

Removable Denture Prosthetics

Principles according to the BPS® Concept

Denture Manufacturing Protocol



The products and equipment shown in this protocol are merely examples. Their availability varies depending on the country and region. Should you have any questions regarding the local availability or the use of additional products, please contact your local Ivoclar Vivadent representative or your dealer.

Removable Denture Prosthetics

Principles according to the BPS® Concept
Denture Manufacturing Protocol

1st edition

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■ Introduction

Will there still be a need for complete dentures in the future?

Although the efforts undertaken in the field of preventive care have had a sustained impact with the number of edentulous patients having fallen to one per cent among the 35- to 44-year olds and to 22.6 per cent among the 65-year olds¹ in Germany, the answer to this question is nonetheless “Yes”.

Studies by Kerschbaum have shown that dentures are worn for a mean period of ten years², in spite of findings by Rarisch, according to which denture replacement is indicated already after seven to eight years³. But for all that, 30.5 per cent of patients still wore complete dentures and 28.1 per cent partial dentures in Germany in 2005.¹ These people will need to have their dentures replaced in the next few years.

Average life expectancy

The 75+ age group has not yet been included in the studies conducted so far, even though the number of patients over the age of 80 is set to increase in the future due to increasing average life expectancies.^{4, 5, 6, 7}

The latest data of the DMS IV German Oral Health Study indicate an increase in periodontal disease in the 35- to 44-year-old age group and this increase is particularly severe among the 65- to 74-year olds.

We may therefore expect that many patients will become edentulous in their later life in spite of all the efforts and advances in the field of preventive dental care. This development may harbour additional challenges for clinicians specializing in prosthodontics. The older the patient, the more difficult it is to adapt to new dentures. The reasons for this include changes of the tegument, salivary flow and tissue elasticity as well as

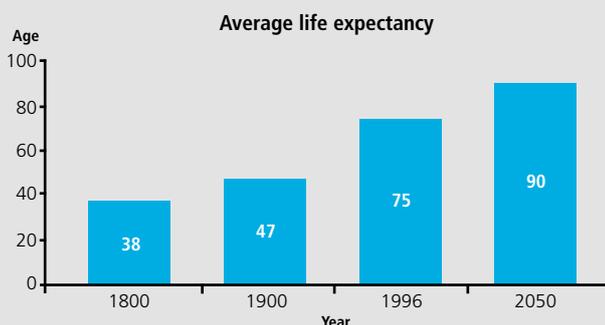
individual cognitive factors, often associated with a lack of mental flexibility to dispense with something familiar. Additionally, old age often brings with it a higher incidence of illnesses, more or less severely affecting the general health of senior patients. This trend is already evident today, as the number of people requiring nursing care is on the rise.

Given the recent advances in implant dentistry, implants can be used today in many cases to provide dental prostheses with additional stability. Yet, this treatment option can often not be pursued because the financial situation or general health of the patient does not permit it. According to the DMS IV study conducted in 2005, 2.6% of senior citizens now wear implant-supported dentures¹. It should be borne in mind, however, that implant-supported dental prostheses cannot ensure lasting retention without being backed up by a fully fledged prosthetic concept, the ability of the patient to perform adequate oral hygiene and regular follow-up care.

A systematic approach including the patient, clinician and technician will lead to successful results and bring back an element of fun and fascination to complete denture prosthetics. Materials and auxiliaries that allow economically efficient and stress-free working procedures are essential to attain this. BPS® (**B**iofunctional **P**rosthodontic **S**ystem) from Ivoclar Vivadent enables a practical path to help the treatment team achieve functional and esthetic dental prostheses.

Whilst this compendium does not claim to be a comprehensive textbook on complete denture prosthetics, it provides a guideline for creating complete dentures according to the BPS concept.

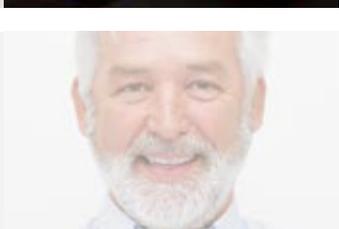
Dr Frank Zimmerling



■ Collaboration between clinician and dental technician

The success of the Biofunctional Prosthetic System (BPS®) is based on the close cooperation of dental technician and clinician. Decades of experience have shaped this workflow and continuously optimized it. Applying it leads to functional and esthetic removable dentures with excellent accuracy of fit. Sources of error are eliminated and the results optimized. Satisfied patients and second fitting sessions that are rendered unnecessary speak for themselves.

This manual focuses on the procedures in the dental laboratory. The procedures in the dental practice are described in detail in a separate manual.

<p>Clinical history Preliminary impressions Provisional maxillomandibular records</p>	
<p>▶ Page 6 Model fabrication Short model analysis Customized trays Intraoral registration</p>	
<p>Final impressions Final maxillomandibular records Tooth selection</p>	
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Block 1

Work documentation

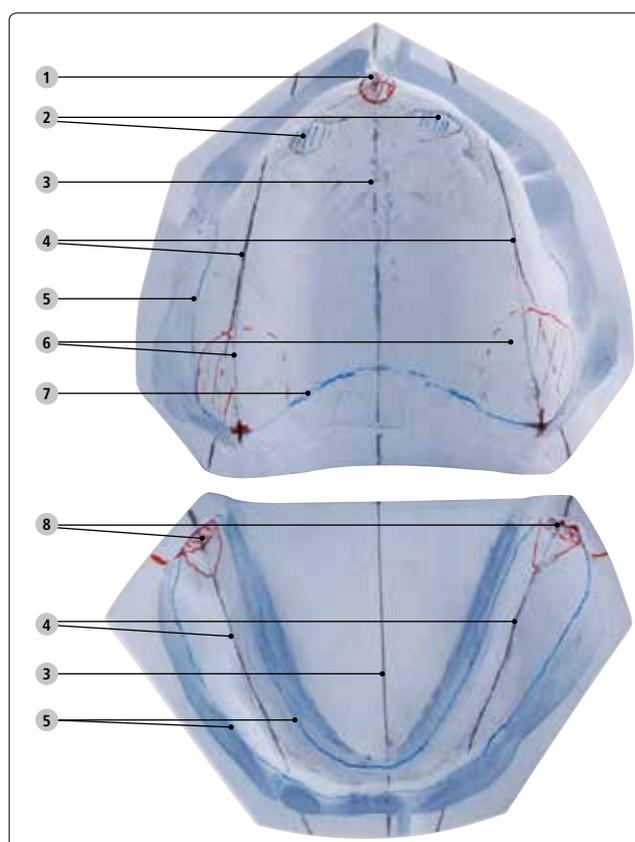
The models are poured in dental stone in the usual manner ensuring that all information from the alginate impressions is exactly reproduced. Impression deficits, such as air bubbles, pressure marks, extraction wounds, flabby ridge etc., have to be rectified beforehand. The provisional determination of the maxillomandibular relations using the Centric Tray should be reduced in such a way that a "close-fitting" three-point support of the models is ensured.



Anatomical landmarks

The following reference points represent the dental technological basis for the subsequent working steps:

- Maxilla**
- 1 Papilla incisiva
 - 2 First large pair of palatine rugae
 - 3 Palatine raphe
 - 4 Centre of the alveolar ridge
 - 5 Maximum vestibular tray expansion
 - 6 Tuber maxillaris
 - 7 Palatal vibrating line
- Mandible**
- 3 Midline (transferred from the maxilla)
 - 4 Centre of the alveolar ridge
 - 5 Maximum vestibular and lingual tray expansion
 - 8 Bisected retromolar pad (trigonum retromolare)



Model orientation in the articulator

The mandibular model is oriented in the articulator according to average values with the help of the horizontal guide. This ensures that the models are oriented within the Bonwill triangle according to average values.



The relation of the jaw models obtained with the Centric Tray corresponds roughly with the subsequent occlusal plane, in which the occlusion is built-up or reconstructed. This procedure provides decisive advantages for the fabrication of the functional impression trays with mounted Gnathometer M or for the fabrication of the wax bite rims. The models are already oriented according to the values of the specific case, which renders the time-consuming adjustments by the clinician unnecessary in most cases.

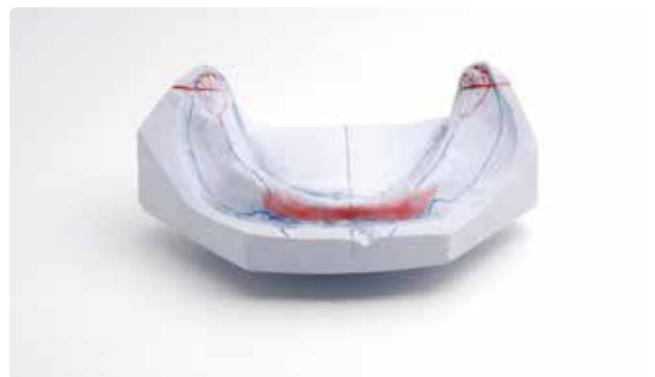


Fabrication of customized trays

The maxillary model can be blocked out with wax in the area of the palatine rugae so that the impression made is as detailed as possible. Undercuts are blocked out.



The undercuts are also blocked out with wax in the mandibular model.



Depending on the needs of the clinician, the entire jaw may be relieved with a thin wax plate (0.2 mm). Selectively attached stops facilitate the intraoral centring of the tray and thus attaining an even impression.



For the customized tray, a resin base is created within the maximum tray extension line. When doing this, it is important to keep the movable mucous membrane unobstructed (myo-dynamic expansion).

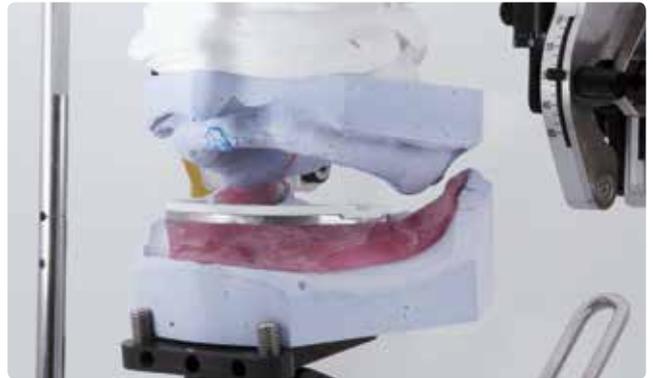


Mounting an intraoral registration set

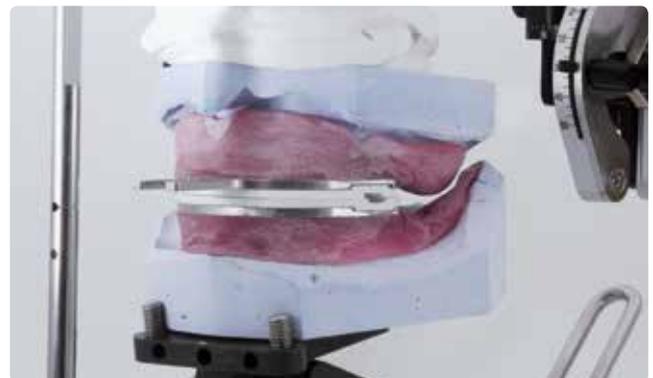
For the determination of the maxillomandibular relations in an edentulous patient, the intraoral registration of the Gothic Arch by means of needle point tracing is particularly suitable. The Gnathometer M is mounted on the customized trays taking the occlusal plane of the respective case into account. In the anterior region, the intervestibular distance between the lowest point of the mucolabial folds in the area of the position of the central incisors is measured and bisected.



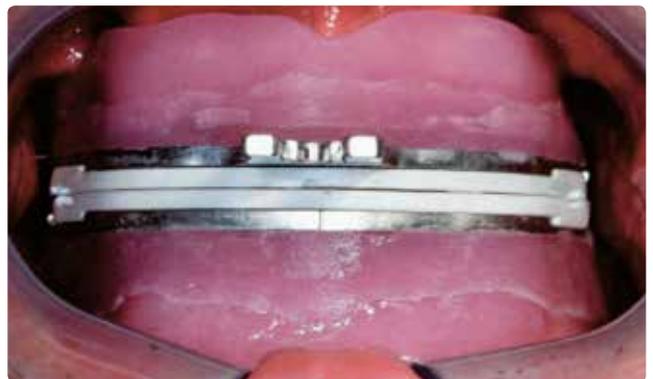
In the dorsal area of the mandibular model, the bisection of the retromolar pad (trigonum retromolare) is determined. Then, the Gnathometer M is secured on the customized tray for the mandible taking the anterior midline and the defined retromolar pads into consideration.



For the maxilla, the Gnathometer M is mounted in such a way that the white bite plates close parallel to the mandibular arch.



The bite plates of the Gnathometer M close parallel to each other in the oral cavity. The use of the Centric Try enables this precision and greatly facilitates the continuation of the registration. The upper frame of the Gnathometer M is already equipped with a connection for the UTS 3D transferbow.



Advantages of the Gnathometer M

- Bite registration with relaxed oral situation
- Easy and time-saving registration of the Gothic Arch for the clinician
- Increased reliability during recording due to the securely mounted registration
- Easy, continuous adjustment of the intervestibular opening
- Wax-free work
- Easy verification of the reference planes

Alternative: Wax bite registration

For cases, in which the Gnathometer M cannot be used (occlusal height too low), the use of wax or resin rims or a combination of the two is recommended as an alternative.



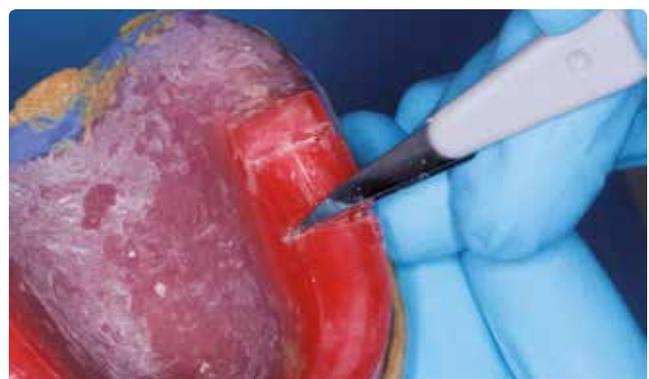
The intervestibular distance – measured from the lowest point of the mucolabial folds in the area of the central incisors – is bisected. In the dorsal area, the distal halves of the retromolar pads (trigonum retromolare) are marked for the determination of the occlusal plane. These values are the reference points for the position of the intended occlusal plane.



The bite rims obtain a considerably higher stability if at least the mandibular rim is realized with resin. The wax rim in the maxilla may also serve as the information carrier for the lip support, midline and smile line, as well as the canine points. The rims are contoured in such a way that their dimensions roughly correspond with the subsequent tooth arch. In this context as well, the models already oriented in the articulator with the Centric Tray permit the patient-specific preparation of the bite plates.



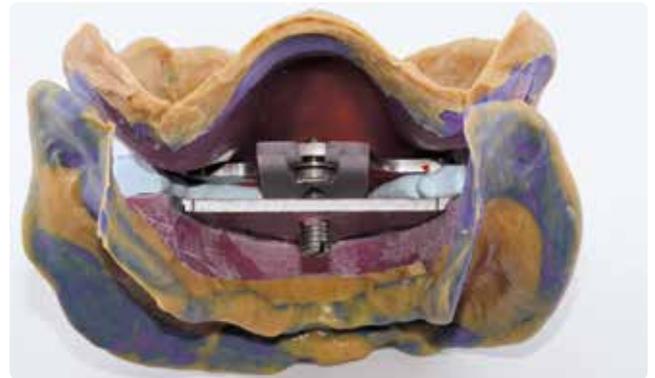
The placement of key marks, such as grooves and dents, is recommended. These marks offer the clinician the possibility to secure the wax rims with registration wax or silicone, separate them for verification purposes and secure them again.



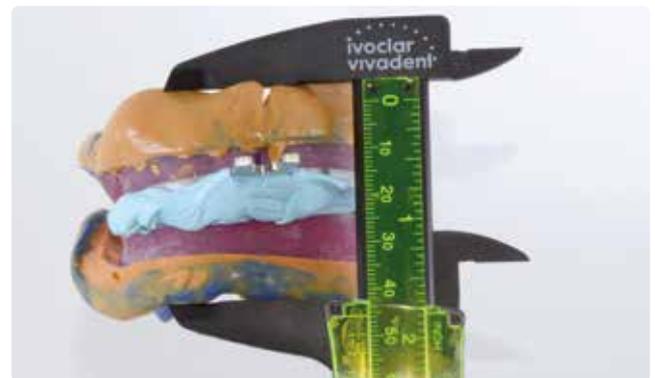
■ Block 2

Master models

The dental technician receives two functional impressions, which are secured in the correct occlusal height and centric position by means of the intraoral registration of the Gnathometer M.



Before the functional impressions are separated for model fabrication, the patient-specific intervestibular distance in the anterior region is measured and noted. After that, the functional impressions can be carefully separated and the key can be set aside.



Now, the master models are poured using a Class III stone. It is important that all the available information of the functional impression (labial frenulum and cheek frenulum, mucolabial fold, etc.) is included.

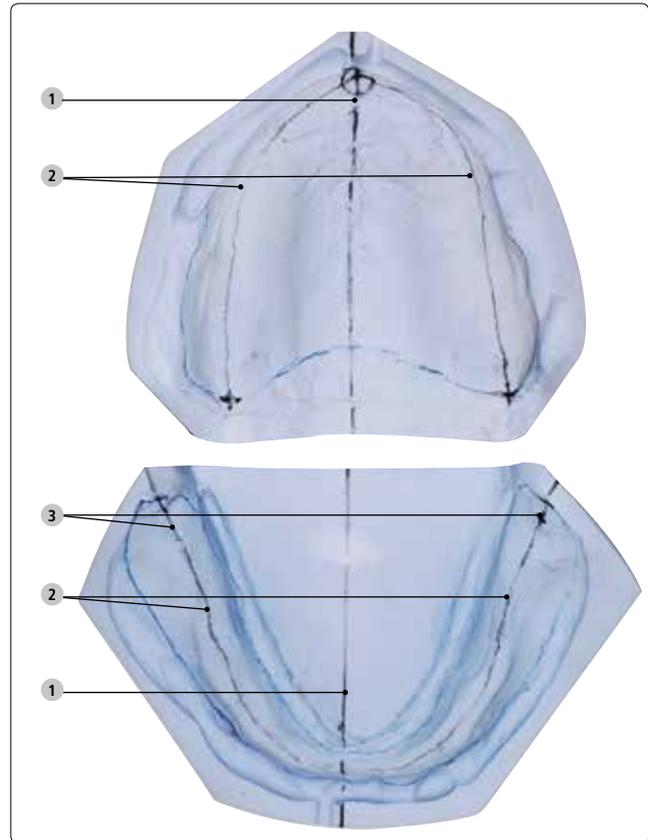


Small model analysis

The following reference points must be observed for the correct model orientation:

- ❶ The incisive papilla and palatine raphe provide the midline (if not otherwise defined by the clinician). The latter is transferred to the mandibular model.
- ❷ Course of the alveolar ridge
- ❸ Trigonum retromolare (retromolar pad)

These reference points are used for the correct mounting of the horizontal guide.



Model orientation

Average-value model orientation using the horizontal guide

The horizontal guide supports the average-value model orientation of partially dentulous or edentulous models within the Bonwill triangle of the articulator.



Before mounting, the symphysis fork of the horizontal guide is set to half the intervestibular distance (distance between the mucolabial folds of the mandible and the maxilla). The fork sits on the lowest point of the mucolabial fold, oriented according to the midline.



The side wings are aligned towards the dorsal to the half of the retromolar pad (trigonum retromolare). The wings of the horizontal guide correspond with the length of the mandible and have to be adjusted in a sagittal direction. The line system is symmetrically aligned with the alveolar ridge on both sides.



Verification

The extension of the midline mark is aligned with the perpendicular bisector of the horizontal guide.

Important

If the height of the retromolar pads differs significantly (e.g. after surgery), the clinician has to be contacted.



The mandibular model is secured to the horizontal guide in this position. The horizontal guide may now be mounted in the articulator with the help of the instrument carrier and the mandibular model can be secured on the base plate using plaster.



Tip

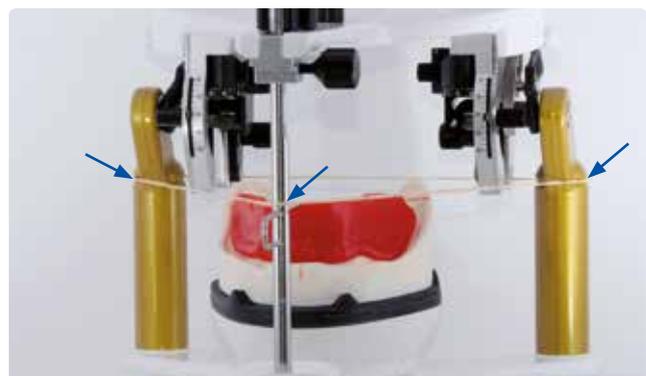
Both the models and the articulator are protected from contamination by the magnetic base block and plaster protection plates.



Alternative:

Average-value model orientation with rubber band

Articulating the models with a rubber band is a widely used method. For this purpose the inclines of the Stratos articulator are equipped with notches. The incisal pin is equipped with a notch and an incisal point indicator.



**Alternative:
Individual model orientation**

Basically, individual registration and model transfer also provide additional, patient-specific information for the ideal positioning of the models in the articulator for complete dentures, as well. To transfer this information to the dentures, the use of the UTS transferbow is recommended. This is specifically recommended for:

- implant-supported dentures
- hybrid-supported dentures
- fixed dentures
- therapeutic restorations.



Mounting may be performed in two different ways:

- with the help of the 3D registration joint holder



- with the help of the UTS support pins Type II.

See UTS 3D Transferbow System for further details.



The maxillary model is oriented according to the mandible by means of the intraoral registration (functional impressions with secured Gnathometer M) and articulated accordingly.



The different bite situations result from the relation of the maxilla to the mandible.

In **the anterior region**, they are referred to as follows:

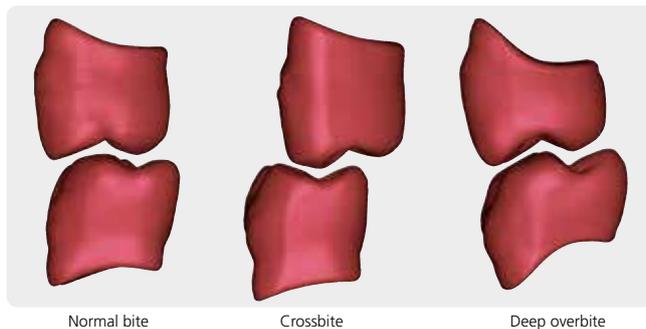
- Class I: Normal bite (scissors bite)
- Class II: Distal bite (prognathism)
- Class III: Edge-to-edge bite (progenia)

In **the posterior region**, they are referred to as follows:

- Normal bite
- Crossbite
- Deep overbite



For these bite type, Ivoclar Vivadent offers the corresponding posterior teeth.



Comprehensive model analysis

Marking:

Centre of the incisive papilla

Meaning:

- Course of the anatomical centre of the maxilla
- Labial orientation of the central incisors

Marking:

First large pair of palatine rugae

Meaning:

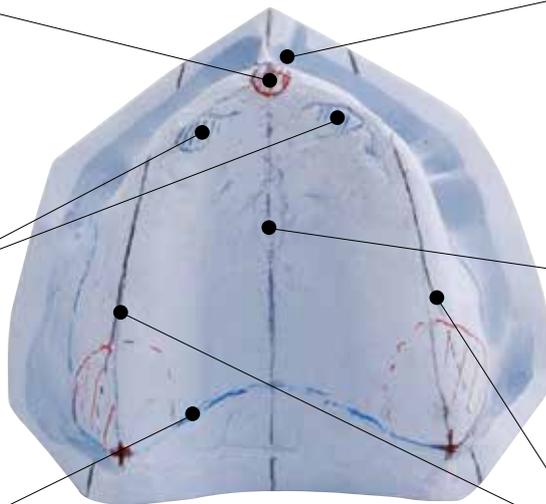
Labial orientation of the canines to the tip of the palatine rugae

Marking:

Palatal vibrating line

Meaning:

Dorsal margin of the denture base



Marking:

Lowest point of the vestibule

Meaning:

Starting point for the measurement of the total vertical and the height of the course of the incisal edge of the central incisors

Marking:

Palatal suture (raphe palatine), anatomical midline

Meaning:

Reference plane for the transverse symmetry of the anterior tooth setup

Marking:

Centre of the alveolar ridge

Meaning:

Orientation to determine the static setup

Marking:

Distal half of the retromolar pad (trigonum retromolare)

Meaning:

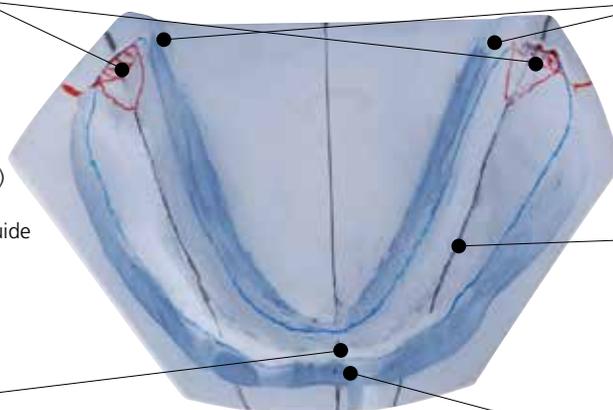
- Dorsal alignment of the setting-up template (corresponds with height of the occlusal plane)
- Dorsal alignment of the lateral wings of the horizontal guide

Marking:

Model centre transferred from the maxilla, anatomical centre

Meaning:

- Bilateral orientation of the anterior tooth setup
- Position of the symphysis fork of the horizontal guide



Marking:

Lingual expansion of the retromolar pads

Meaning:

Pound's line, respecting the tongue space

Marking:

Centre of the alveolar ridge

Meaning:

Course of the central fissure of the posterior teeth (static positioning)

Marking:

Lowest point of the vestibule

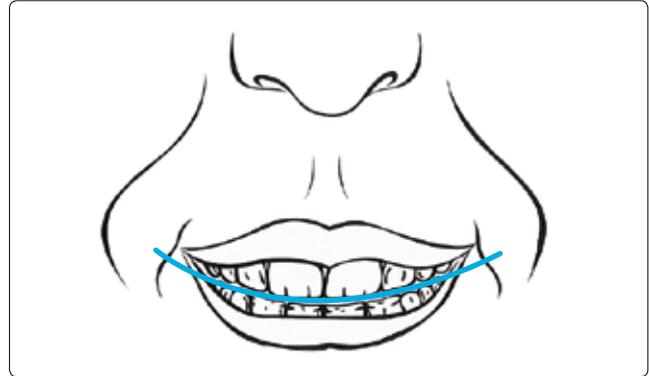
Meaning:

Starting point for the measurement of the total vertical

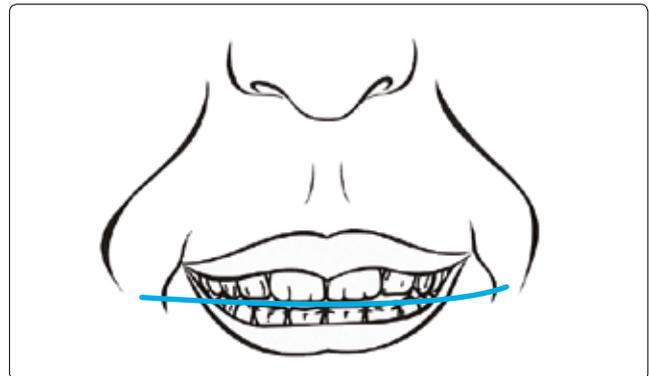
Tooth setup

Anterior tooth setup

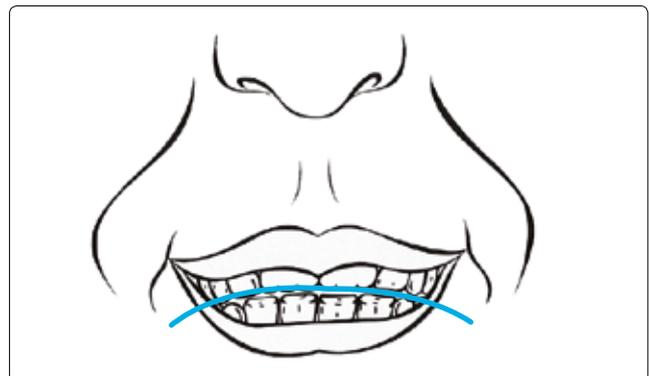
Patients are basically served best with an upward curving anterior tooth arch, which is known as the "friendly" arch. Especially women prefer the rather youthful smile line. The following principle applies: The upper tooth row that runs parallel to the lower lip line harmoniously blends in with the oral and facial expression.



In older patients, abrasion wears down the incisal edges over time, which results in a rather straight smile line and which imparts an older appearance.



In an angular, athletic type, a neutral, straight anterior arch appears very natural.



When setting up anterior teeth, a negative arch has to be prevented for esthetic reasons. Before treatment commences, the clinician should discuss with the patient how s/he imagines the dentures to be and what the expectations regarding the esthetic appearance are. The demands of the patient are best conveyed with a photograph of the patient which depicts the original natural tooth position.

Precise and stable resin plates made of tray material facilitate the try-in and prevent deformation.

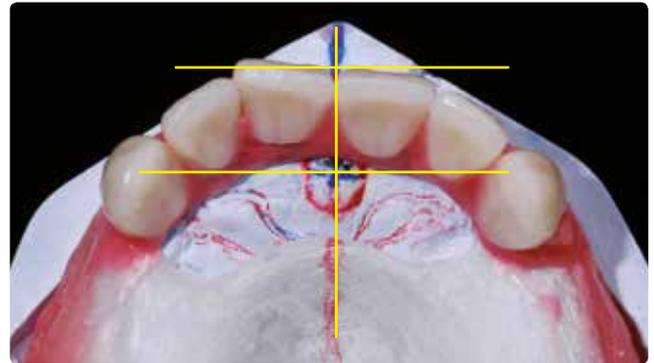
A hard wax with a high softening point can be used for setting-up the teeth. The gingiva parts are contoured at a later time. A softer wax can be used for that purpose.

The anterior teeth are set-up with the help of the following anatomical model information.

- The central incisors are aligned mesial to the midline.
- Half the papilla incisiva plus 7 to 9 mm indicates the labio-palatal alignment of the central incisors (lip support).
- Half the intervestibular distance plus 2 mm overbite results in the length of the maxillary incisors (in a normal bite situation).
Crossbite: 0.5 to 1 mm
Deep overbite: 3 to 3.5 mm
These are average values.

- Usually, the maxillary incisors point toward the lower mucolabial fold in a bow direction. Their labial curvature harmoniously blends in with the vertical anterior tooth arch.

The position of the canines is of decisive importance for the function and esthetic appearance of the setup. The symmetric positioning of the canines, the most distinctive teeth in the maxillary anterior region, facilitates the setup. The first large pair of palatine rugae is a reference point for the positioning of the canine. Ideally, the distal ridge runs parallel to the sagittal course of the alveolar ridge.



After the setup of the maxillary anterior teeth, they can be checked using the setting-up template. For that purpose, the mandibular model is removed and the instrument carrier with setting-up template is mounted. The setting-up template should be adjusted below and behind the maxillary anterior teeth. The symmetrical line system of the template enables the verification of the harmonious position of the teeth (horizontal course, midline and, if necessary, bilateral symmetry). The central incisors are set-up perpendicular, while the lateral incisors slightly tilt towards the mesial. The canines are again set-up perpendicular along the longitudinal axis.



Viewed from the proximal, the central incisors are positioned perpendicular along their tooth axis. The incisal areas of the lateral incisors may slightly tilt towards the labial. The incisal areas of the canines tilt towards the palatal and the cervical area towards the buccal.

This "lively" setup supports the natural effect of the dental reconstruction.

The mandibular canines are set-up in a relation to tooth 13 and tooth 23. The extension of the longitudinal axis of the mandibular canine points between the maxillary lateral incisor and the canine.



Basically, bilateral symmetry to the setting-up template has to be kept in mind during the setup (average-value orientation).

It is important to set-up the canine out of contact, which ensures a reliable group guidance in the posterior region.



If necessary, the canines can be repositioned. The mandibular anterior arch is only supplemented with the incisors after the posterior teeth have been set-up.

Posterior tooth setup: "Typ"

With the setting-up template, the curves of Wilson and Spee are automatically taken into consideration. This results in a bilateral standardized Mosen compensating curve with the posterior teeth.

The template is adjusted for the posterior tooth setup, for which the bottom side of the anterior part is oriented on the cusp tip of the mandibular canines. In the posterior area, the underside of the template ends in the area of the distal thirds of the retromolar pads.

Now the mandibular "Typ" posterior teeth can be symmetrically aligned with the template on both sides.



The first premolar should be positioned in such a way that a smooth transition to the canine is achieved. This means that the distal slope of the incisal edge is flush with the mesial rise of the first premolar.

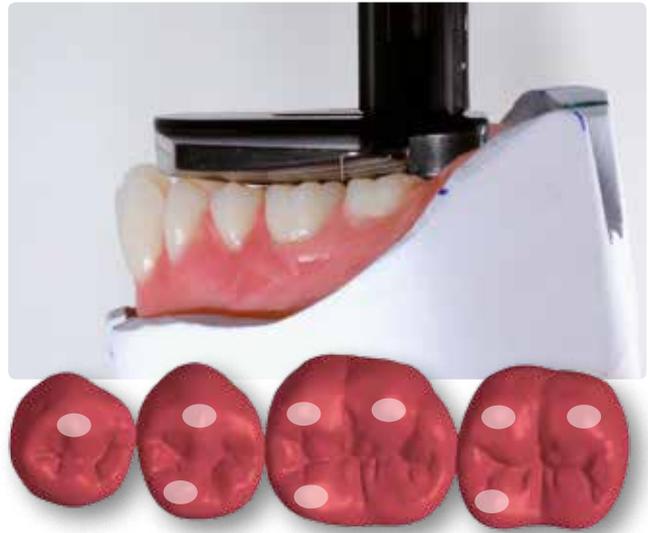


Occlusal cusp contacts with the template

First premolar: buccal cusps

Second premolar: buccal and mesio-lingual cusps

First and second molar: mesio- and disto-buccal as well as mesio-lingual cusps



Pound's line (lingual limit to the tongue space) and the centre of the alveolar ridge (static and buccal limit) are reference points for the orientation of the functional corridor for the posterior tooth setup.



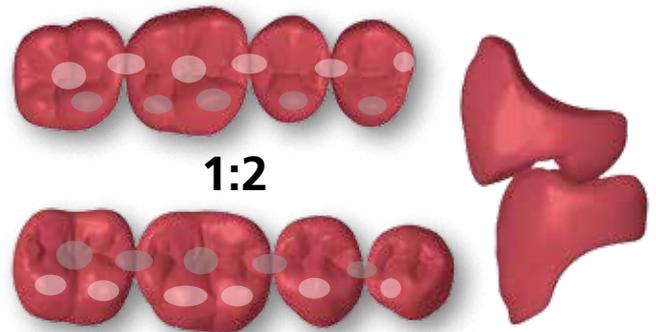
The line system of the template facilitates the symmetrical set-up of the posterior teeth. Nevertheless, there is a certain range of variation. The lines on the setting-up template help with the orientation of the prosthetic balance and facilitate achieving the bilateral symmetrical orientation (bilateral equilibrium). The objective is the maximum intercuspation of the posterior teeth.



Antagonist contacts

The "Typ" teeth from Ivoclar Vivadent implement the concept of group function on the working and balancing side (latero- and mediotrusion) by Dr Strack.

They are set-up in accordance with a normal bite situation in a one-tooth to two-teeth relation. In this way, the primary contacts in the centric position are located in the central fossae in the mandible as well as on the marginal ridges. In the mandible, the "Typ" teeth are supported by a secondary contact area on the buccal cusps.



Depending on the specific case, the maxillary second molar can be omitted if there is not enough space or for reasons of statics. Space conditions permitting, the second molar in the mandible is set-up to support the cheeks.



Completing the anterior tooth setup

It has to be made sure that the maxillary anterior teeth are placed on the alveolar ridge and that the incisal area shows a slight inclination towards the labial in a normal bite situation so that the orbicularis oris muscle can adapt.



The overbite and overjet should be in the range of 0.5 to 1.0 mm.



As far as the mandibular anterior teeth are concerned, only the incisal edges can be seen in top view. Therefore, interlocking and the grinding in of wear facets are favourable for the esthetic appearance.

Important

Exclusive anterior/canine guidance has to be avoided.



Occlusal function

As soon as the dentures are set-up, their occlusal function is verified:

Centric

Maximum intercuspation

**Laterotrusion – working side**

The bucco-mesial surfaces of the maxillary premolars slide over the bucco-distal edges of the mandibular premolars.

**Mediotrusion – balancing side**

The mesio-palatal cusps of the maxillary molars slide on the diso-buccal cusps of the mandibular molars.

**Protrusion**

The disto-buccal facets of the maxillary premolars slide over the mesio-buccal facets of the second premolar and the first molar.

The anterior teeth are set-up or ground in in such a way that they come into group contact with the posterior teeth. Premature contacts must be avoided!



Gingiva design

To facilitate the final contouring, it is sufficient to secure the teeth only with hard wax. For the remainder of the denture body, a more contouring-friendly, slightly softer wax can be used.

The following important points have to be considered in this context:

Cervical course of the gingiva

Basically, the gingiva must be contoured in such a way that it is easy to clean and has a lifelike appearance. Too prominent contours (balconies) must be avoided. Especially the transition from the canine to the first premolar often shows unesthetic steps. They occur if the posterior teeth used are too short.

In the maxillary anterior region, the gingival margin tends to run the highest in the distal third. In contrast, the lowest point in the mandible tends to be in the centre area.



Denture body

The course of the root should be slightly outlined in a true-to-nature manner. The corresponding freeway space must be created for the labial and cheek frenulum. Small concave areas must be avoided, as they can scarcely be cleaned by the patient. The vestibular parts of the mandibular denture are given a concave design to accommodate muscle dynamics. In this way, the soft tissues (cheeks and muscles) can optimally adapt to the denture body.

The vestibular parts of the maxillary denture should be given a convex design – particularly in the molar region. This then supports the masseter muscle and minimizes the possibility of "cheek biting".



Important

- Tubera and trigona should be embraced, as they assume important support and holding functions.
- The labial and cheek frenulum must be exposed and protected from food impaction with a slight bulge.

The contoured dentures should correspond with the completed work as closely as possible. The dentures are sent for try-in on the model in the articulator.



■ Block 3

Completion

After try-in, the setup is verified in the articulator, the necessary adjustments are made and the denture bodies secured on the model with wax.

When realizing the waxed-up dentures in acrylate, the following points should be observed:

- The wax-up and dimensions should no longer be changed.
- The centric and functional sequences are verified and, if necessary, adjusted.
- Clean investment saves time and enhances precision.



Realization in acrylate:

Within the BPS System, Ivoclar Vivadent offers various denture base materials, which are very well coordinated with each other in terms of quality, procedure and function.

The instructions of the manufacturer for processing the denture base material must be observed.

Divesting and completion

The polymerized dentures remain on the models and will be replaced in the articulator. They can now be re-occluded and checked for the correct function of the occlusion.

The following points have to be verified:

- Centric
- Occlusal height.



Working and balancing contacts:

Mere canine guidance must be prevented!



Protrusion:

Grinding in premature contacts, aiming for group guidance.

Important

- Adjustments by grinding should be performed selectively. The resulting grinding marks should be polished to a high gloss using the corresponding polishing instruments and a step-by-step protocol.
- After that, the dentures are lifted off the models. Flash and sprues are removed and the attachment points smoothed out.
- The following principle applies: Any heat development must be avoided.

Working with the handpiece is recommended for the precision steps of polishing. The polishing motor with brush and buffing wheel can be used for large surfaces and final polishing. In this way, both the texture of the tooth surface and the contour of the gingiva are maintained. Pumice, Paris white and polishing paste are recommended for polishing. Polishing and cleaning media containing solvents must not be used under any circumstances. Such media may attack the denture base resin and result in white discoloration.

Storage and transportation to the clinic

The dentures are delivered to the dental office in a moist environment and separated from the models.



Function check

1) Verifying the centric:

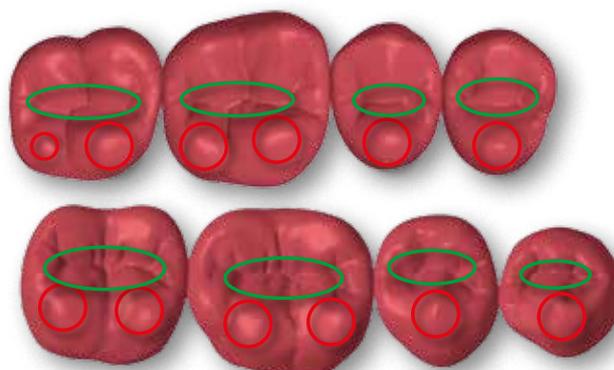
In accordance with the working procedures of the BPS concept, no major adjustments by grinding are carried out prior to the realization of the wax-up in acrylate.

The correction of a possible increase in vertical dimension is performed before the polymerized dentures are removed from the model. For that purpose, the centric lock of the articulator must be fixed.

The following grinding rules must be observed:

- The working cusps must not be ground.
- Preliminary contacts in the antagonist fossa must be reduced.

If the height of the occlusal position has been adjusted, all the centric contacts determined by the set-up have to be established.



Grinding in areas of the centric contacts:



Grinding in contacts



No grinding

2) Verifying the functional movement:

In order to ensure the function of the balanced occlusion, laminar guiding facets are desired.

Minimum requirements:

- Mediotrusion – balancing side
In the maxilla, the palatal molar cusps guide 16 and 17 to 46 and 47 or 26 and 27 to 36 and 37.
- Laterotrusion – working side
Guidance of the buccal cusps from 14 and 15 to 44 and 45 or 24 and 25 to 34 and 35.
- Protrusion
At least two guiding facets per side, preferable in the pre-molar region.

Note:

Exclusive anterior/canine guidance has to be prevented, as these teeth are often set-up in an unstable manner for esthetic reasons.



■ Impressions



Glossary

Sources:

¹⁾ The Glossary of Prosthodontic Terms, Eighth Edition, Reprinted from the Journal of Prosthetic Dentistry, Copyright 2005 by the Editorial Council of The Journal of Prosthetic Dentistry

²⁾ Merriam-Webster Online Dictionary, www.merriam-webster.com

abrasion of the occlusal surface ¹⁾ (scraping)

- attrition: the mechanical wear resulting from mastication or parafunction, limited to connecting surfaces of the teeth
- demastication: wear of the occlusal surfaces by food abrasion

anteriores

anterior teeth

atrophy ¹⁾

a diminution in size of a cell, tissue, organ or part

axial ¹⁾

in the direction of the axis

alveolar process (processus alveolaris) ¹⁾

the cancellous and compact bony structure that surrounds and supports the teeth. It contains the tooth surfaces to anchor the dental roots.

antagonists ¹⁾

teeth in one jaw that articulate with teeth in the other jaw - called also dental antagonists. Teeth that come into contact upon normal closing of the mouth.

balancing side ¹⁾

that side of the mandible that moves toward the median line in a lateral excursion; the non-working side of the mandible

bilateral balanced articulation ¹⁾

the bilateral simultaneous anterior and posterior occlusal contact of teeth in centric and excentric positions

Bonwill triangle ¹⁾

eponym for a 4 inch equilateral triangle bounded by lines connecting the contact points of the mandibular central incisor's incisal edge (or the midline of the mandibular residual ridge) to each condyle (usually its mid point) and from one condyle to the other

buccal ¹⁾

pertaining to or adjacent to the cheek

buccinator muscle; musculus buccinator ¹⁾

mimic muscle; forms the muscle mass of the cheek; its purpose is to pull back the angle of the mouth and to flatten the cheek area, which aids in holding the cheek to the teeth during chewing; this action causes the muscle to keep food pushed back on the occlusal surface of the posterior teeth; by keeping the food in the correct position when chewing, the buccinator assists the muscles of mastication

Camper's plane (CP) ¹⁾

a plane established by the inferior border of the ala of the nose (or the average between the two) and the superior border of the tragus of each ear; a plane passing from the acanthion to the centre of each bony external auditory meatus.

caninus / dentes canini

canine

centric ¹⁾

- tooth centric: highest-level multi-point contact between occluding teeth
- max. intercuspation
- joint centric: physiological condyle position in occlusion

cervical ¹⁾

in dentistry: pertaining to the region at or near the cementoenamel junction

Christensen's phenomenon ¹⁾

eponym for the space that occurs between opposing occlusal surfaces during mandibular protrusion

compensation ²⁾

equalization or reciprocal neutralization of opposing forces of equal strength

compensating curve (curve of Spee) ¹⁾

also anteroposterior curve; the anatomic curve established by the occlusal alignment of the teeth, as projected onto the median plane, beginning with the cusp tip of the mandibular canine and following the buccal cusp tips of the premolar and molar teeth, continuing through the anterior border of the mandibular ramus, ending with the anterior most portion of the mandibular condyle

concave ²⁾

curving inward (antonym: convex)

convex ²⁾

curving outward (antonym: concave)

curve of Spee ¹⁾

also anteroposterior curve; the anatomic curve established by the occlusal alignment of the teeth, as projected onto the median plane, beginning with the cusp tip of the mandibular canine and following the buccal cusp tips of the premolar and molar teeth, continuing through the anterior border of the mandibular ramus, ending with the anterior most portion of the mandibular condyle

diastema (-ata) ¹⁾

a space between two adjacent teeth in the same dental arch

diastema mediale ¹⁾

combined with a labial frenulum (frenulum labii) grown through the diastema, in a deciduous dentition often physiological (frenulum tecto-labiale)

esthetic ^{*)}

pertaining to the study of beauty and the sense of beautiful

eugathic tooth positioning ^{*)}

flawless tooth positioning as regards harmony, shape and function

food impaction ^{*)}

Jammed or pinched food particles; here particularly under the margins of the denture base

force vector ^{*)}

direction of the force development represented by an arrow

Frankfort Horizontal (FH) ^{*)}

eponym for a plane established by the lowest point on the margin of the right or left bony orbit and the highest point of the margin of the right or left bony auditory meatus

freeway space ^{*)}

the difference between the vertical dimension of the rest and the vertical dimension while in occlusion.

frenulum ^{*)}

a connecting fold of membrane serving to support or retain a part

frenulum labii ^{*)}

lip frenulum

frenulum labii superioris anomale ^{*)}

low-connecting lip frenulum grown up to the papilla incisiva; one of the causes of a diastema; continuance of the frenulum tecto-labiale physiological to newborns

functional corridor or neutral zone ^{*)}

the potential space between the lips and cheeks on one side and the tongue on the other; that area or position where the forces between the tongue and cheeks or lips are equal

functional analysis ^{*)}

assessment of findings and recording of the data important for the possible therapy; conducted at the beginning of treatment

geniohyoid muscle; musculus geniohyoideus

muscle of the floor of the mouth; it is a narrow muscle situated superior to the medial border of the mylohyoid muscle; it arises from the inferior mental spine, on the back of the mandibular symphysis, and runs backward, and slightly downward, to be inserted into the anterior surface of the body of the hyoid bone

gothic arch (needle point tracing) ^{*)}

registration of the lateral and protrusive movements of the mandible on a horizontal plate; the tracing resembles an arrowhead; registration to determine the predominantly horizontal jaw relations.

homogeneous ^{*)}

of the same or a similar kind or nature

hybrid dentures prosthetics ^{*)}

removable complete dentures retained by root cups connected with bars, root caps equipped with retaining elements, on telescope crowns or as cover dentures

intercuspatation ^{*)}

the interdigitation of cusps of opposing teeth

intermittent tongue pressure ^{*)}

sporadically interrupted tongue pressure

intraoral ^{*)}

within the mouth

labial ^{*)}

of or pertaining to the lip; toward the lip

laterotrusion ^{*)}

condylar movement on the working side in the horizontal plane; this term may be used in combination with terms describing condylar movement in other planes

lingual ^{*)}

pertaining to the tongue; next to or toward the tongue

mamelon ^{*)}

one of the three tubercles sometimes found on the incisal edges of incisor teeth

masseter muscle; musculus masseter ^{*)}

large muscle of mastication

maxillomandibular relation ^{*)}

any spatial relationship of the maxilla to the mandible; any one of the infinite relationships of the mandible to the maxilla.

median plane ^{*)}

an imaginary plane passing through the body, from front to back, and dividing it into left and right halves

muscle dynamics ^{*)}

the forces or the movements of the muscles

muscular balance ^{*)}

the denture base should be in muscular balance between cheek and tongue, i.e. the force of the tongue pressure on the denture base should be equal to the force of the cheek pressure on the denture base (see also functional corridor)

mylohyoidea

hyoid bone

myloloid ridge ^{*1)}

an oblique ridge on the lingual surface of the mandible that extends from the level of the roots of the last molar teeth and that serves as a bony attachment for the mylohyoid muscles forming the floor of the mouth

needle point tracing ^{*1)}

see gothic arch

occlusion ^{*1)}

the act or process of closure or being closed or shut off; the static relationship between the incisive or masticating surfaces of the maxillary or mandibular teeth or tooth analogues

overbite ^{*1)}

also: vertical overlap; the distance teeth lap over their antagonists as measured vertically; especially the distance of the maxillary incisal edges extend below those of the mandibular teeth.

overjet ^{*1)}

also: horizontal overlap; the projection of teeth beyond their antagonists in the horizontal plane

palatal ^{*1)}

pertaining to the palate or towards the palate

palatal raphe ^{*1)}

clear elevation in the median line of the mucous membrane of the hard palate, which phases into a pronounced ridge (incisive papilla) and laterally branches off several, slightly winding cross-folds (palatine rugae)

palatine rugae ^{*1)}

the anatomic fold or wrinkle - usually used in the plural sense; the irregular fibrous connective tissue ridges located in the anterior third of the hard palate

parameter ^{*2)}

in statistics, designation for constants and variables that characterize a basic unit

pathological ^{*2)}

extreme in a way that is not normal or that shows an illness

phonetics ^{*2)}

the study and systematic classification of the sounds made in spoken language

physiology ^{*2)}

a branch of biology that deals with the functions and activities of life or of living matter (as organs, tissues, or cells)

physiological incorporation

mounting taking the special functions into account of the organs and their proper interplay

pigment ^{*2)}

finely ground, natural or synthetic, inorganic or organic, insoluble dispersed particles (powder), which, when dispersed in a liquid vehicle, may provide, in addition to colour, many other essential properties such as opacity, hardness, durability and corrosion resistance

pigmentation ^{*2)}

colouration of materials with pigments

polymerization shrinkage

resins form micromolecules during polymerization, i.e. the individual molecules form chains; this results in a volume reduction, which is manifested in the shrinkage of the material

Pound's line ^{*1)}

imaginary line from the mesial edge of the lower canine to the inner (lingual) edge of the tubera; this line should not be crossed by artificial teeth

protrusion path angle ^{*1)}

inclination of the condylar gliding path in relation to the Camper's plane or Frankfort Horizontal

proximal surface ^{*1)}

the surface of the dental crown that faces the adjacent tooth

Raphe-Median-Plane RMP ^{*1)}

sagittal midline plane of the skull along the palatal raphe; used to determine the midline of the maxilla

Raphe-Papilla-Transversal (RPT) ^{*1)}

auxiliary line; perpendicular to the Raphe-Median-Plane at the end of the incisive papilla, where the front palatine rugae originates; in a normal dentition, the RPT runs over the canine tips; in steep palates over the mesial third and in flat palates over the distal third

reconstruction ^{*1)}

the process of putting something (a dental situation) back into a good condition

reference point

measuring point

registrations ^{*1)}

articulation indicators to identify and mark jaw positions and antagonist contacts in occlusion

registration joint

here: three-dimensionally adjustable joint with which the UTS 3D facebow can be attached to the bite fork in the mouth

relation of the jaw models ^{*1)}

see maxillomandibular relation

reoccluding ^{*1)}

the repositioning in the articulator of complete dentures after investment and packing and renewed verification of the occlusion

residual monomer content

the monomer that remains in the polymer after the end of polymerization and that did not take part in the reaction

residual ridge line ^{*1)}

The highest point of the alveolar ridge is traced with a pencil, which results in the residual ridge line, which, in turn, is important for the setup of the posterior teeth

retromolar pad ^{*1)}

a mass of tissue comprised of non-keratinized mucosa located posterior to the retromolar papilla and overlying loose glandular connective tissue

semi-adjustable articulator; arcon articulator ^{*1)}

an articulator that applies the arcon design; this instrument maintains anatomic guidelines by the use of condylar analogs in the mandibular element and fossae assemblies within the maxillary element

statics ^{*2)}

the science that studies the relationship between forces that produce equilibrium among material bodies

stomatognathic system ^{*1)}

the combination of structures involved in speech, receiving, mastication and deglutination as well as parafunctional actions

sublingual fold ^{*1)}

the crescent-shaped area on the floor of the mouth following the inner wall of the mandible and tapering toward the molar region

symphysis ^{*1)}

a type of cartilaginous joint in which the opposed bony surfaces are firmly united by a plate or fibrocartilage; the immovable dense midline articulation of the right and left halves of the adult mandible

symphysis fork

used to correctly align the horizontal guide with the jaw

to be tangent to ^{*2)}

meeting a curve or surface in a single point

tonus ^{*2)}

a state of partial contraction that is characteristic of normal muscle which is decisively influenced by the striatum

tonus balance ^{*1)}

the denture body should be balanced by the cheek and tongue muscles

transverse ^{*2)}

acting, lying, or being across

tuber ^{*1)}

anatomical prominence

tubercle ^{*1)}

a small bony prominence or excrescence; a nodule

vestibule ^{*1)}

the portion of the oral cavity that is bounded on the medial side by the teeth, gingiva, and alveolar ridge or the residual ridge, and on the lateral side by the lips and cheeks

wax contraction ^{*1)}

thermal shrinkage of the wax upon changing of the aggregation state from liquid to solid

wear facet ^{*1)}

any wear line or plane on a tooth surface caused by attrition

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Clinical history
Preliminary impressions
Provisional maxillomandibular records

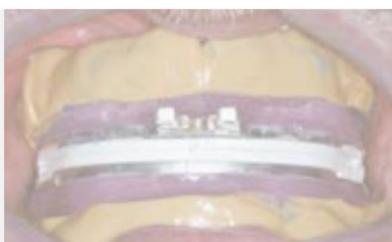


▶ Page 6

Model fabrication
Small model analysis
Customized trays
Intraoral registration



Final impressions
Final maxillomandibular records
Tooth selection



▶ Page 11

Comprehensive model analysis
Model orientation
Tooth setup
Gingiva design



Try-in



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Completion



Insertion
Continuing care



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