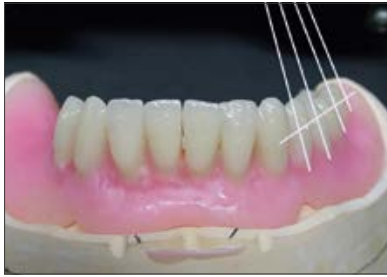
As the mobile component of the mastication system, the mandible must be able, through the position of the teeth, to achieve the correct physical alignment of the masticatory force to the maxilla. In practical terms, this means that the correct setup of the upper jaw results from the physiological setup in the lower jaw.

The functional stability of the prosthesis outside of tooth contact is ensured mainly through the muscular retention of the masticatory, cheek, lip and tongue musculature, and is best when the denture teeth are positioned where the patient's natural teeth once stood, in a muscular balance. Also the oral and vestibular surfaces of the artificial teeth, their size and the artificial alveolar ridge progression must, for the reasons mentioned, correspond to nature.



No tooth contact is possible as long as there is food between the teeth rows. If occlusion takes place during mastication, it only does so in physiological occlusion within a three-dimensional, functional centric space of approximately 1 mm (see also the BLP DVD Chapter 1.1.2). Occlusal stabilization of the prosthesis takes place solely in the physiological centric position homogeneously and simultaneously with an average of 25 pairs of contacts.

Mould Chart Acrylic teeth (No. 10252E/1)



- All posterior tooth crowns are individually axially inclined towards the centre of the cranium.
- The curve of Wilson results from the lingual inclination of the tooth crowns. The axial inclination of the lower posterior tooth crowns contributes to this orientation.
- The curve of Spee results from the setup of the posteriors, beginning with the first premolar with an increasing distance to the occlusal plane towards the first molar downwards, and once more with a decreasing distance towards the second molar upwards.
- Only the distobuccal cusps of the second molars and the anterior teeth touch the occlusal plane.
- The occlusal plane runs parallel to Camper's line. This line was transferred to the model base after model analysis.
- Looking at the setup from an occlusal viewpoint, the posteriors are set up in harmonious alignment with a parabolic contour. Seen from the anterior view, the labial facets of the premolars and the first molars appear to be set up only to a slight extent in the continuation of the distal facet of the canines in a harmonious contour. The labial facets of the second molars are now no longer visible from the anterior view.
- As in natural dentition, the posterior teeth are situated in the main direction of force which runs from the tip of the canine to the centre of the retromolar triangle. This line was transferred to the model base, according to the model analysis.
- The lingual setup limit of the teeth is given by Pound's line. The position of their non-working cusps does not move outside of the limit given by Pound's line.
- To satisfy the functional requirements in complete denture prosthetics, all posterior teeth must be positioned in a muscular balance, i.e., they must be positioned where the patient's natural teeth once stood.
- All premolar and molar teeth are set up as a rule. The setup limit is the centre of the retromolar triangle, often up to, but not exceeding its upper third. Not only the number and position of the teeth in relation to the neighboring teeth, but also the original size of the teeth is required to achieve a functional equilibrium. With their corporeal forms, VITA PHYSIODENS posteriors fulfil this requirement.

The first lower premolars

- are positioned 1 - 2 mm short of the occlusal plane.
- their labial surfaces are often positioned above the vestibule.
- the vertical axis is upright or very slightly mesially inclined.
- inclined slightly lingually.

The second lower premolars

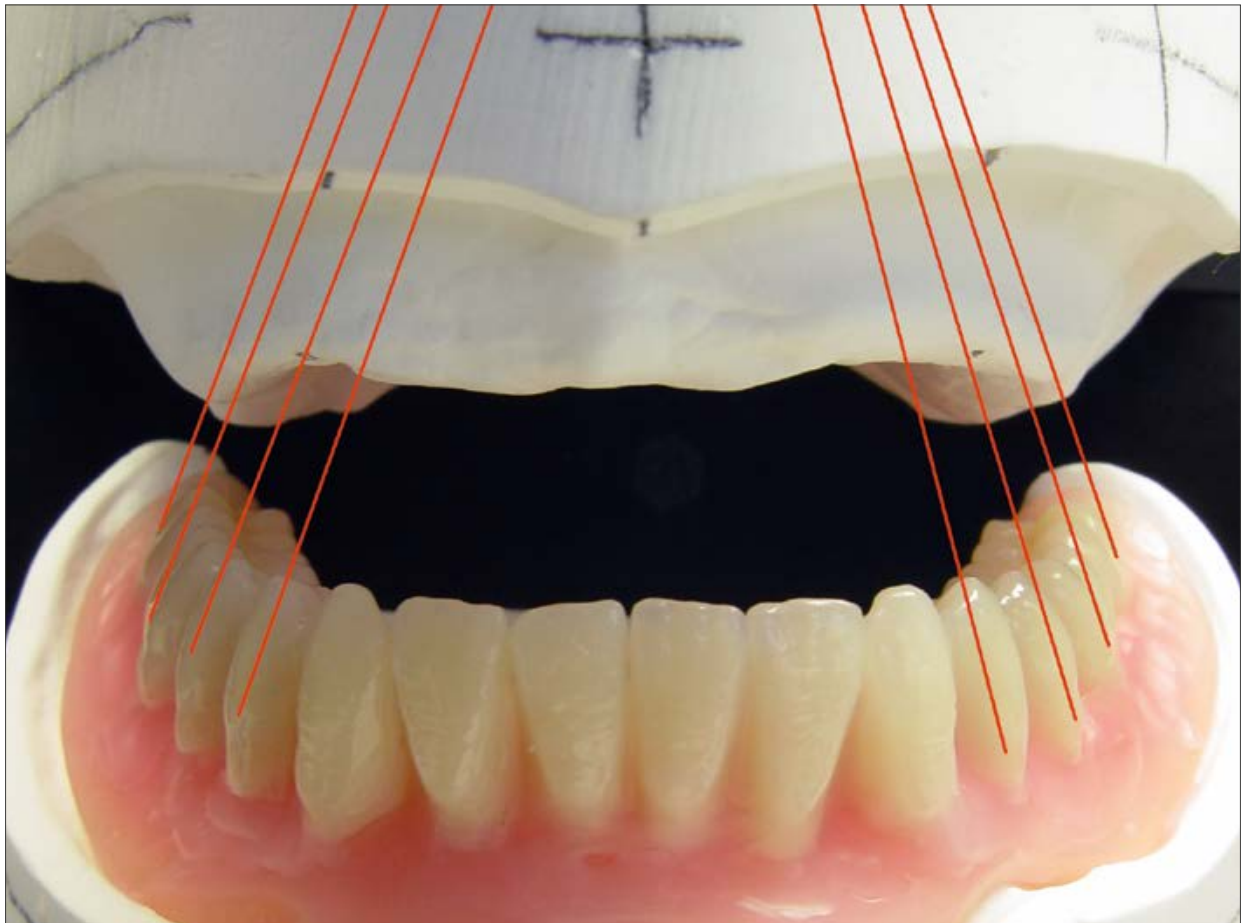
- are positioned a little shorter of the occlusal plane than the first lower premolars.
- their labial surfaces are no longer positioned over the vestibule.
- their central fissures are set on the canine-retromolar line.
- the long axis is rather mesially inclined.
- is lingually inclined.

The first lower molars

- the long axis of the first lower molars is somewhat mesially inclined.
- their occlusal surfaces are orally inclined following the curve of Wilson, and rise distally following the curve of Spee.

The second lower molars

- their distobuccal cusps form the occlusal plane with the incisal edges of the lower anteriors.
- their occlusal surfaces are lingually inclined following the curve of Wilson, and rise distally following the curve of Spee.
- their long axes are mesially inclined.



As in the third quadrant, the posterior teeth of the fourth quadrant are set up without aiming to achieve absolute symmetry (Chapter 4.5 on the BLP DVD).

In dental prosthetics, the crowns cannot be set up, "in isolation," it is always necessary to also think of the artificial teeth as having roots, and to imagine their crown and root axes. The posteriors will no longer be set up with their occlusal surfaces horizontal. The same applies also when modelling crowns.



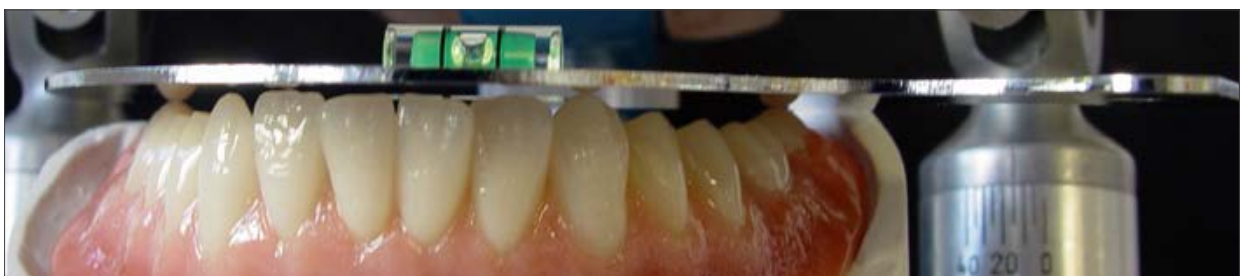
It is often necessary to reduce the basal distal area of the second molar by grinding, as it is situated very close to the retromolar triangle. As much as possible, the lingual and buccal wall of the crown should be kept intact, as the restored alveolar portion provides valuable tongue and cheek support.



This creates conditions similar to natural dentition, and with one to three contact points on the second molars, provides valuable centric stops for stabilizing the denture in the physiological centric position, increases masticatory efficiency and directs the chewed food continuously along the food corridor to the pharynx.



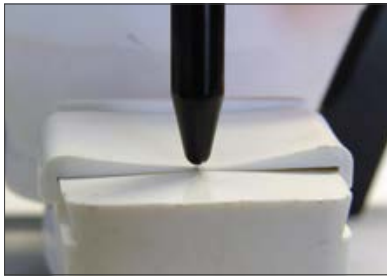
Before setting up the upper posteriors, the correct physiological setup of the mandibular teeth is checked once again: only the anteriors and the distobuccal cusps of the second molars are in contact with the occlusal plane. As with all the principles of physiological occlusion, natural dentitions always exhibit a tendency with individual tolerances, rather than absolute symmetry.





The setup of the upper posteriors begins with **tooth 24**.

It is set up first, in harmony with the dental arch, and only temporarily in contact with the lower jaw. On average it has one to two, and less frequently three contact points. According to this practical method, it is brought into its final position only after the remaining teeth of the second quadrant are set up.



By way of exception, the non-working cusp of the first upper premolar takes two thirds of the tooth crown. The first lower premolar mostly shows only a rudimentary non-working cusp, while the working cusp is strongly pronounced, taking up a good two thirds of the tooth crown. The anatomy of these teeth and the low degree of contact they exhibit, result in the physiologically necessary, high degree of occlusal freedom also found in natural dentition.

The teeth are set up quadrant by quadrant to create a natural occlusal surface relief. Repeated corrections to the setup, which necessitate further grinding to adjust the occlusion, should be avoided.



After the provisional setup of tooth 24, **tooth 26** is set up, if possible, in a neutral interdigitation with reference to the lower tooth 36. When setting up the first molars, the incisal pin should be at a distance of approximately 2 mm from the incisal table.

The setup should remain with the bite open to this degree until all four posteriors have been set up in order to grind in the correct physiological number of contact points in this quadrant after setting up these four teeth. The crown axis is aligned at an oblique angle to the occlusal plane in such a way that the inner slopes of its working cusps come into contact with the inner slopes of the working cusps of its antagonist (Chapter 4. 6. 2. on the BLP DVD).

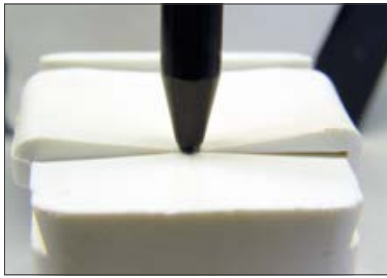


The non-working cusps in the wax setup should remain out of contact before grinding to adjust the occlusion. The first molars have 3 to 5 contacts on average, mainly on the inner slopes of the working cusps at different heights, and centrally on the highest ridges, and fewer marginal ridge contacts and non-working contacts. The interdigitation increases via the second premolars at the first molars, and shows greater occlusal freedom again at the second molars. Teeth should not be set up in a traditional intercuspatation, but only in the optimum physiological, and not in the maximum contact position.



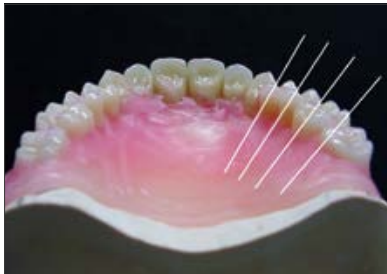
As shown in the the anterior and occlusal view, **tooth 24** is brought into its optimum final position with light working contacts to create a harmonious dental arch.

The **crow axis of tooth 25**, like 24, is aligned perpendicular to the occlusal plane. Here is the setup intended to obtain contact only on the inner slope of the working cusp of the antagonist.



Tooth 27 completes the dental arch with few contacts and even greater occlusal freedom of the teeth row. Like all posteriors, it is set up in relation to its antagonist in such a way that the inner slopes of the working cusps come into contact. The non-working cusps are also not intended to have contact here in the waxup.

After grinding to adjust the occlusion to the physiological centric position, the second molars now have one to three contacts, which are mainly working contacts, but also marginal ridge and non-working contacts. The second molars are often set up in a crossbite or an edge-to-edge bite to obtain a harmonious contour of the dental arch.

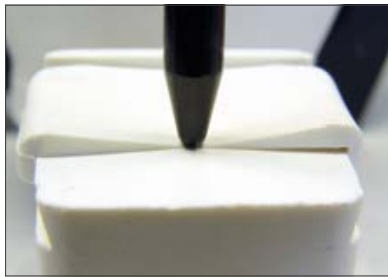


The working contacts of the upper posteriors are aligned to the working contacts of the already correctly positioned lower teeth, resulting in working contacts that create occlusal freedom at the non-working contacts. This results automatically in the helicoidal curve of occlusion and the curves of Spee and Wilson in the upper jaw. These, however, are not compensating curves and are not concerned with occlusal balancing. They correspond to the direction of force of the levator muscles and the axial inclination of the teeth towards the centre of the cranium. They are aligned along these vectors of force for optimum masticatory efficiency and are of key importance for the masticatory function.



As with the second lower molars, likewise the second upper molars must often be ground down to the occlusal surfaces basally and distally, since they are very closely embedded in the tuber. However, the oral and buccal surfaces of the tooth must remain intact here in order to provide the tongue and cheek the necessary support for creating the anatomical and functional (i.e., the biological) equilibrium. This results in conditions similar to those of natural dentition.





Before setting up the first quadrant, the second and third quadrants, which were set up with the incisal pin open by approx. 2 mm, are ground into the physiological centric position (Chapters 4.6.5. on the BLP DVD).

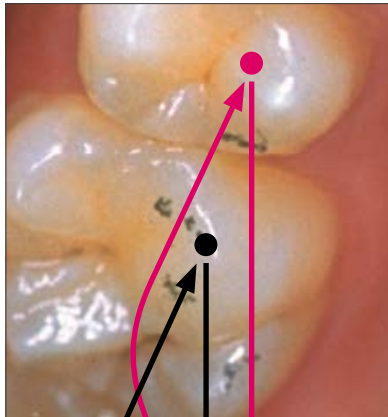


All contact points on the teeth are ground to adjust these anatomically in quality and quantity, until the registered zero position at the incisal pin is reached once more. Grinding is performed in accordance with the characteristic masticatory movements, which show the same basic pattern for both fully dentate patients and denture wearers, and with the six principles of physiological occlusion. The working contacts should be predominant in quantity and quality. Adjustments are made by grinding in the lower and the upper jaw to obtain the required occlusal surface relief. In the vicinity of the centric position, the goal is to perform physiological, virtually vertical masticatory movements. No tooth-guided excursion movements are performed, since these are unphysiological.



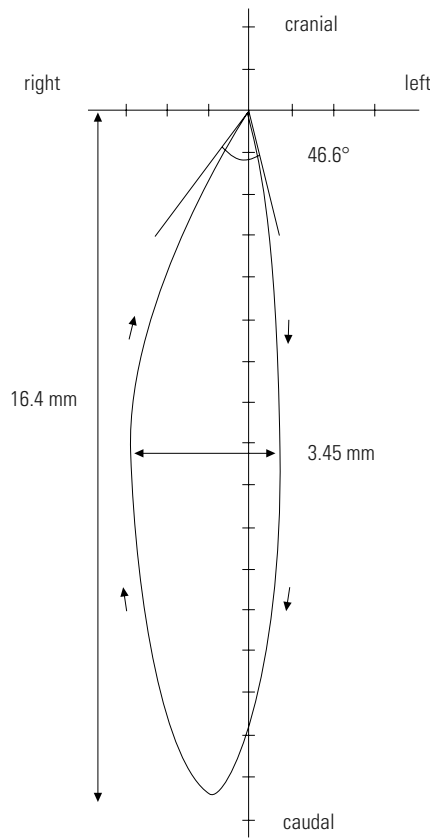
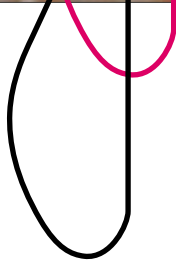


There are one to two, and less frequently three contact points on the premolars. The first molars have three to five contacts. With one to three contacts, the second molars have fewer contacts than the first molars. The first premolars are set up with plenty of occlusal freedom. The intercuspation becomes tighter towards the first molars, and shows more occlusal freedom again afterwards. There are more outer non-working contacts than inner non-working contacts.

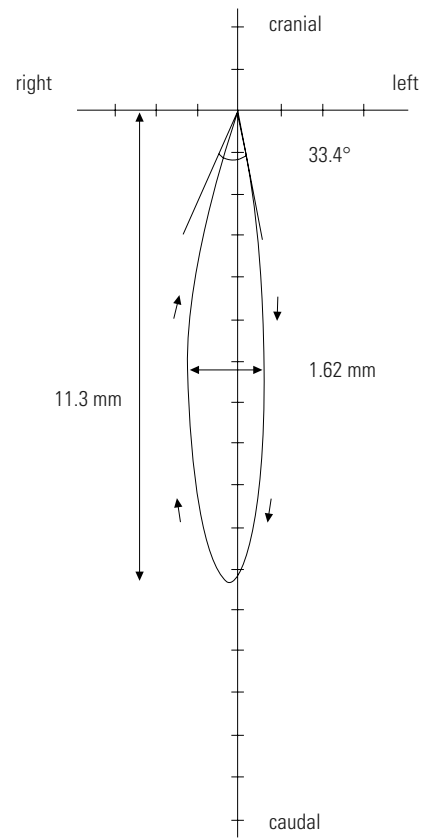


Schematic diagram of a typical act of mastication in the anterior area

This shows the "typical" pattern of an act of mastication characteristic of the frontal plane performed by fully dentate patients and complete denture wearers in comparison.



Dentate patient



Denture wearer



The posterior teeth in the first quadrant are set up in the same way as the second quadrant without aiming to achieve complete symmetry (Chapter 4.7 BLP DVD).



Tooth 14 is set up in contact, at first only provisionally as a point of reference. The incisal pin is opened once again by approximately 2 mm while setting up tooth 16. Then teeth 16, 15 and 17 are set up in the same way as for the second quadrant. Slight unilateral deviations from the completely symmetrical ellipse are possible. Since the upper jaw atrophies centripetally and orally, the posterior teeth are positioned, depending on the atrophy, on the alveolar ridge, or often more vestibularly of this. With this setup, however, the tooth axes are congruent with the tooth axes of the mandibular posteriors in the direction of force of the levator muscles, converging cranially and diverging posteriorly, so that the prosthesis is physiologically loaded in the centric position.



On this side too, no lateral excursion movements are carried in pursuit of -or in order to avoid - tooth guidance or balancing. The physiological centric relation is the only contact position reached during all physiological movements. This is the only physiological contact position on any articulator.



In the case of difficult jaw conditions it is also possible to set up teeth 4 to 7 in sequence. However, it is still necessary to expose the non-working cusps and to open the bite by approximately 2 mm in order to achieve the required contact points after making occlusal adjustments by grinding.



Although a tooth-to-two-tooth relationship is the goal, this is not strictly necessary in order to achieve optimum masticatory function.



In order to achieve the physiological centric position, occlusal adjustments are now made by grinding in quadrants one and four which, like the left-hand side, were also set up with the incisal pin open by approximately 2 mm.



As already described on the left, all contacts are reduced anatomically and in their number to achieve a virtually homogeneous and simultaneous contact relationship of the mandible with the maxilla as described by the physiological centric position. The goal is a distribution of contact points that allows scope for intra- and interindividual variation, with an average of 10 contact points per quadrant featuring mainly working contacts with fewer marginal ridge and shear (non-working) contacts, as well as some light anterior contacts:



- Premolars: 1 to 2 contacts
- First molar: 3 to 5 contacts
- Second molar: 1 to 3 contacts
- Anterior teeth: on average, five contacts (in the wax setup, there is an advantage in keeping the anterior teeth slightly out of contact).

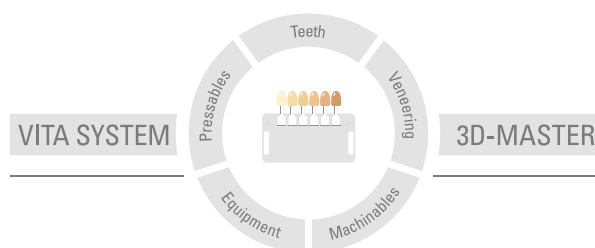
These principles should be understood as general conditions, as well as clearly defined guidelines, rather than as rigid rules.



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