Competence in

Implant Esthetics

Implant Superstructures

For removable restorations

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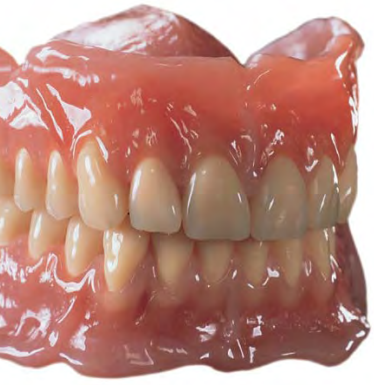


Cultural historical finds indicate the human beings have tried to replace missing teeth by homeo- or alloplastic materials (human or animal teeth, carved bones, ivory or mother of pearl items) from very early on.

What is known as dental implant today was first inserted towards the end of the nineteenth century. Today's customary implant shape was inspired by that of the natural root of the tooth and used for the first time in 1939.
Since that time, implantology has been continuously further developed and has become and important element of dental restorative treatment.

Dental implantology requires well-founded professional skills and experience from all the parties involved, i.e. dentists and dental technicians.

This Manual will provide a short introduction to the planning and realization of prosthetic treatment options. In addition to the theoretical basics, the fabrication of various implant superstructures is described step-by-step with the help of case studies.

The pictures of the dental-lab and clinical work were supplied by the team of T. Duffing, DDS, R. Gläser and K. Dittmar, MDT. The pictures of the ball clasp restoration were provided by W. Böthel, MDT. Furthermore, we would like to thank Camlog Biotechnologies AG for providing the supplementary graphics.

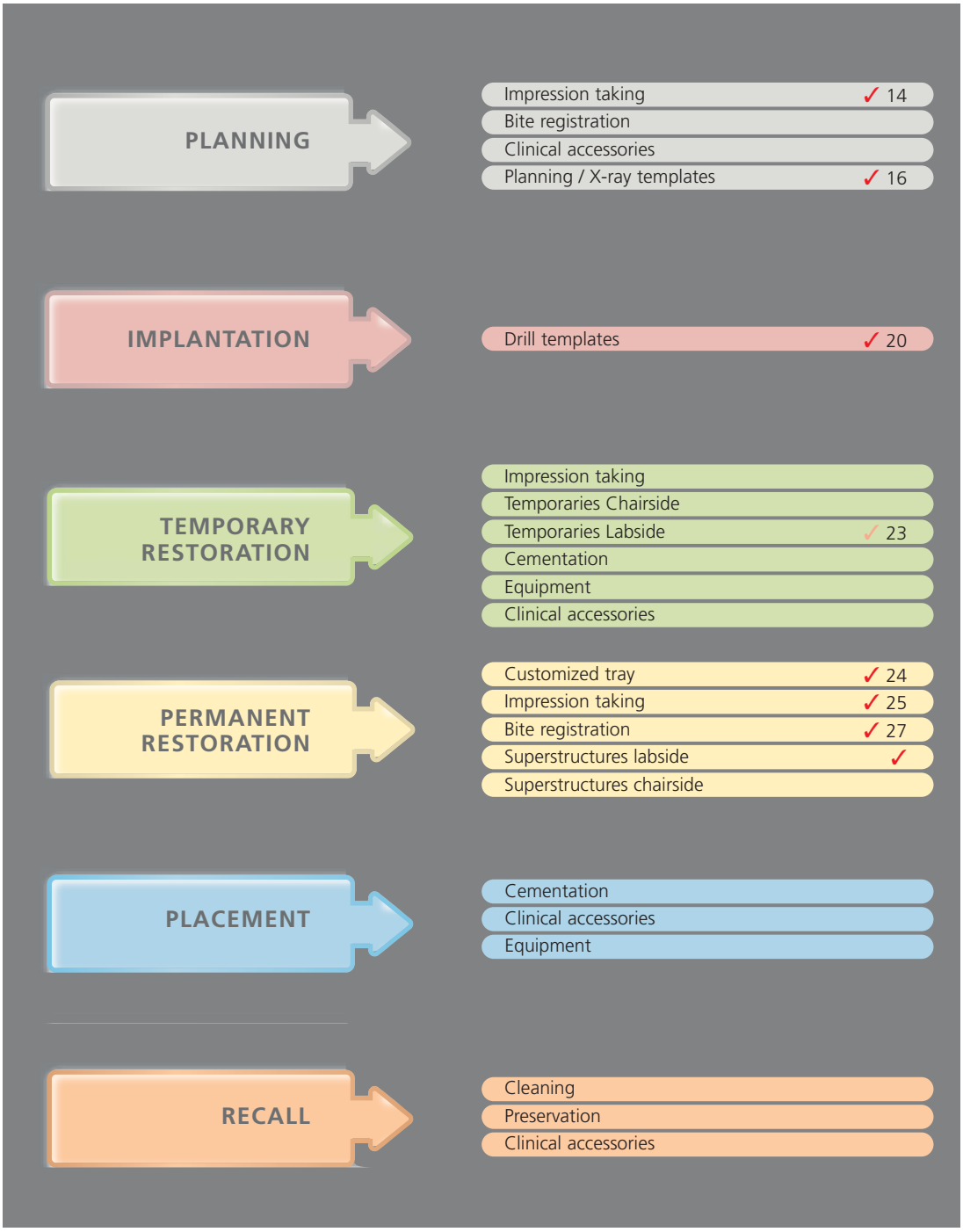
Overview

Navigation

The fabrication of a functional and aesthetic implant-retained restoration involves interwoven clinical and technical procedures for which various dental products are used.

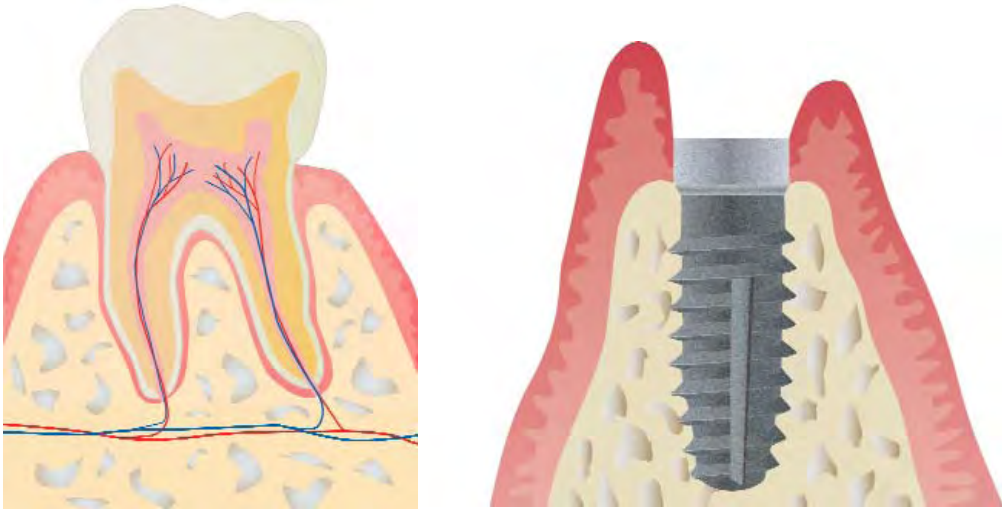
The navigation shows the sequence of procedures for an implant-retained restoration in six main working steps. Each step is again divided to provide a more detailed overview of the individual process.

The red ticks within the working steps indicate the processes explained in this Manual. The colour code should make it easier for you to identify the individual processes.



Introduction to dental implantology

Implantology is the science of implanting foreign (alloplastic) materials to replace endogenous (lost) organ functions with the objective of tissue-friendly setting (biointegration). Dental implants may also be called artificial roots which are implanted into the jaw bone in the place of missing teeth.



Comparison of a natural dental root with an «implant root»

In dentistry, dental implants are alloplastic materials, which are incorporated in the area of the mucous membrane-periosteum epithelium and/or the jaw bone in order to retain dental restorations.
We are working with open implants in dentistry, which are in permanent contact with the germ-laden oral cavity.

Classification of the different implant types

Classification according to the recipient tissue

- **Subperiostal implants**
  They date back to the infancy of implantology and are no longer in use today. They consisted of a kind of framework that extended over a certain area of the alveolar process between the periosteum and the bone.

- **Mucous membrane implants**
  These are smaller implants, which snap into defects punched into the mucous membrane of the maxilla. Similar to subperiostal implants, this type of implant is only rarely used today.

- **Intra-ossal implants**
  Intra-ossal implants are securely anchored in the bone. They exist in two basic shapes:
  - Blade and disk implants, a rather rarely used type
  - Cylindrical implants, which is the most frequently indicated type nowadays. They are available in a multitude of systems.

- **Sub-classifications**
  - Materials
  - Rough morphology – characteristics of shape
  - Fine morphology – surface structure

Oral implantology distinguishes between different implant types. Intra-ossal implants are considered the implants of choice today. An intra-ossal implant is an implant that is directly anchored in a bone.

Area of application of intra-ossal implants:
- *Immediate implant*: Implantation is performed during the same appointment as the tooth extraction or within a week at the latest.
- *Standard implant*: Insertion is performed approximately 4 to 6 weeks after tooth loss.
- *Delayed implant*: Insertion only once the bone in the alveolar cavity has healed. The implants are used as retention elements for hybrid dentures.

With intro-ossal implants, the osseo-integration of the implants can be achieved. The term osseo-integration describes the direct, functional, and structural bond between the organized, living bone tissue and the surface of a treated implant (Brånemark, 1977).

Factors of successful osseo-integration (implantation)

Patient selection

- healthy oral and overall situation of the patient
- correct information of the patient about the treatment procedure and the intended treatment result

Bone quantity

- the available bone structure of the maxilla and mandible determines the indication and the selection of the implant
- in case of an atrophied alveolar process, reconstruction of bones by means of augmentation techniques

Bone quality

- the suitability is determined by two different bone structures (compacta, spongiosa) and is sub-divided into four categories I-IV

Implant material

- the requirements, such as mechanical strength, biological compatibility, and stability must be met

Implant surface

- biocompatible materials with a structured surface induce the settlement of bones
- smooth surfaces at the neck section of the implant reduce plaque accumulation

Implant shape

- Blade implants (rarely used today)
- Needle implants
- Screw implants
- Cylindrical and root-shaped implants
- Combined implants

Implantation planning

- Implantation should be preceded by a careful planning stage, in which the number, position, and length of the implants are determined.

The following pre-operative planning tools are prepared for edentulous jaws:

- General and dental anamnesis
- Extra- and intra-oral findings
- Functional analysis
- Fabrication of diagnostic casts
- Mounting of the models in the articulator (facebow, determination of TMJ relations)
- Wax-up, diagnostic tooth set-up
- Radiological examination
- Photographic documentation

Surgery

Surgical procedures in the implant technique are divided into:
– soft tissue intervention (gingival, mucosa)
– hard tissue intervention (bone)

The planned implant position of the diagnostic model is transferred to the intra-oral situation with the help of a drill template or a navigation system.

Superstructures

Cemented or screwed-down:
Individually fabricated crowns and bridges
– purely implant-retained
– one or several implants connected with natural abutment teeth (hybrid bridge)

Removable or partly removable:
– implant-retained hybrid dentures

Occlusion

– With implant-retained superstructures, the aim should be axial load and multi-point contact in the centric position with unimpeded excursive gliding movements.

Oral hygiene

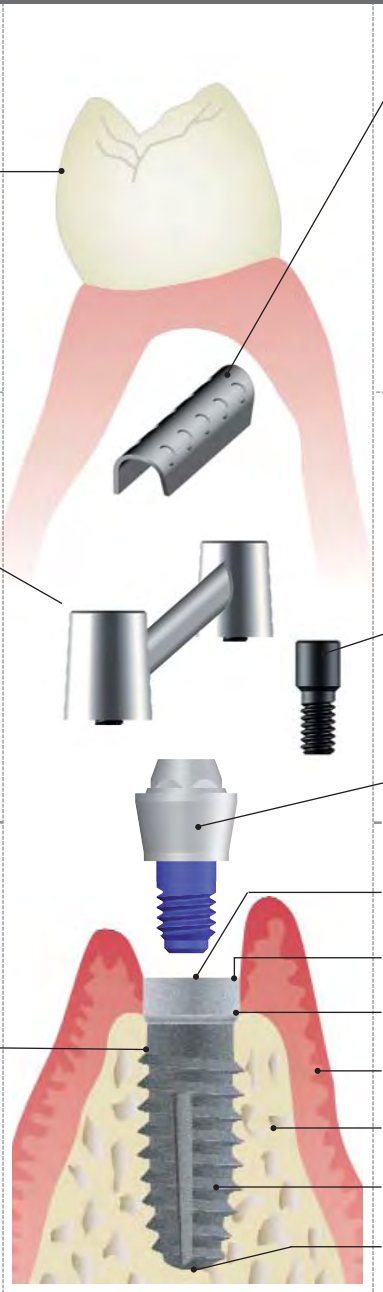
– Patients are instructed in advance on the independent cleaning of the implants and superstructures in order to perform adequate oral hygiene (interdental brushes have proven most successful).

Aftercare

– Optimum oral hygiene on the part of the patient is necessary for the long-term success of intra-ossal implants. Additionally, patients should have regular dental check-ups.

Structural elements

	CLASSIFICATION	STRUCTURAL ELEMENTS
Superstructures	**Tertiary elements** (exostructure)	**Superstructure** (dentures)
	Secondary elements (mesostructure)	**Implant abutment** (abutment – prefabricated or customized) e.g. bar construction (with abutment)
Implant	**Primary elements** (endostructure)	**Implant**



Implant

The term implant describes the part of an implant system that is anchored in the jaw bone. The implant can also be called 'artificial tooth root'.

Primary element / endostructure = «implant»

Implant head

– The implant head is the most coronal part of the implant and it represents the connection to the implant post or directly to the superstructure. There are implant heads with and without anti-rotation lock. The concept of an anti-rotation lock depends on the system, or the manufacturer, respectively.

Implant shoulder

– The implant shoulder is the transition between the implant neck and the implant post. The implant shoulder is narrow with a machine-treated surface and may be bevelled to improve the aesthetic appearance.

Implant neck

– The implant neck is located between the implant body in the jaw bone and the implant shoulder. An implant neck with a machine-treated surface prevents plaque accumulation. Given the subgingival placement of the implant neck, the mucous membrane may adapt without irritation.

Implant body

– The part of a root replacement that is positioned in the bone (intra-ossal) is called the implant body.
The coated, perforated implant bodies are classified into hollow body and solid body implants.

Implant apex

– The implant apex is the lower (apical) part of the implant body,
Through which the vertical force exerted on the implant is transmitted to the jaw bone. Screw implants transmit the vertical force via the thread into the bone.

Superstructures

A superstructure comprises everything that is retained by the implant and protrudes into the oral cavity, i.e. secondary and tertiary elements.

Secondary element / mesostructure = «abutment»

Implant abutment

– The implant abutment, short abutment, is the part of a one- or two-phase implant system which is connected to the implant or fixed to it. It is the build-up that protrudes into the oral cavity, which is either directly included into the superstructure or which serves as a connection element between the implant and the superstructure.

Implant screw

– The implant screw, also called abutment screw, is used for a rigid, mechanically stable connection between the implant, abutment, and superstructure.

Tertiary element / exostructure = «superstructure»

Superstructure

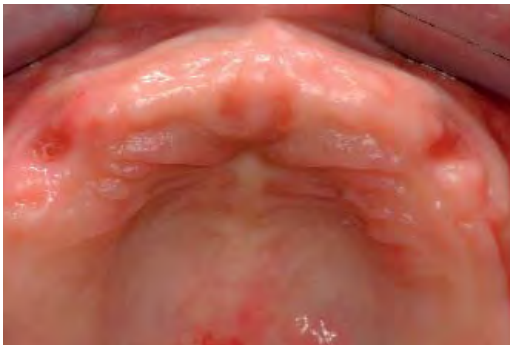
– The superstructure is the prosthetic restoration that is either directly or, in most cases, indirectly connected with the implant.
It may be retained on implants and natural abutment teeth at the same time. Depending on the type of connection, superstructures are classified into fixed, partly removable, and removable superstructures.

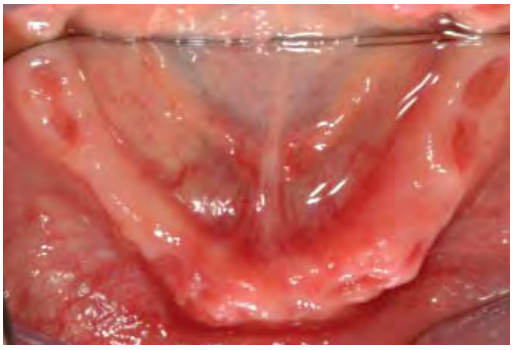
Planning of implant-retained prosthetic restorations

The main objective of implant-retained prosthetic reconstructions is the restoration of aesthetic, function, and phonetics. If enough bone structure is available in the respective quality or by means of augmentative procedures and membrane techniques, implants may be inserted wherever they are useful in connection with interdisciplinary treatment planning and permit good aesthetic results. Aesthetic aspects have become increasingly important in implant prosthetics.

The possible treatment plan and prosthetic restoration should be defined in advance by the entire team consisting of jaw surgeon, dentist, and dental technician. Without ample communication by the entire "restoration team" and the patient, his/her desire for an aesthetic and functional restoration is only met in very rare cases.

A carefully prepared, prosthetics-oriented implantation plan, in other words «backward planning», is indispensable for correct positioning and selection of the implants.
Only in this way may prosthetic superstructures be fabricated that meet the requirements regarding function, phonetics, oral hygiene, and aesthetics.





Clinical situation of an edentulous jaw

Implant-supported restorations have to be fabricated with utmost precision to ensure a tension-free fit of the restoration both on the model and in the oral cavity. What is known as the Sheffield Test* is a simple method for the clinician and technician to check the meso-structure with regard to the above aspect.
An arbitrary facebow for the articulation of the maxilla and a centric registration to determine the TMJ relations are considered the absolute minimum requirements to be fulfilled.

UTS 3D Transferbow in the Stratos® 300

*) Sheffield Test: In the Sheffield Test, an outer screw of the implant-retained superstructure is tightened in order to check the accuracy of fit of the framework without any tensions. If a gap develops in another area once an outer screw has been tightened, tension-free accuracy of fit of the restoration has not been achieved.

Clinical and laboratory procedures

for the fabrication of implant-retained superstructures

The clinical and laboratory procedure for the fabrication of implant superstructures shown below represents one option and is related to the superstructures presented in this Manual.

Practice, Clinic	Dental Laboratory
– Planning / analysis / patient selection – Impression of the maxilla and mandible – Preliminary bite registration – Facebow registration	
	– Fabricating the preoperative models – Articulating by means of the facebow registration, preliminary bite registration – Model analysis for the diagnostic set-up – Diagnostic set-up
– Functional and aesthetic try-in	
	– Fabricating the planning, radiographic, and drill template
– Planning / analysis – Radiograph, computer tomography DVT (Digital Volume Tomography) – Augmentation (if necessary) – OPG Orthopantogram (panoramic radiograph that shows the entire jaw) – Implantation – Inserting the healing cap – Healing phase 2 to 8 months	
– Impression of the jaw with implants	
	– Fabricating the temporary or adjustment of the existing dentures
– Inserting of the temporary	
	– Fabricating a customized impression tray for open-tray or closed-tray impression – Fabricating an intra-oral bite registration
– Removing the healing cap (gingival former) – Inserting or screwing down of the impression posts on the implants – Checking the impression tray – Impression of the implants and the jaw – Re-inserting the healing caps – Facebow (extra-oral registration) – Intra-oral bite registration	
	– Inserting or screwing down of the laboratory implants – Fabricating a master model – Fabricating a gingival mask (depending on the method used. In the direct technique, this step is performed prior to the fabrication of the master model) – Wax-up in accordance with the planned set-up
– Wax try-in	
	– Fabricating/adjusting of the mesostructure (e.g. bar or abutment for telescope) – Fabricating a framework construction
– Try-in of the framework	
	– Completing the superstructure – Checking the completed superstructure
– Removing the healing caps – Incorporating the superstructure – Radiograph (OPG) – Check-up of the superstructure after approximately 1–2 weeks (pressure sores, etc.) – Aftercare	

Planning

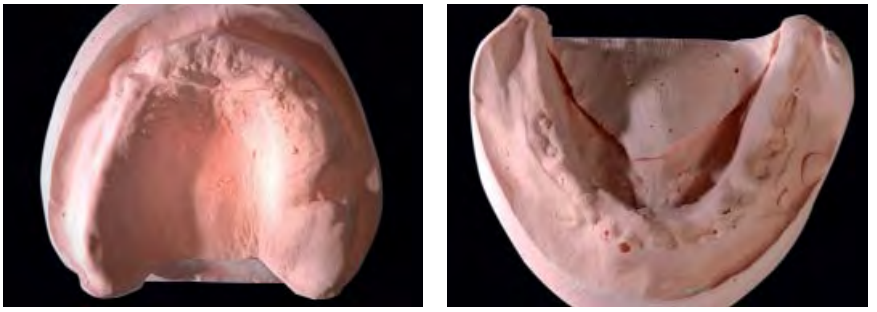
Once the clinical and radiographic examination has been conducted to determine possible treatment methods, the planning of implant-retained prosthetic restorations can begin.

«Backward Planning» is indispensable for an optimum result. Modern implant prosthetics is planned in reverse order, which means the future prosthetic superstructure represents the starting point.

Pre-operative model

Preoperative models must reproduce the fine details or the alveolar ridges, gingivo-buccal fold, and retromolar areas. The impression of the entire jaw situation helps to identify and take into consideration any augmentations required.

Skull-related, articulated preoperative models completes optimum planning. Together with the diagnostic set-up, a comprehensive model analysis represents the basis for implant-retained prosthetic restorations (see also Handbook of Complete Denture Prosthetics from Ivoclar Vivadent for a detailed model analysis according to BPS).



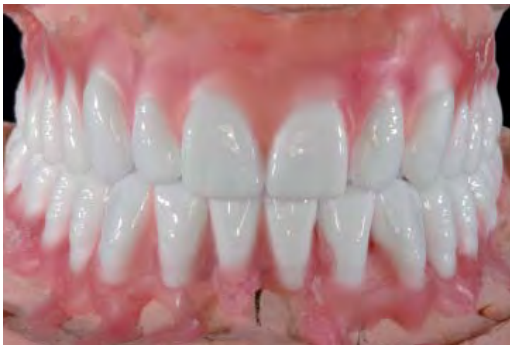
Preoperative models

TIP:
By means of the preliminary bite registration with the Centric Tray, the vertical dimensions may be provisionally determined at this early stage. This permits taking the patient's individual intermaxillary distance into account already during the diagnostic wax-up.

Diagnostic wax-up

A diagnostic wax-up of the missing tooth and jaw records should precede every prosthetic restoration. With the help of a diagnostic set-up, the subsequent position of the prosthetic teeth are planned and the phonetics, aesthetics, and functions are checked beforehand on the occasion of a diagnostic try-in. The set-up of such a wax-up is performed according to the principles of complete denture prosthetics (see Handbook of Complete Denture Prosthetics from Ivoclar Vivadent).

Ideally, the completed diagnostic wax-up should be tried-in in the patient's oral cavity. In this way, planning errors can be prevented, and the communication within the triangle of dentist – dental – technician – patient intensified. Misplaced implants can be prevented, atrophied jaw bones recognized, and augmentative measures taken in time.

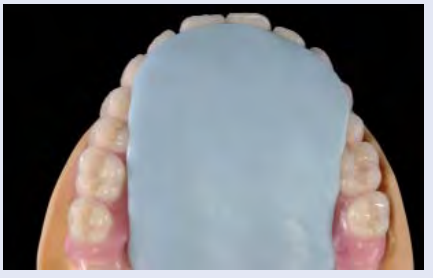


Diagnostic wax-up with SR VivoTAC® and SR OrthoTAC®

TIPS:

– Working with radiopaque teeth for the diagnostic wax-up enables time-saving fabrication of the planning templates.

– The fabrication of an additional silicone or stone key is an excellent checking tool for the subsequent fabrication of the permanent restoration.



Fabricating a silicone key

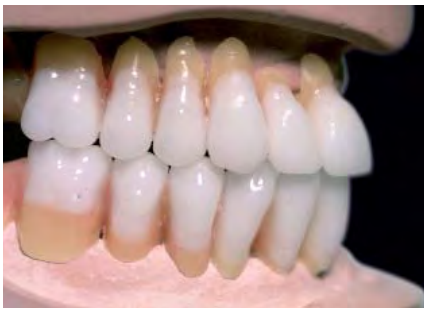
Planning template

To determine the planned implant position in the jaw, a planning template is fabricated.

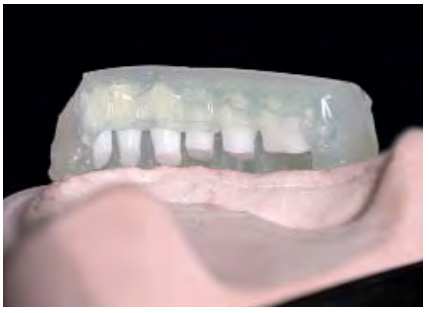
The planning template is designed on the basis of the diagnostic wax-up (page 15). For that purpose the excess gingival modellation of the try-in is removed so that the tooth base comes to rest on the alveolar ridge as an extension of the tooth axis.

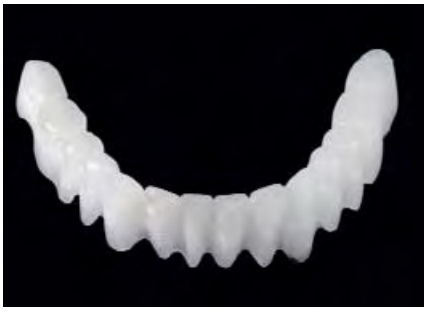
With the help of a silicone or stone key, this contouring is subsequently transferred to a radiopaque resin and finished.

This extension of the tooth axis may be used to determine in advance the most favourable implant position from a prosthetic point of view. Whether or not the position is suitable for the implant is determined during the course of the further planning and/or examination.



Extension of the cervicals down to the alveolar ridge – wax modellation

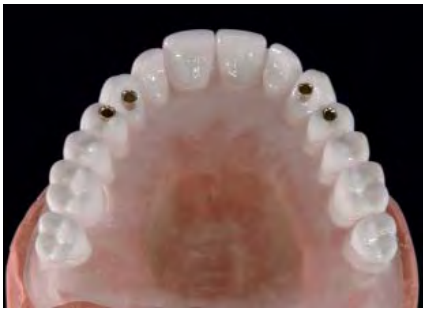
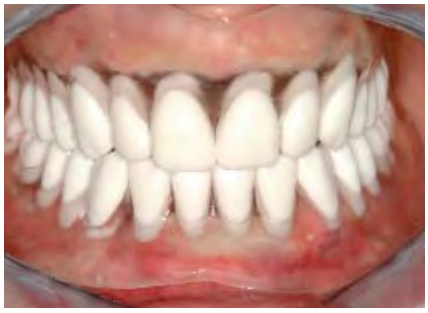




Transfer of the contouring to a radiopaque resin.

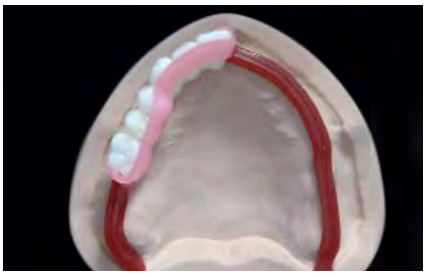
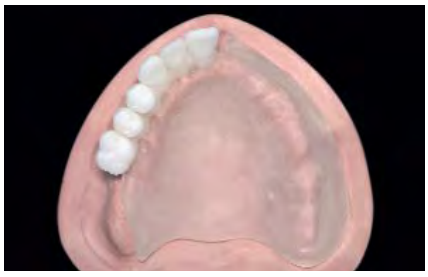
Radiographic template

The radiographic template represents a connection between the preoperative model of the patient to the radiograph. Radiopaque teeth, barium sulphate, titanium tubes or posts outline the position of the teeth. This enables optimum analysis and planning.

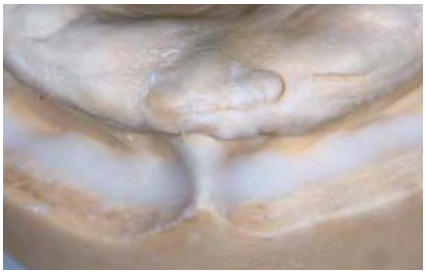
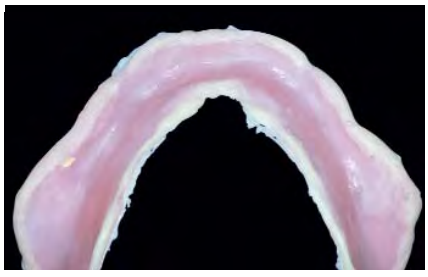



Radiographic template on the model and in the oral cavity of the patient

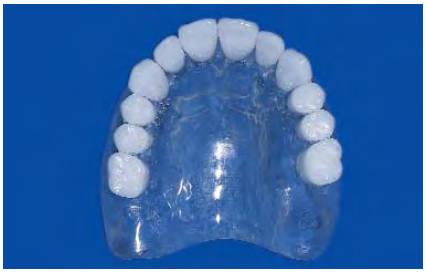
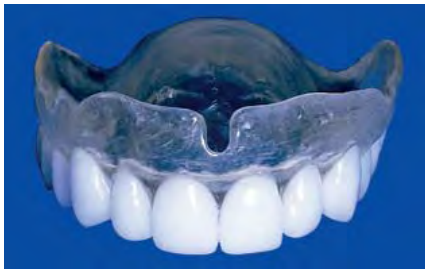
Radiographs provide information about the bone structure available for the implantation and about the position of the important anatomical landmarks. The planning template can be used as the basis. CT tubes or other radiopaque markers are placed in the planned implant position and are then used as reference points in the radiographs. With the help of computer tomography, it is possible to obtain a sectional radiograph of the bone in certain defined areas of the jaw. The medical information obtained with the radiographic template is subsequently used to determine the implant positions, number of implants, implant diameters, and implant lengths.

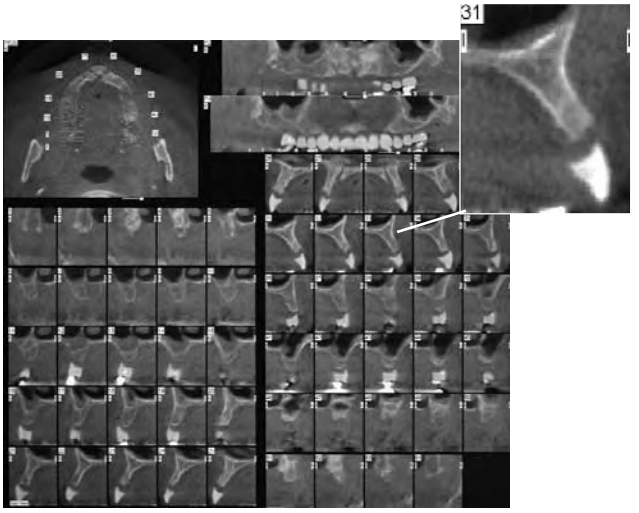
Course of the alveolar ridge marked with barium sulphate

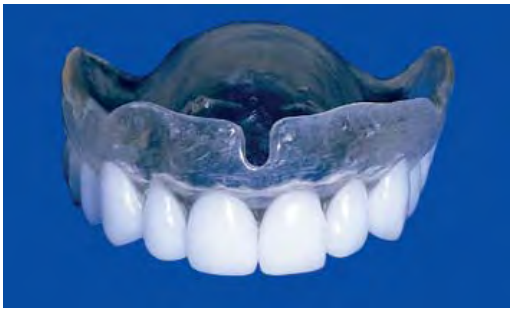



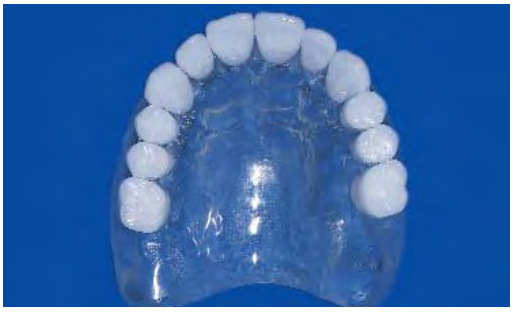
Bucco-labial fold marked with barium sulphate

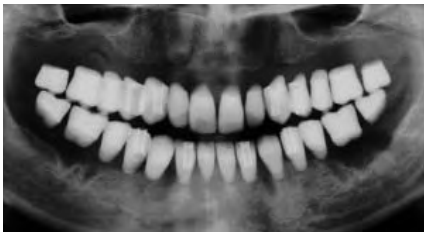



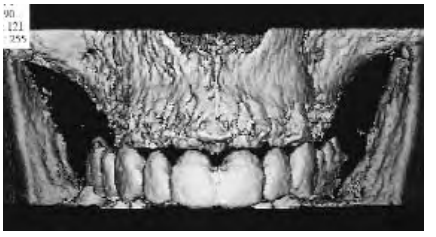
Tooth arch of radiopaque teeth

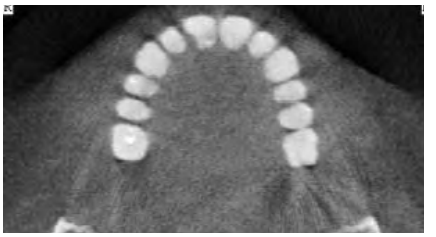


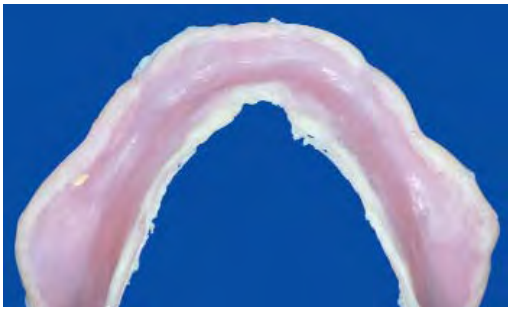


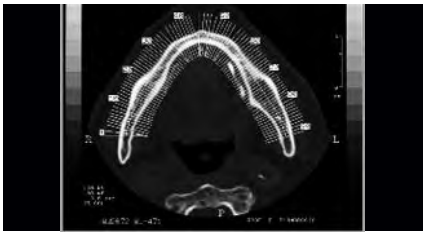








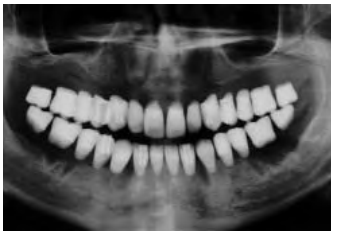




Radiographic template in the original and in the CT image

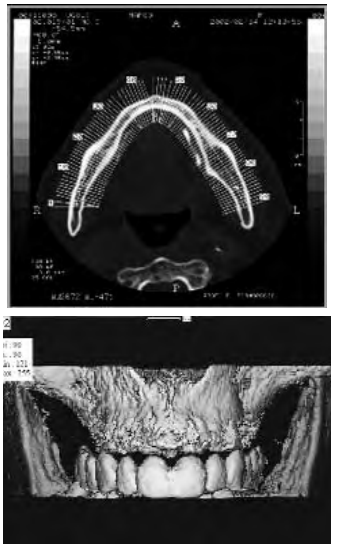
Teleradiogram
A teleradiogram as the sole diagnostic tool is often not sufficient for the planning of implant-retained restorations. However, it enables, among other things, the analysis of the horizontal relation of the jaws to each other and to the skull.

Orthopantomography (OPG)
An orthopantomographic image is an panoramic radiograph that provides an excellent overview of the situation in the oral cavity.



Computer tomography (CT)
A CT-supported examination provides exact data on the anatomical situation of the patient. Especially for edentulous jaws, this type of analysis represents the ideal solution.

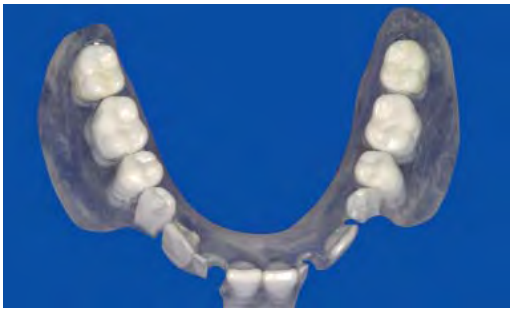
The analysis of the radiograph shows whether or not the insertion direction simulated in the planning is agreeable with the available bone structure and to what extent changes are necessary. In this way, the position and orientation of the implants are determined at the same time.



Drill template

The drill template guides the surgeon during the placement of the implants according to the prosthetic aspects determined during planning.
With the drill template, the planned location and axial position of the implants is transferred to the bone. At the planned implant insertion location, a guiding hole is drilled into the resin and titanium tubes (guiding tubes) inserted.
The surgeon uses the drill template to conduct the pilot drilling. Adequate stability and fixation of the template in the palatal or gingival area is required.

Important:
The radiographic template should be designed according to the demands of the clinician. If he or she requires a special design of the template base or certain materials, it should be tried to adjust the design of the template to the corresponding demands.



Individual demand by the clinician:
The guiding holes of this drill template are only "half trimmed"

Important:
This section merely outlines the implantation procedure and is intended to provide some general information. The details depend on the implant system used, the working habits of the surgeon, and the respective patient.

Procedure

Incision

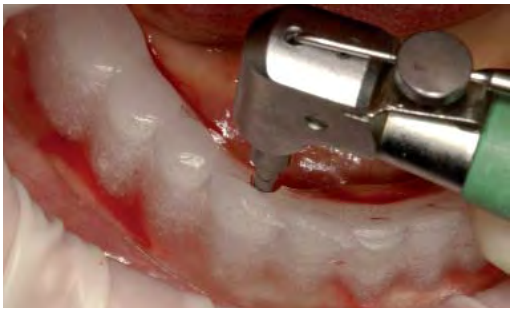
The incision clearly exposes the surgical area and permits optimum wound closure later on. For this purpose, the mucous membrane is separated with a scalpel, the periosteum lifted, and the muco-periostal flap folded towards the back (i.e. oral).

Smoothing

The area in which the implant is to be inserted is smoothed using a bone bur. After that, a marking drill hole is placed.

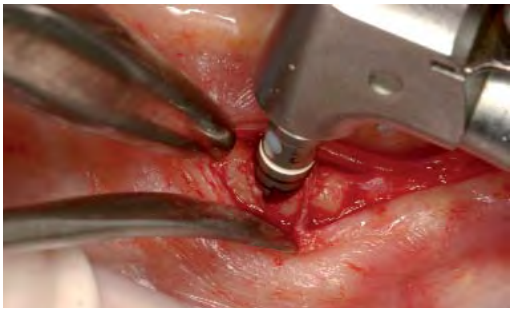
Pilot drilling

The preparation of the bone bed starts with the pilot drilling with the help of the lab-fabricated drill template. The pilot drilling determines the subsequent real implant axis, as well as the final length. Furthermore, the clinician obtains information about the actual bone quality at this point. If the bone quality does not meet the requirements, the corresponding measures must be initiated.



Milling the bone bed

The bone bed is prepared in several steps with internally and externally cooled profile drills with increasing diameters. These drilling procedures are performed under constant cooling by way of rinsing with physiological saline solution, which also simultaneously removes the bone chippings produced. Inadequate cooling may result in local overheating of the bone and thus to osteonecrosis.
The profile drills are equipped with marking rings, which provide the clinician with information about the current depth of the bone bed.

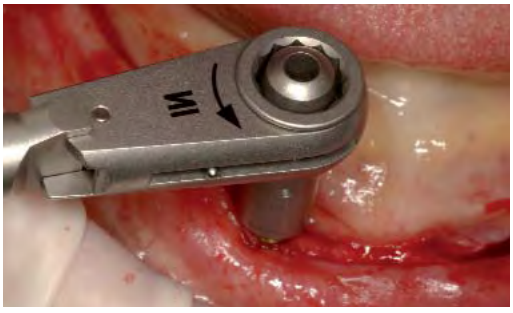


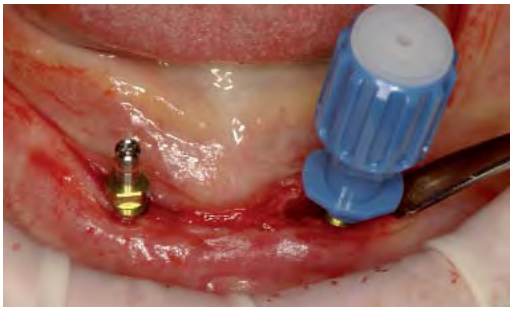
Accurate expansion of the implant bed

The step can be performed, among others, with conical «reamers». In the case of screw-type implants, the thread can be cut into the opening by means of a manual instrument and rinsed. This step is not required with self-tapping implants or with the corresponding bone quality.

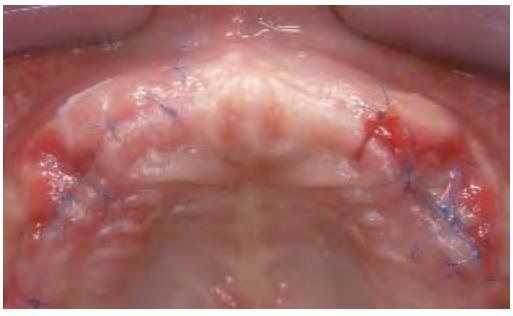
Screwing in the implants

The implant is screwed in at limited speed and without pressure. Depending on the manufacturer, cylindrical implants are even tapped in.

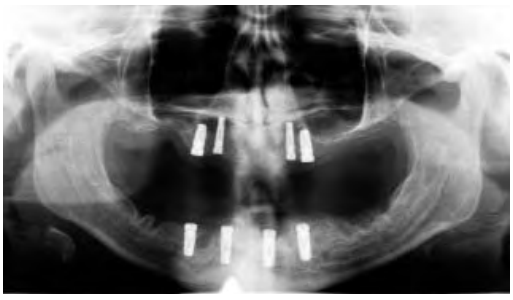




Finally, the healing caps are placed. If a closed healing system is used, the insertion area is covered with the mucous periostal flap and sutured without tension.



The final step of the implantation is the radiographic check.



Temporary restoration

In removable, implant-retained prosthetics, the fabrication of a new temporary restoration is not absolutely necessary. Often, the existing complete dentures can be adjusted by grinding in the area of the implantation in such a way that the freshly seated implants are not affected by the dentures.

However, the available restorations are not always suitable for adaptation. The condition and type of the previous restoration, number of implants, implant system used, and the decision of the clinician of whether or not immediate loading of the implant is possible are important aspects.

Another possibility of using the existing dentures as a temporary is to reline them. Since the temporaries are intended to be used for a limited time, soft relining materials are often applied. The susceptibility of these soft materials to plaque accumulation, however, must not be ignored. Whether the relining is fabricated in the dental office or the laboratory is irrelevant in this context.

Whether or not a temporary restoration is incorporated and the time of incorporation also depend on the decision of the clinician.

Important:
If possible, the temporary should not transmit any stress on the healing implant. Exception: Implants indicated for immediate load.

Implant-retained prosthetic superstructures

In the field of removable denture prosthetics, implant-retained restorations place the highest requirements on materials, clinicians, and psyche of the patients. A few examples of implant-retained restorations will be described in detail. In addition to the ready-made Dolder® bar joint, an implant-retained telescope solution, as well as a restoration using ball clasps will be presented.

Preparation of the permanent restoration

Tray design

The objective of impression taking is the exact reproduction of the oral situation including the implant position and the corresponding dimensions.

Before the fabrication of the individual tray, a new anatomic impression should be taken, which will form the basis for all future procedures.
The fabrication of a customized tray for implant-retained restorations is carried out in a manner similar to the fabrication of conventional customized impression trays. Usually, a light- or self-curing material is used. The design, however, is somewhat different from that of conventional trays, i.e. the tray may be given an open or closed design in the area of the implantation.

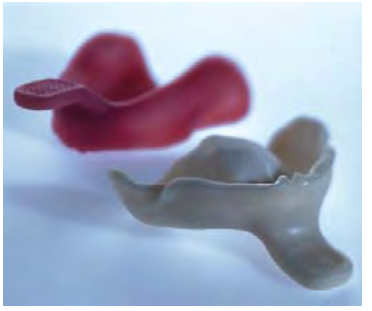
In this context, the question of which is the better of the two methods is often raised. Basically, there is no prescribed solution. Both versions have their advantages and disadvantages. It is important, however, that both the clinician and the dental technician are familiar with the technique used and know how to work with it accordingly.

Implant manufacturers often provide recommendations regarding certain impression taking methods suitable for use with their system and offer impression posts for the various methods. Therefore, the stipulations of the implant system manufacturer must be strictly observed.

For implant-retained removable restorations in edentulous jaws, an open, individually designed impression tray with a myco-dynamic impression taking method is used, while closed, myco-static impression taking is the method of choice for individual implants.

Closed-tray impression

After impression taking, the lab implant is inserted into the impression elements. The impression post and lab implant must perceptibly click into place in the impression elements.

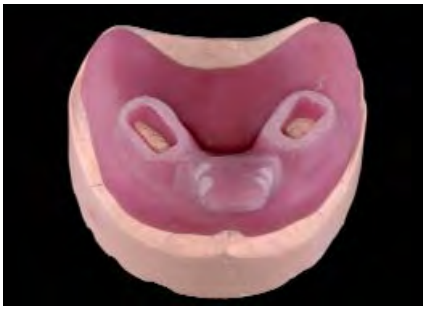


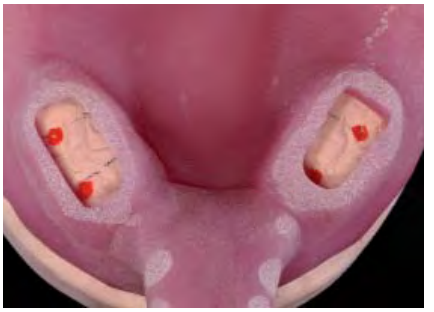
Important:
The impression caps and impression posts must precisely and perceptibly click into place in the implants/lab implants or screwed down accordingly.

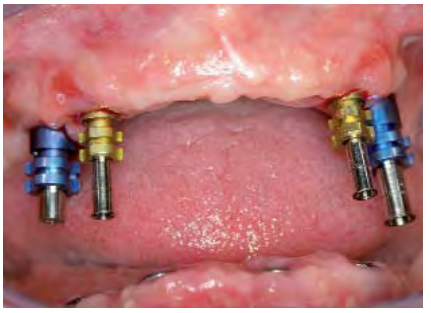
Open-tray impression

The screwed version is suitable for both individual implants and groups of inserted implants. It is particularly indicated for non-parallel inserted implants and with very deeply located implant shoulders or if the gingiva is flush with the implant. The sturdy and precise screw connection between the impression post and the implant prevents the impression posts from coming loose. However, while the screw is being tightened, the lab implant must be held at its retentive part.

During impression taking, the impression post is firmly screwed to the implant. After loosening the screw, the impression post integrated in the impression can be removed and repositioned in the impression later on.







Closed-tray impression

(Camlog Biotechnologies AG)

Advantage	Disadvantage
– The impression posts are protected from external influences to a very large extent – Vertical space requirement in the oral cavity is limited (patient with limited jaw opening)	– Little control regarding the correct position of the impression posts – The impression posts are loosened after the removal of the impression and then repositioned in the impression (source of error)

Open-tray impression

(Camlog Biotechnologies AG)

Advantage	Disadvantage
– Better control during impression taking – After impression taking, the impression posts are loosened and removed together with the impression – The screwed version is suitable for all impression taking methods	– The projecting impression posts are to be blocked out with resin or a similar material, distortion may occur as a result of shrinkage – The projecting ends are rather sensitive

TIPS:

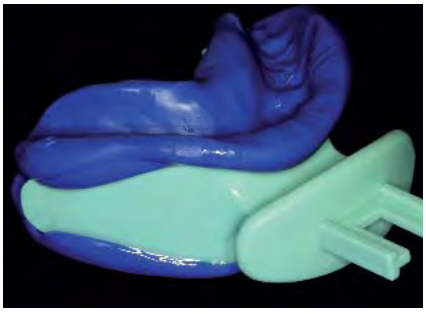
– The position of the impression posts in the oral cavity of the patient may be additionally checked by means of radiographs. If more than two implants are present, this examination should always be carried out since it helps prevent transfer errors.

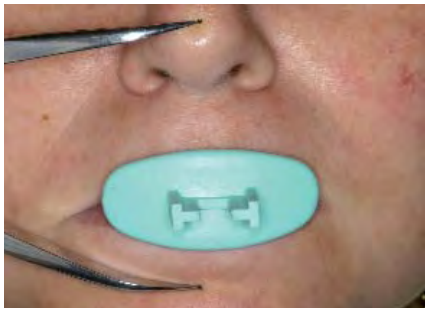
– The model implants required for model fabrication should be available in the laboratory together with the impression.

Important:
The impression posts must not be modified in the «shoulder» area.

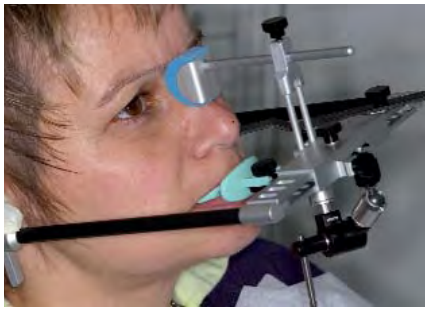
Bite registration

For the three-dimensional determination of the relation between the mandible and the maxilla (centric relation), a maxillo-mandibular relationship record (bite registration) is prepared.
The maxillo-mandibular relationship record is fabricated in the same way as in the conventional methods used in complete denture prosthetics. With edentulous jaws, the preliminary bite registration should be carried out as early as during the planning stage in order to facilitate and optimize the further processing steps.

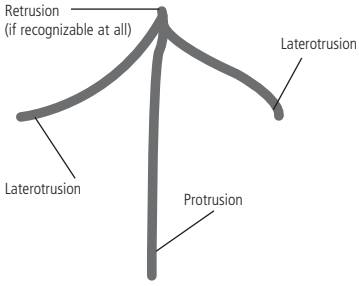


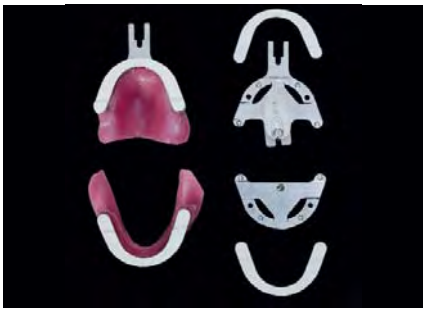


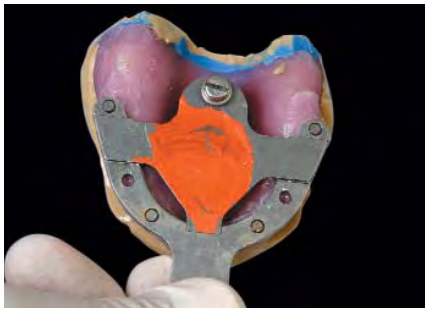
For the exact determination of a patient's individual data, the use of a facebow registration (UTS 3D) should be mandatory.



Additionally, an intra-oral registration (needle-point tracing – Gnathometer M) of the jaw movement pattern provides information about any possible disturbances. They should be considered for the fabrication of the permanent restoration or even be rectified before the restoration is incorporated.







Note:
It goes without saying that bite registration may also be performed with conventional wax rim registrations. In order to obtain the most precise result possible, however, it is recommended to work with an additional facebow registration.

Model fabrication

Precise model fabrication is the basic prerequisite of every prosthetic restoration.

Once again, it must be emphasized that the zero position of the implants can only be achieved with the close cooperation between the dental office and laboratory. Depending on the implant system and impression taking method, the lab implants have to be set into the impression and checked accordingly

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(Camlog Biotechnologies AG)

Important:
Since precision and exactness are indispensable in the fabrication of implant-retained dentures, the processing instructions of the manufacturer must be observed for all working steps.

Prerequisites for exact and reproducible results for impression taking and model fabrication:

- All the materials used for impression taking and model fabrication have to be processed according to the manufacturer's instructions (each deviation may lead to uncontrollable results).
- The impression taking time in the clinic should be noted (important for the calculation of the setting time of the impression material).
- The time required for the elastic recovery of the impression material indicated by the manufacturer must be observed (particularly important in conjunction with exposed jaws and diverging impression posts).
- Cleaning and disinfection of the impression.
- Exact positioning of the lab implants and transfer elements.
- Selection of the model system and model fabrication method.
- The expansion of the stone must be taken into account (constant expansion of the special stone should be below 0.08 %).
- While the type 4 special stone is vibrated, it must be ensured that the transfer elements are not turned loose.

Important:
The lab implants must be precisely inserted into the impression caps and impression posts and perceptibly snap into place or be screwed down.
An adhesive must not be used. Model implants may only be used once.

Before the impressions are cast, the fit of the lab implants in the impression must be checked again.

Loosening of the lab implants during model fabrication may have grave consequences for the subsequent fabrication of the restoration and may only be noticed during try-in and/or incorporation.

Gingival mask

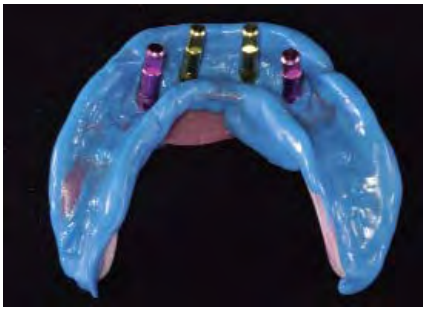
For the optimum design of implant-retained restorations, a removable gingival mask is fabricated on the master model. Silicone materials in various consistencies and different shades of pink are available for the fabrication of gingival masks.

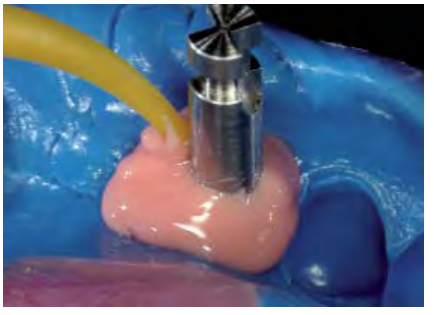
Advantages of a removable gingival mask:
- unimpeded view of the model implants
- optimum check of the accuracy of fit of the superstructures
- precise reproduction of the gingiva
- precise reproduction of the gingival margins (emergence profile)
- design of the prosthetic restoration according to the gingival outlines
- fabrication of superstructures that are convenient to clean from a periodontal standpoint

Gingival masks can be fabricated directly or indirectly.

Direct fabrication

Once the impression has been taken, the gingival mask is fabricated directly in the impression.
- Before the silicone material is injected into the silicone impression, a recommended separating agent should be used (this is not required with polyether materials – see information of the manufacturer)
- Apply silicone walls as a limit for the gingival mask if the consistency of the gingival mask seems to be too liquid.
- The silicone material is directly injected/poured into the impression around the model implants
- After the silicone material has set, the removable gingival mask is adjusted by grinding to give it a conical shape for the subsequent model fabrication.



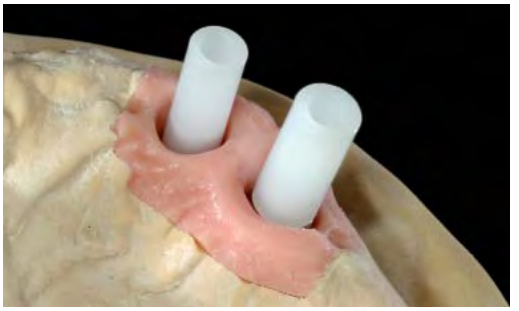


Gingival mask – direct fabrication method

Indirect fabrication

After pouring the master model, the gingival portion of die stone is replaced with a removable gingival mask made of a silicone material.

– A silicone key is prepared with the screwed down impression posts.
– The gingival area made of stone is generously reduced by grinding to below the upper part of the model implants.
– The silicone material is poured or injected through the predrilled injection channels in the silicone key.
– Subsequently, the gingival mask is carefully adjusted.



Completed gingival mask with plastic tubes

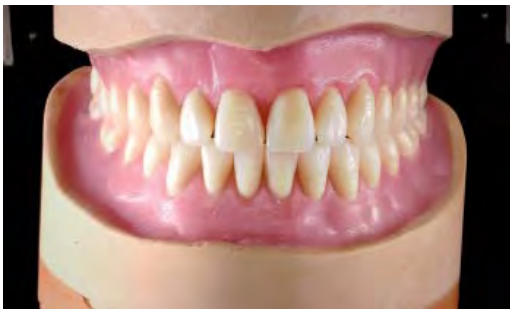
TIPS:

– Make sure that the removable gingival mask demonstrates adequate stability to ensure easy removal from and exact repositioning on the master model.
– For the indirect fabrication, the neck areas of the model implants may be slightly blocked out with wax at the gingival edge before the silicone material is applied.
– After model fabrication, checking the implant axes with the help of the silicone key of the diagnostic set-up is recommended.

Abutment selection

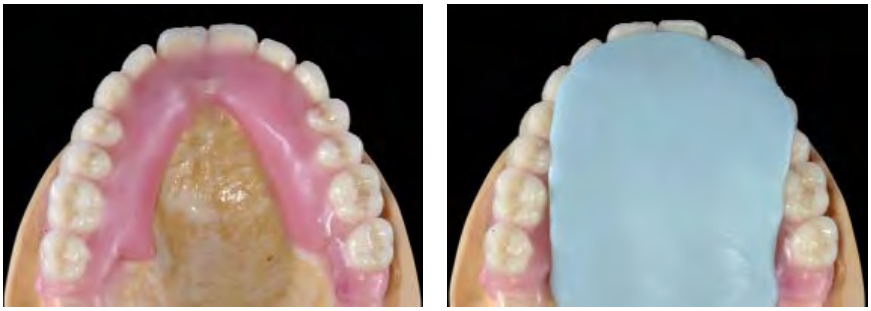
The selection of the suitable abutments is done in the laboratory since the impression only records the implant position. The intended superstructure ultimately determines the selection of the abutments. Therefore, the final wax-up taking the final implant position into account should be carried out before the selection of the abutments.

There are currently only very few studies on the set-up of implant-retained removable restorations which describe the influence of the various occlusion concepts on the longevity of implants. It is known, however, that occlusal overload should be prevented, since it is considered a potential cause for peri-implant bone and implant loss.
Mostly bilaterally balanced and lingualized occlusion concepts are mentioned as occlusal recommendation for implant-retained removable dentures.



Final wax-up

After the set-up, a silicone or stone key of the final wax-up can be fabricated, which will then facilitate the selection of the abutments.



Fabrication of a silicone key of the diagnostic set-up as an aid for abutment selection

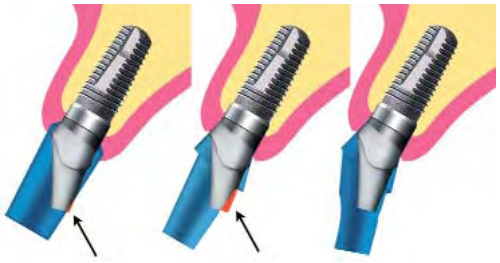
Abutment selection aids

To facilitate the selection of the abutments, the implant manufacturers offer a number of plastic abutments. These planning auxiliaries are positioned on the model implant in the model. The height and axial direction can be checked and the optimally fitting secondary elements/abutments selected.

Abutment selection auxiliaries
(Camlog Biotechnologies AG)

Important:
These plastic abutments/plastic secondary elements must be clinically used.

Straight abutments may balance out an axial inclination of up to 10°. With a more pronounced axial inclination, however, angled abutments of 15°/20° must be used or custom-fabricated as mesostructure. Angled or custom-fabricated abutments may compensate for unfavourable directions of the implants to a certain degree.



Determining the abutment angle
(Camlog Biotechnologies AG)

In the field of removable implant-retained prosthetics, there are various construction possibilities and, consequently, a large selection of prefabricated abutments.

– Telescopes

– Bar attachments

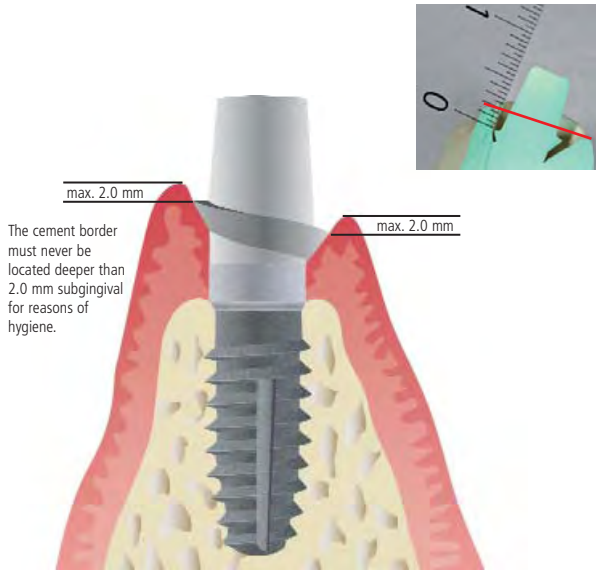
– Retentive anchors

– Locator

(Camlog Biotechnologies AG)

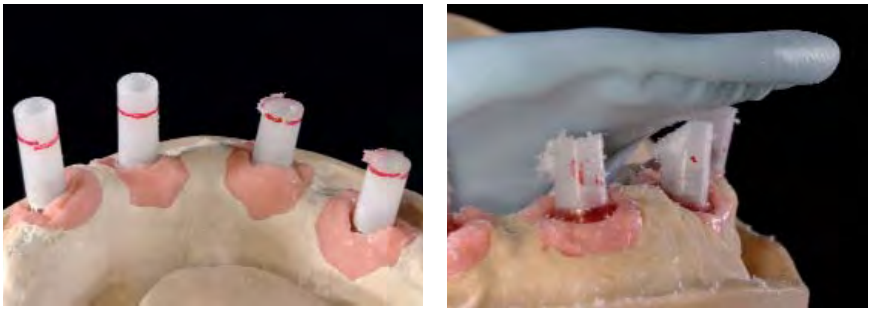
For the optimum selection of the abutments, the gingival height is also decisive. The stipulated abutment/gingival height corresponds with the height at the deepest labial/buccal point. An aesthetic permanent crown margin, both in fixed and removable restorations, should ideally be located 1–1.5 mm subgingivally, but no deeper than 2 mm below the gingiva. With implant-retained overdentures and hybrid dentures, even a para- or supragingival crown margin is possible, since this does not present an aesthetic disadvantage because it is subsequently covered by the denture base. Especially for older patients, such a positioning of the crown margin is an advantage with regard to the cleaning possibilities.

Adjustment of the vertical dimensions: Abutments must be correctly selected with regard to their height relative to the occlusal plane and shortened according to the available space.



Correct agingival heigth

TIP:
The silicone key of the final wax-up has proven useful for the shortening of the abutments, since it enables better estimation of the vertical dimensions.



Shortening of the plastic tube – checked with the silicone key

Important:
If a customized bar attachment is planned, abutment and bar should come from the same system. Manufacturers offer various bases, which are suitable for different joining techniques (e.g. soldering, welding, or cast-on technique), i.e. the planned processing method should already be taken into consideration when selecting the abutments.

Abutment preparation

Prefabricated abutments may be customized and adjusted according to their respective indication.
The orientation should be checked using a parallelometer and subsequently adjusted, if required, by means of a milling device.

The correct individualization of the abutment is checked by means of a silicone key.

The following points are checked:
– vertical dimensions
– circumference
– preparation angle 0°-4°

Additionally, the following characteristics should be checked:
– chamfer preparation
– course of the preparation margin
  – subgingival location of the vestibular area (1-1.5 mm) or paragingival location
  – in the oral area
– The cement border should not be more than 2 mm subgingival.

Customizable titanium abutments

The titanium abutment is adjusted to the desired dimensions using a titanium or tungsten carbide metal bur. The titanium abutments should not be given a completely round shape, since this may result in a rotation of the framework. Slightly flat areas and ground in grooves contribute to an anti-rotation lock. This is particularly recommended for unblocked telescope constructions.

Important:
Heat development during titanium grinding must be prevented. Therefore, use only limited pressure to grind titanium (up max. 10,000 rpm).

During the customization procedure, the titanium abutment should be replaced on the master model several times and checked in the articulator, as well as with the silicone key.

Note:
Implant manufacturers offer various universal holders with the corresponding diameters to facilitate the processing of titanium abutments. The abutment is mounted in the abutment holder by means of the retaining screw and secured in the universal holder with a hex screwdriver.

Processing of an abutment with the help of a universal holder (Camlog Biotechnologies AG)

Case I:
Customized Dolder®* bar (joint)

The documentation of the following patient case begins with the orientation of the bar joint. All the previous steps from planning to abutment selection have already been performed.

The primary task of the bar in a bar attachment is not only the protection from pulling or lifting forces, but also the interlock and supporting stabilization of the implants.
Usually, manufacturers of implant systems offer various profile shapes for Dolder bar joints, which allow for different degrees of freedom regarding the movability of the prosthetic restoration (Wirz, 1994).

For the patient case presented here, a Dolder bar joint with an «egg-shaped» profile (height: 3 mm, length 25 mm) was used.

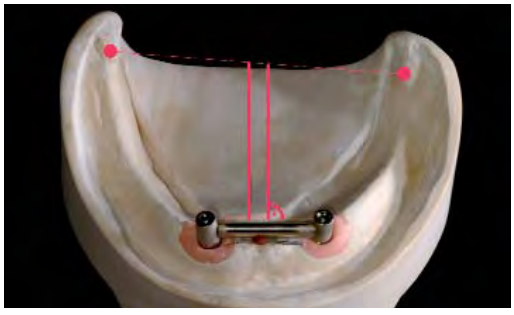
Ready-made bar profiles

After the selection of the corresponding abutments, a prefabricated standard bar is integrated in this case.

The length of the bar is shortened and adjusted as precisely as possible to the abutments. Before the bar is positioned and secured, both the bar ends and the corresponding contact areas to the abutment are sandblasted. The surface expanded by the sandblasting procedure offers tiny undercuts to the cold-curing resin that fires without leaving residue and thus provides sufficient mechanical retention of the resin on the metal abutments.

Aligning the bar

The removable restoration must not transmit irregular stress onto the implants and the remaining alveolar ridge. Therefore, static and anatomical aspects must be considered for the positioning of the bar.



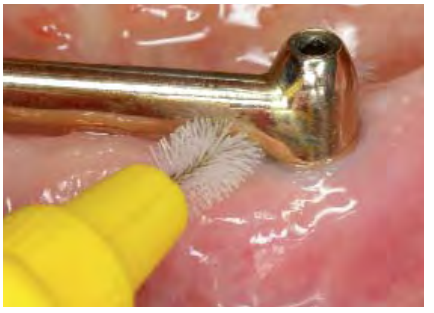
Positioning of the bar – occlusal view

*) Dolder®: Registered trademark after Prof. Eugen Dolder

– *Occlusal view*:
  The retromolar triangles and the «anatomical» center* are marked on the model. From an occlusal view, the bar should be located at a right angle to the model center and parallel to the connection line of the retromolar triangles. In this way, the tilting movements caused by the masticatory forces may partially be absorbed by the jaw. Torsion stress exerted on the bar by mastication is thus minimized and the implants are protected.

– *Vertical view*:
  Ideally, the bar axis runs parallel to the abutment axes (buccal view/section).

For optimum manual cleaning by the patient, an adequate bar height must be selected, which also takes static aspects and the available space conditions into account.



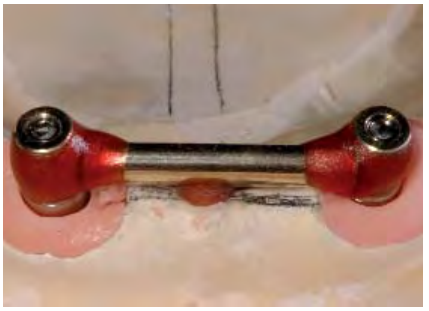
TIPS:

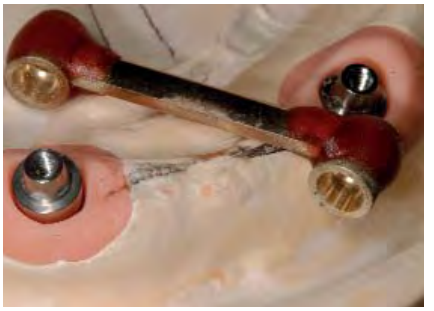
– The bar can be aligned in a targeted fashion and thus facilitates the attachment by means of soft wax (e.g. from tooth tabs) or plasticine.

– In order to provisionally fix the bar position, a small amount of superglue can be applied to the contact area between the abutment and the bar. Capillary forces ensure that the glue is distributed evenly in difficult-to-access areas.

Positioning and provisional fixing of the bar using superglue.

The bar ends and the abutment are adequately set and secured with modelling resin.

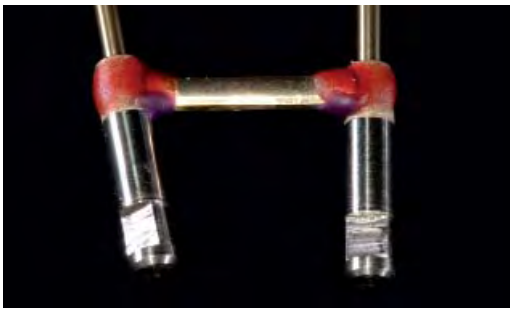




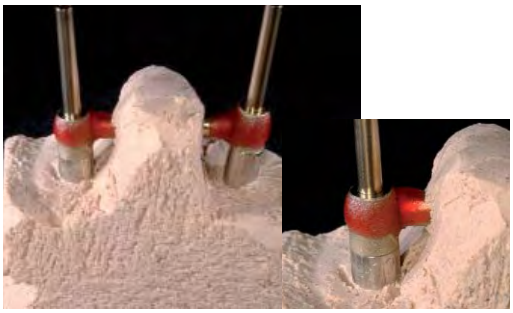
*) Resulting connection from the position of the lip frenulum and the center of the connection line between the retromolar triangles.

Fabrication of the soldering model

Implant manufacturers offer special soldering aids for the soldering models which are screwed into the abutments instead of the lab implant.



During the fabrication of the soldering model, the bar must be largely set in investment material so that no rotation may occur during soldering. For this purpose, a tension-free fit of the construction is absolutely necessary.
Design the soldering model as small as possible to ensure maximum heat absorption. The area around the soldering joint must be freely accessible.



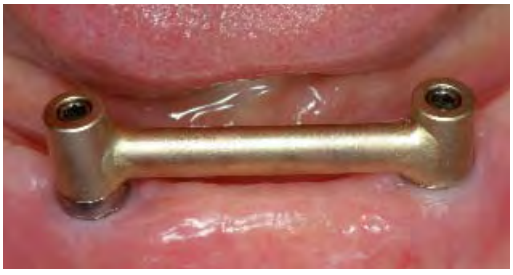
Usually, the soldering procedure is performed in the same way as in the conventional methods. However, the instructions of the manufacturer must be strictly observed, since certain materials or systems often require deviations.

TIP:
Furnace soldering

After cooling to room temperature, the construction is sandblasted to remove any solder investment material residue and subsequently finished. Sandblasting the basal abutment surface should be avoided.

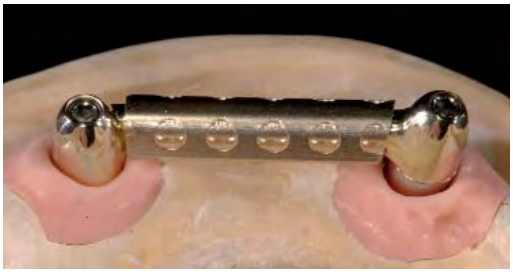
The occlusal areas may be freely finished. The vestibular and oral parts are given a cone-shaped finish in favour of the direction of insertion with the help of a parallelometer.

TIP:
Early try-in of the framework before the tertiary structure is fabricated may prevent unnecessary adjustments of the final work. Checking the mesostructure for tension-free fit is a matter of course. The Sheffield Test (page 12) is one possibility to check the framework with regard to the absence of tension.



After completion of the secondary construction, the rider is fitted. Similar to the bar, its length also has to be shortened and finished. Since both the bar and «rider» belong to one system, adjusting the inner aspects of the matrix is usually not indicated.

As the matrix in the tertiary structure, the rider should be designed with minimum proximal free-way space relative to the abutments.



Fitting the «rider» on the bar

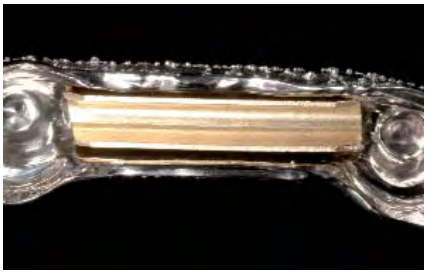
Whether the proximal ends of the rider are given a plane-parallel or a trapezoid design depends on the approach of the dental technician by arrangement with the clinician.

The metal framework of the tertiary structure is fabricated in the same way as frameworks in the conventional model cast technique. When preparing the investment material model, please keep in mind that the duplicate of the master model should reproduce both the bar construction and the corresponding rider.
After fitting and finishing the model cast framework, the rider is welded and/or glued to the framework in the occlusal area.

Welded matrix in the metal framework of the mesostructure – occlusal view

No connection should be established in the basal area in order not to jeopardize the resilient properties of the matrix.

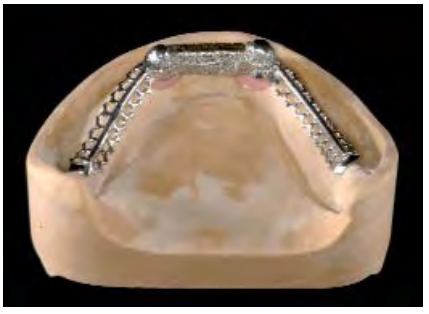
After finishing, the secondary construction and the metal framework of the tertiary structure are tried-in in the oral cavity of the patient.



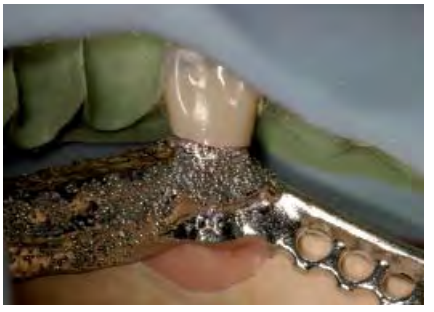
Welded matrix in the metal framework of the mesostructure – basal view

TIP:
From a patient-psychological point of view, the presence of the dental technician during try-in is recommended. This promotes communication and also improves and facilitates the cooperation within the team.

If no adjustment is necessary, the restoration may subsequently be completed in the dental laboratory.



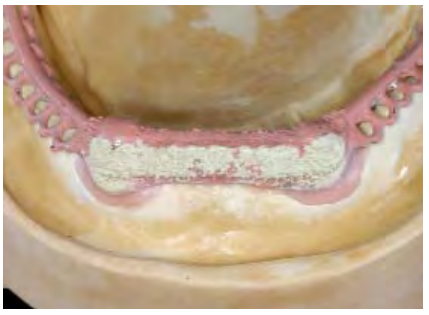
Occlusal view of the metal framework of the mesostructure

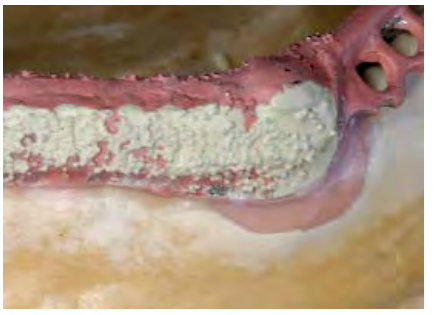


The implant was planned for the area of tooth 43. The silicone key shows the result of the teamwork. An optimum result by way of «backward planning».

For aesthetic reasons, the cast framework must be covered with a pink opaquer. In this way, the greyish metal reinforcement is prevented from shining through.

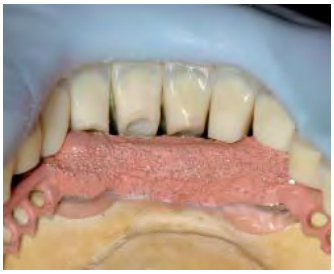
TIP:
In the anterior region, the tooth-coloured opaquer supports the aesthetic appearance.





Tooth-coloured opaquer in the anterior region of the metal framework

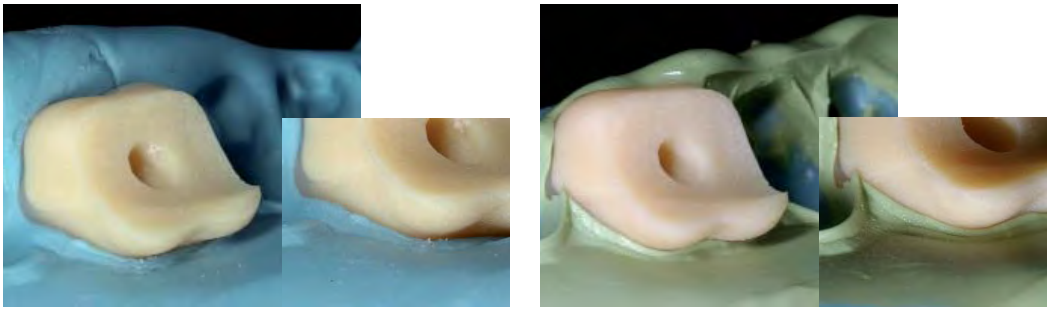
The occlusion and mandibular movement patterns should again be checked prior to polymerization. In this way, many errors may be eliminated even before polymerization.



Checking the repositioned teeth

The further procedure is determined by the technique used and is again comparable to the conventional model casting technique. In this case, the casting technique is used to transfer the restoration into resin. For that purpose, a silicone or stone rim of the final wax-up is fabricated, into which the teeth are repositioned after burning out.

TIP:
A liquid silicone with a high final hardness used for the matrix captures all the delicate details of the gingival contouring and optimizes the transition from the gingiva to the teeth.



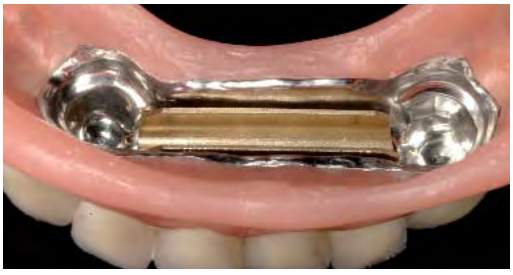
Different qualities with different silicone matrices

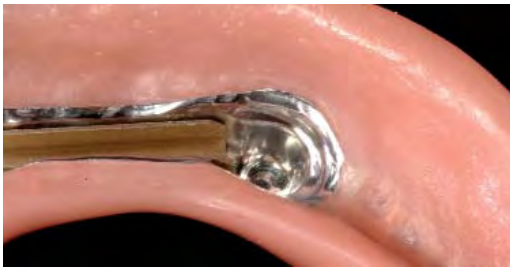
Since cold-curing polymers are usually used in the casting technique, it is important that the basal surfaces are roughened and additionally provided with retention beads. Additional etching of the teeth with monomer also supports the bond between the teeth and the denture base.

Once the bar construction has been secured on the model, the model cast is positioned. Before the model cast is secured, a final check of the accuracy of fit has to be performed, since the opaquer layer may have produced new interfering areas.

To prevent the liquid resin material from flowing between rider, bar, and abutment, it is important to seal these areas with wax or Vaseline.

Note:
The use of what are known as high-impact materials is the ideal solution in the field of removable, implant-retained restorations. The impact resistant resin is twice as tough as conventional materials and may thus optimally withstand the high stress exerted on implant-retained restorations.

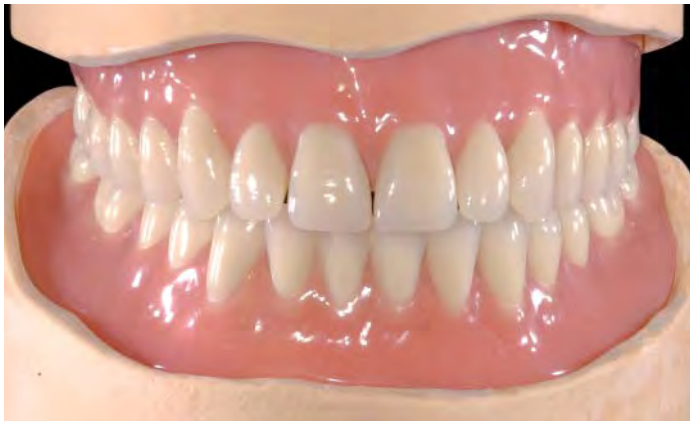


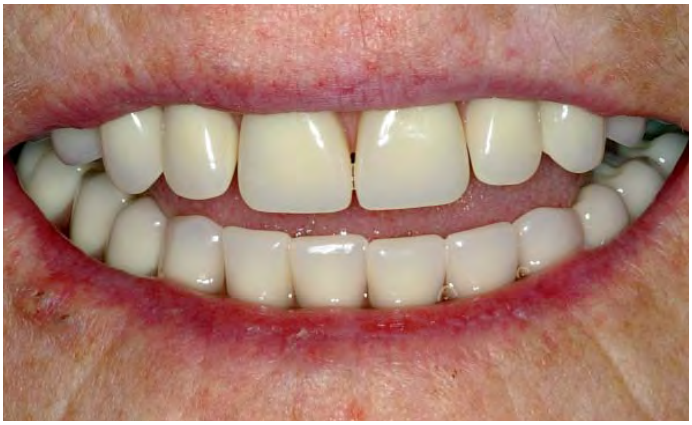


Completed restoration – basal view

After polymerization of the denture, it is lifted off, the areas sealed with wax are cleaned with the steamer, and the transition areas are checked under the microscope. The better the transitions have been designed, the less retention areas for contamination are created.
Final re-occlusion in the articulator, as well as finishing and polishing are carried out in the same way as for conventional removable restorations.

The result is an aesthetic and functional implant-retained restoration.





Case II:
Implant-retained prosthetic restoration – telescope technique

As already mentioned in the previous patient case, the steps from planning to model fabrication have already been performed for this case in the telescope technique (pages 14 to 20).

The abutments are selected according to the aspects described on page 31 ff. It should be made sure that the selected abutments are indicated by the manufacturer for telescope crowns.

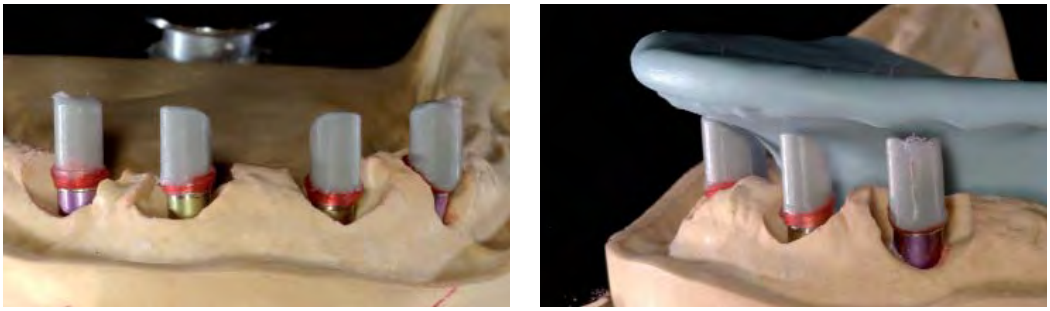
In the present case, the mesostructure is individually fabricated. Hence, it must be made sure that the abutment and alloy used are suitable to be cast on.

Dimensioning of the abutments

– In a first step, adequately shorten the plastic abutments with the help of a silicone key. The space requirements of the previously planned construction must be taken into consideration.

Shortening of the plastic auxiliary elements

– The abutments are built up using resin and milling wax so that a subsequent «zero degree milling» can be performed.
– Instead of the telescope crowns, conus crowns may also be milled.
– The screw cavity must remain «free» during the fabrication and/or contouring of the abutments.
– Before investment, the contoured structures must be checked with the silicone key a final time with regard to their dimensions.

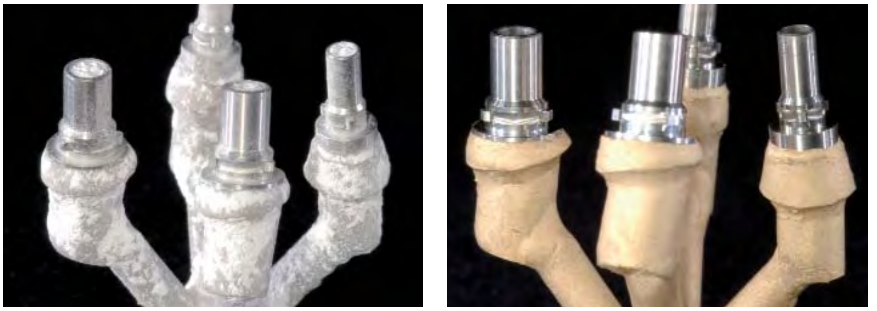


Checking the dimensions with the help of the silicone key of the final set-up

– When using a modelling resin, the resin parts should be coated with a wax layer of at least 0.3 mm. The resulting hollow space of the melting wax creates a free-way space necessary for the expansion of the resin.
– In the areas of the metal margin and around the screw threads, the contouring should be a little more pronounced to enable a smooth cast-on procedure.
– With non-oxidizing tertiary elements capable of being cast on, a slight alloy margin should remain.
– The individual secondary element is now precisely contoured up to the delicate metal margin and the space conditions are checked with the silicone key.
– The contoured structure should demonstrate a thickness of at least 0.7 mm.
– The metal margin must remain free of grease and wax, which is checked under the microscope.

TIP:
To facilitate the handling and contouring off the model, the use of an additional lab implant is recommended.

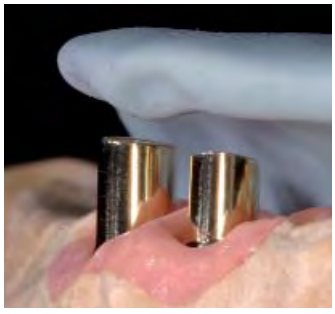
Important:
– Do not use a debubblizer.
– Clean visible areas of the secondary element capable of being cast on with a brush or a cotton swab soaked with alcohol before investment. The other areas of the contouring must not come into contact with alcohol, since the latent heat may result in distortion.
– When using gold/plastic abutments and modelling resin, «Speed» investment materials should not be used.
– Fine divestment is carried out with ultrasound, the steamer, and by pickling. A precise accuracy of fit can only be achieved by careful treatment in the connection area between the abutment and the implant. The inner aspects of the abutments should be as smooth and shiny as before the investment.
– If casting errors, such as incomplete cast, shrink holes, flash, or spilling of the alloy into the inner aspects, the fabrication of the mesostructure must be repeated.
– The silicone key is used for renewed checking of the space conditions.



Divesting the cast abutments

Finally, the abutments are finished using a milling device. To protect the master model, working with a milling base as it is done in the conventional telescope technique is recommended.

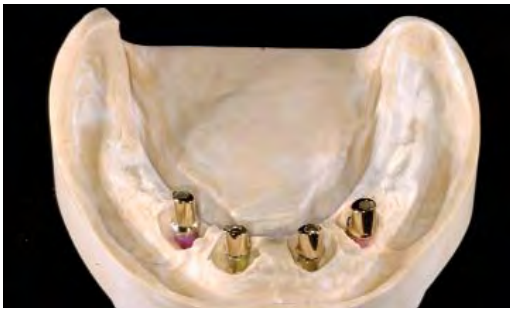
Finishing the cast abutments

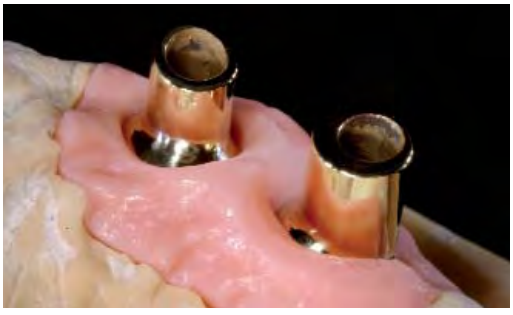


Checking the completed abutments with the silicone key

Once the abutments have been completely milled and finished, the contouring of the telescopic secondary structure may commence.

For better handling and to protect it, the gingival mask is removed and only repositioned for subsequent checks.





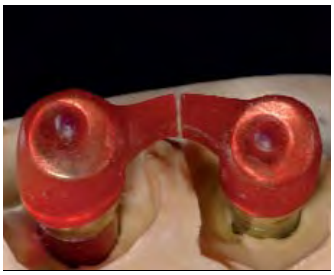
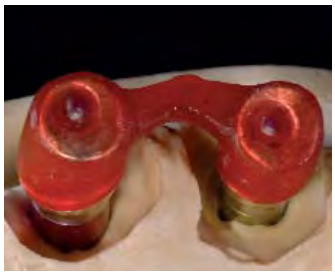
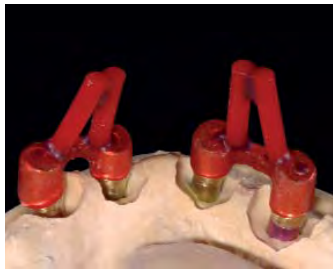
The completed abutments on the model with and without gingival mask

Before proceeding, the screw cavity should be blocked out with a small quantity of harder wax (e.g. sticky wax) to prevent any subsequent interfering areas in the telescopic coping. As it is the case for conventional telescopes, the design of the tertiary structure should be taken into consideration when contouring the copings. Once again, checking the work in progress with the silicone key of the diagnostic set-up is an excellent tool.

For reasons of stability, the base should be fabricated of a suitable modelling resin. As already mentioned, it is recommended to apply a wax layer on the modelling resin to counteract any tensions created while the structure is burned out.

TIPS:

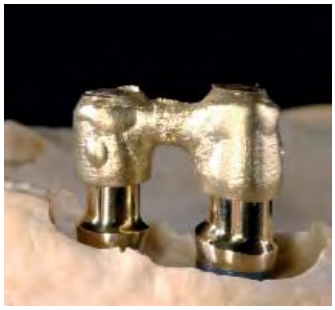
- Instead of conventional telescope copings, electroplated copings may also be fabricated in the usual method.
- Interlocking the secondary telescopes supports the stability of the tertiary structure.
- The chemical shrinkage of the resin, as well the thermal shrinkage of the wax result in tensions within the framework. Therefore, thinly separate the interlock prior to investment and subsequently reconstruct it with a small quantity of resin or wax.

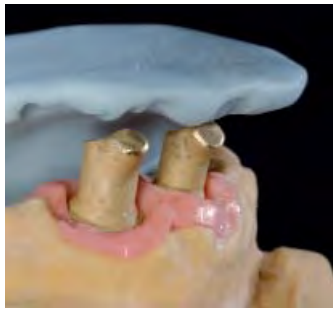
Interlocking and sprueing of the telescopic secondary elements

Important:
The area of separation should be as narrow as possible to prevent renewed tension after the reconstruction.

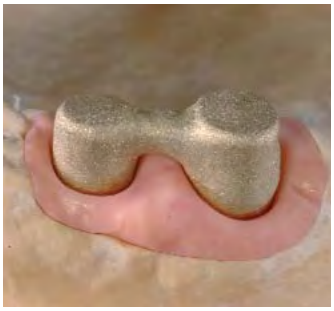
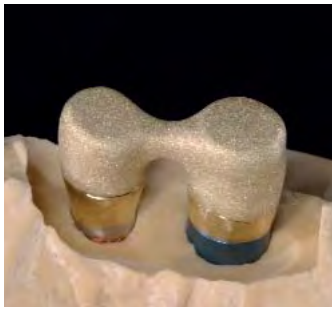
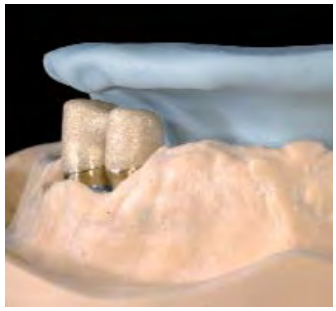
Telescopic secondary elements blasted with polishing beads



Fitting the copings on the abutments

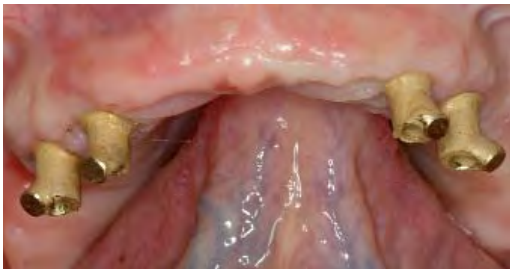


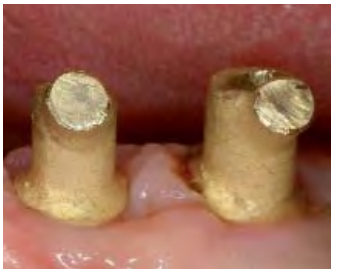
Renewed checking of the dimensions with the silicone key

Finished copings – final check with and without gingival mask and silicone key

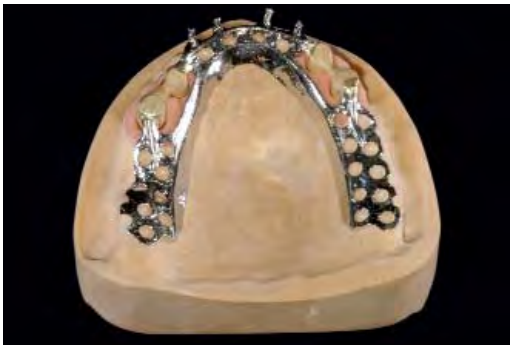
Sprueing, investment, and divestment are carried out according to the principles of the conventional casting technique (see also Manual on Implant Superstructures for Crown and Bridge Restorations).
Trying-in the secondary structure including the telescopic secondary elements should be considered a matter of course.





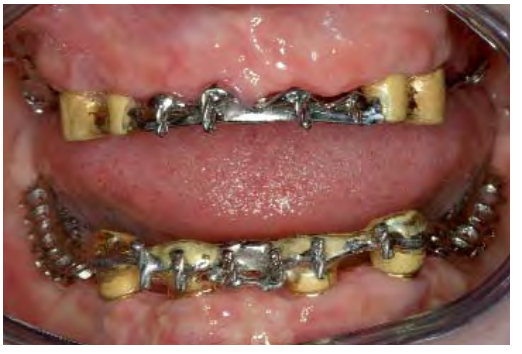
Try-in of the telescoping primary element to check the course of the gingiva

The model cast construction is designed in the same way as conventional telescopic elements. Whether the copings are adhesively bonded, welded, or soldered to the framework is the decision of the dental technician in agreement with the clinician.



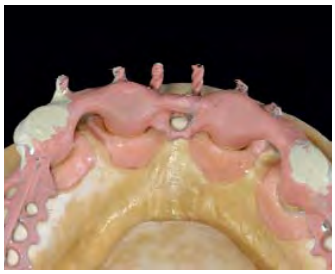
Designing the model cast construction in the maxilla

Before the restoration is completed, a final try-in of the framework in the oral cavity of the patient should be conducted – this time with the metal framework and the superstructure. If the result of the try-in is satisfactory, the completion with resin may proceed.



Try-in of the complete framework

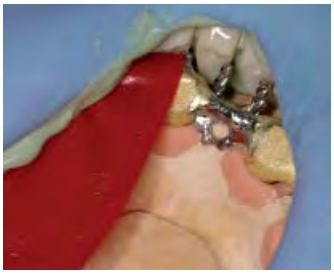
Minimum adjustments of the wax-up cannot be entirely excluded. Therefore, the entire construction should be rechecked in the articulator, same as in the first case presented, before any further working steps are carried out.

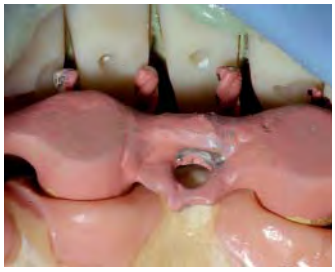


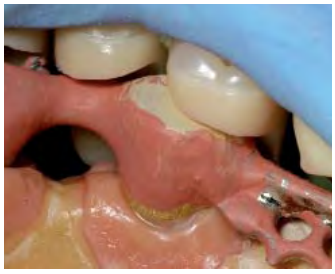
For this restoration as well, the casting technique is the method of choice to transfer the restoration to resin.

Similar to the bar restoration described above, tooth-coloured and gingiva-coloured opaquers are used. In this way, even the most exacting aesthetic requirements can be satisfied.

Once the abutments have been secured on the model, the metal framework of the superstructure is positioned. A renewed check regarding accuracy of fit and interfering areas is absolutely necessary at this point.



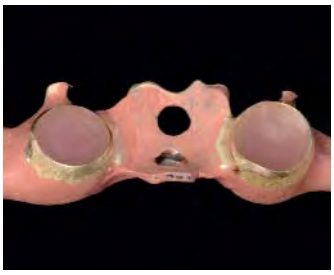


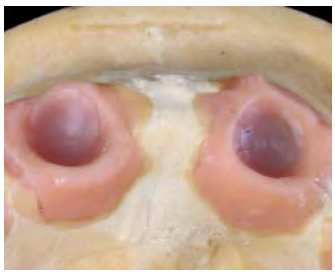


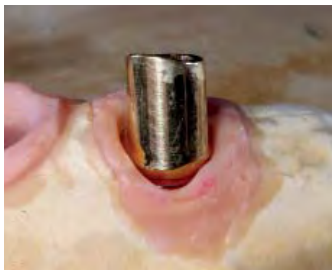
Checking the repositioned teeth and the metal reinforcement before completion

The check will also show what the good cooperation within the team coupled with comprehensive planning can achieve. The better the preparatory work, the easier the completion will be.

To prevent the resin from entering between the telescope and the abutment, it is important to seal the margins.

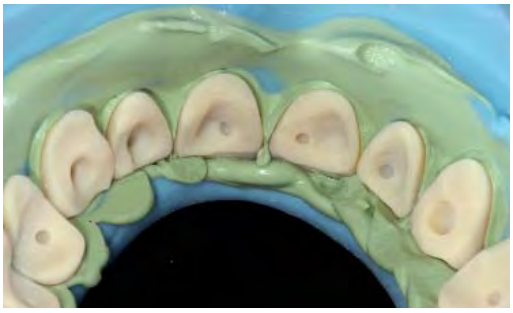






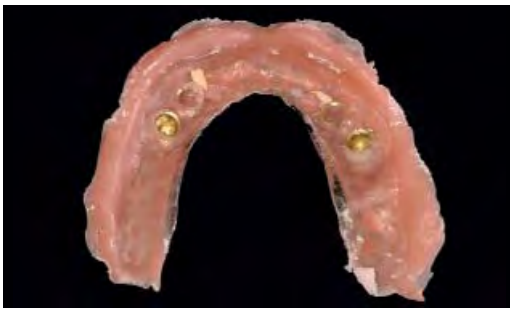
TIP:
By using warm Vaseline, even the smallest areas may be adequately protected.

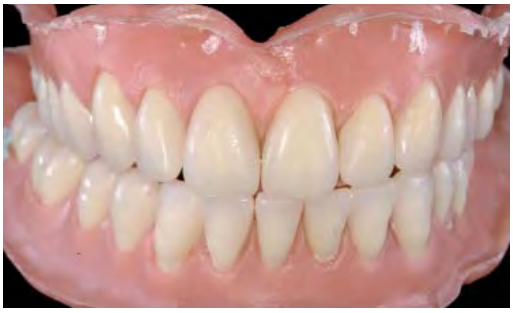
If cold-curing materials are used, the basal surfaces of the teeth should be roughened, provided with retention beads, and slightly etched with a small quantity of monomer.

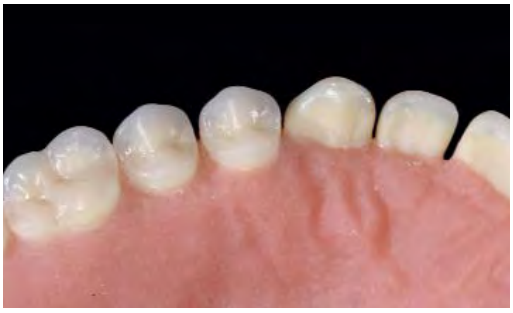


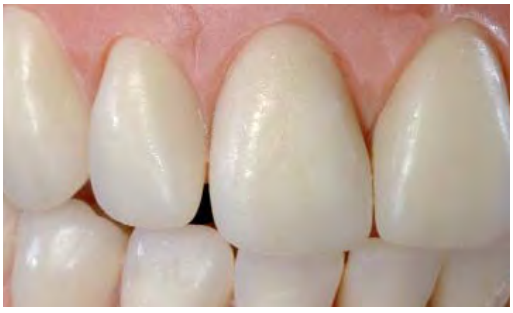
Important:
Avoid pooling when treating the teeth with monomer, since they may result in slight porosities in the interdental area.

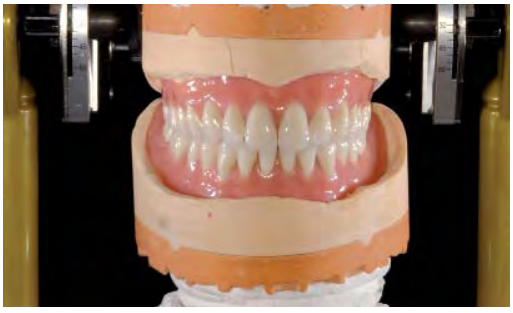
The basal surface must be checked after polymerization. If necessary, slight inaccuracies may be repaired using a fine instrument and cold-curing resin. Transitional areas should be finished under the microscope to achieve ideal results. The better the design of these areas, the easier it is for the patient to perform the oral hygiene measures necessary for implant-retained restorations.



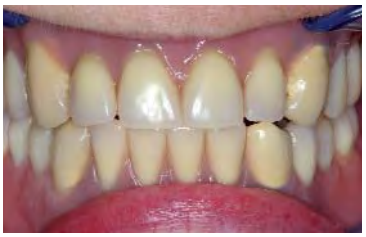


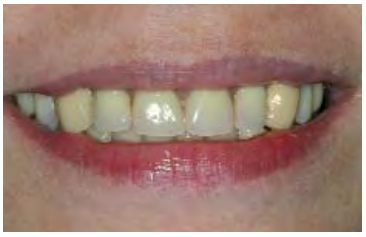




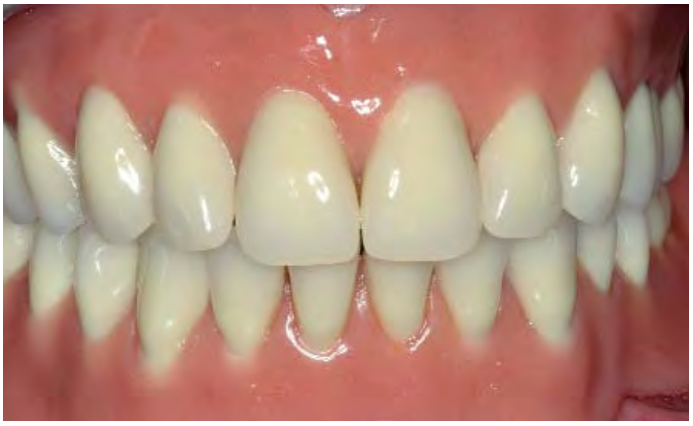


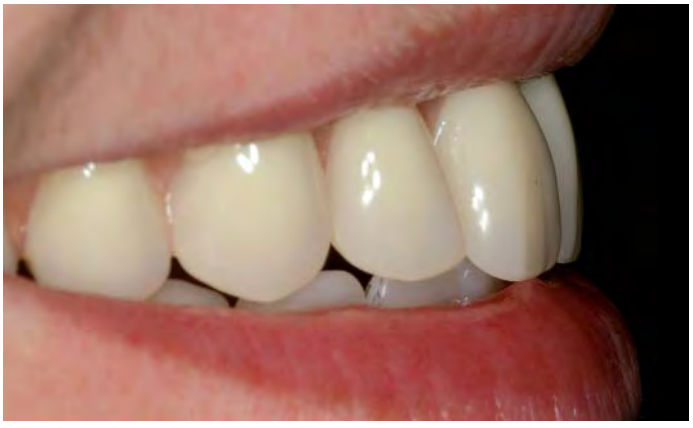
The finished restoration





before

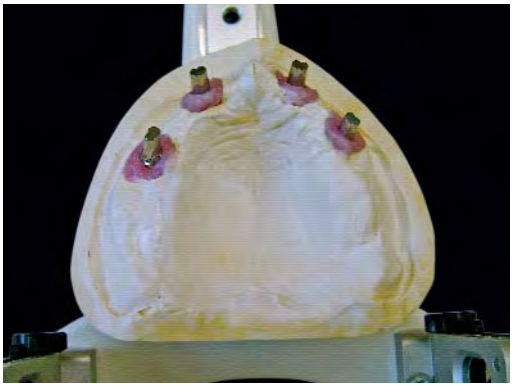


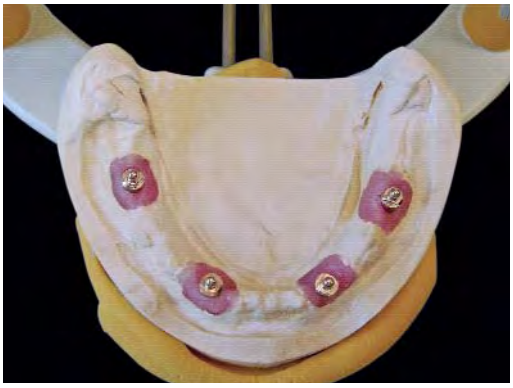


after

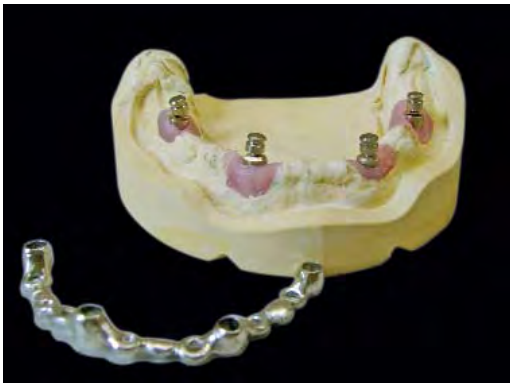
Case III:
Retentive anchors

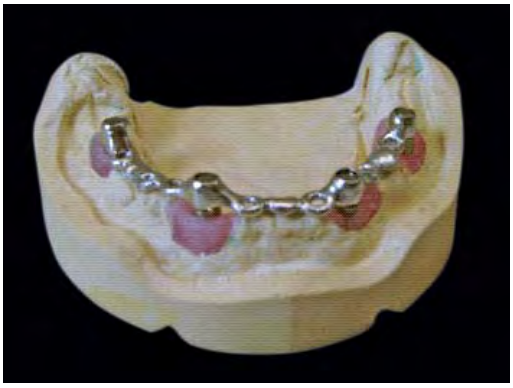
As mentioned in the chapters before, the steps from planning to model fabrication have already been performed in this case covering retentive anchors or ball attachments.





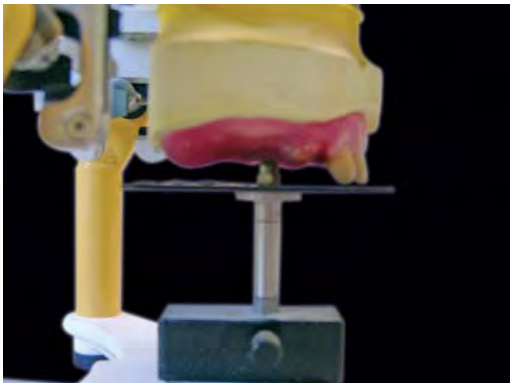
In this patient case, ball attachments were chosen to ensure the stability of the restoration. Whether a metal or glass-fibre framework is used to reinforce the superstructure of a ball attachment is left at the discretion of the clinician and/or technique. In any case, a reinforcing structure is recommendable as far as the stability is concerned.

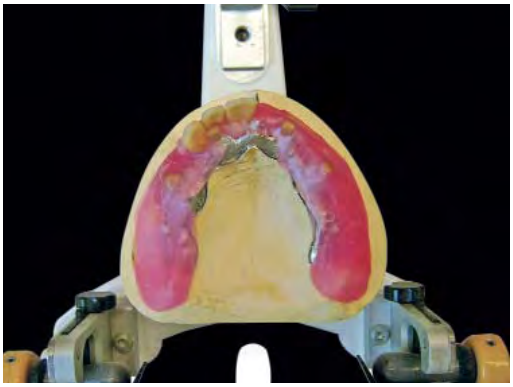




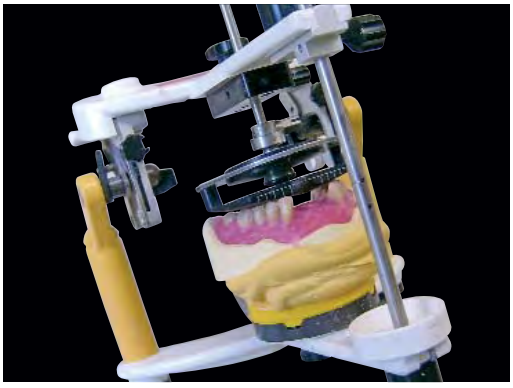
Ball clasp with reinforcing metal framework

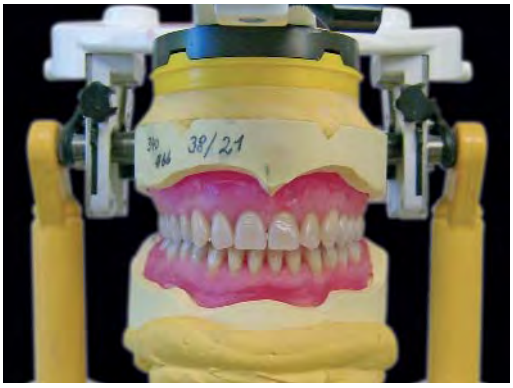
The teeth are set-up according to the tried-and-tested BPS method (see also the BPS Handbook of Complete Denture Prosthetics from Ivoclar Vivadent).



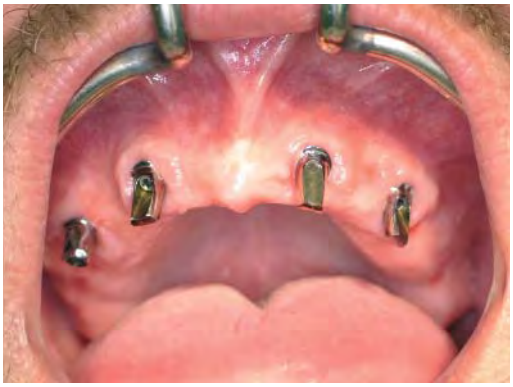


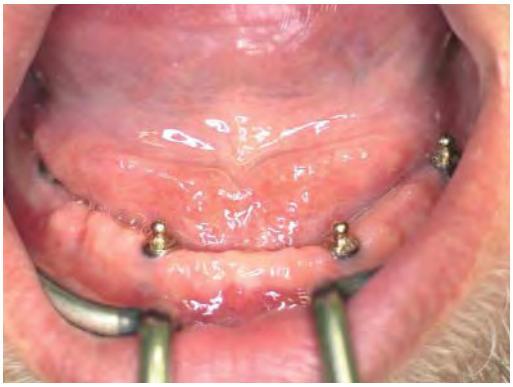
The 3-D setting-up template for the set-up of the mandibular teeth is particularly suitable for cases in which individualized registrations were made.





Ball clasp-retained dentures should also undergo a try-in of the mesostructure including the metal framework in the oral cavity of the patient. The accuracy of fit of the metal reinforcement and the set-up are decisive aspects for an aesthetic and functional final result.



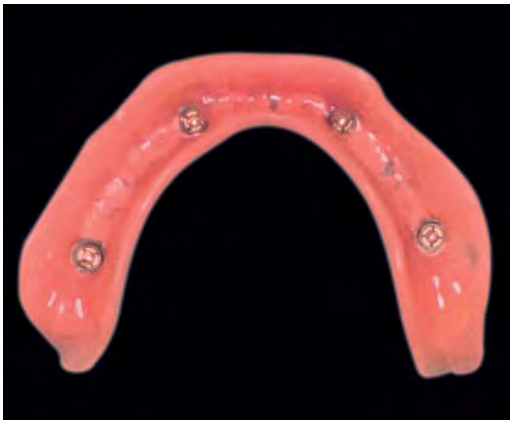


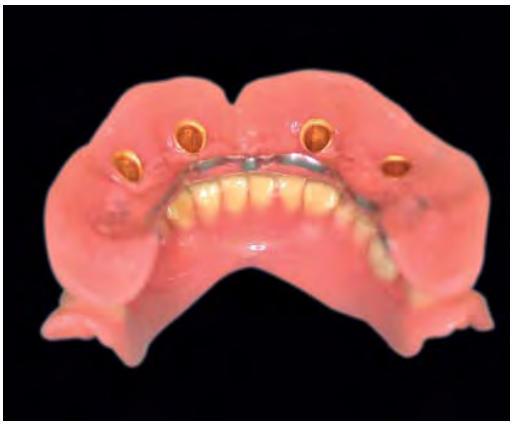
Completion

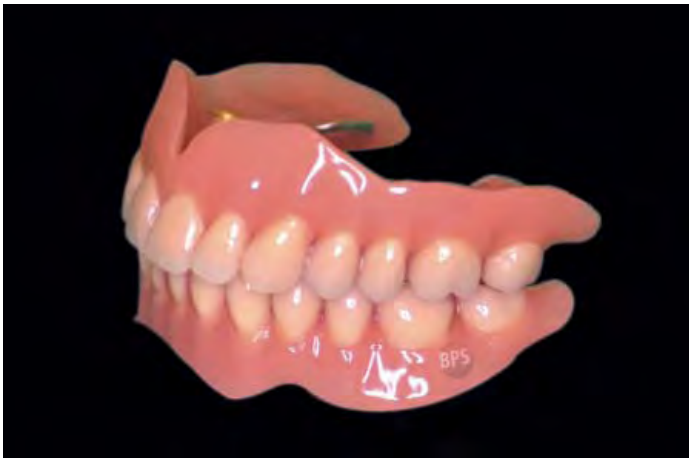
In this case, the SR Ivoclar System is used to complete the denture.
The sprues are attached in the same way as for conventional complete dentures. Furthermore, the gap between matrix and the patrix must be adequately protected from the injected resin.

If the metal framework is to be entirely covered by resin, it is recommended to attach at least two wires on the metal framework as retentions. They subsequently help to maintain the position of the metal reinforcement in the stone counter model. With this method, the framework should be opaquerized before investment.

After divesting, the wires are ground smooth and the indentations resulting from grinding are filled with a suitable material (in this case ProBase® Cold).
Finishing and polishing are carried out in the same way as for conventional dentures.







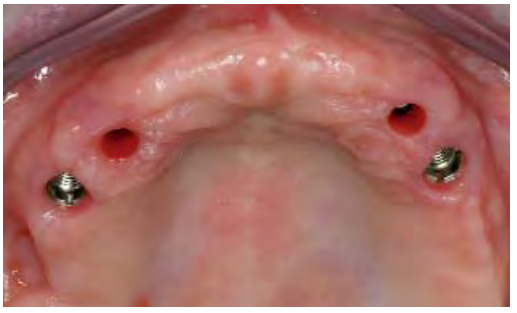
The finished restoration

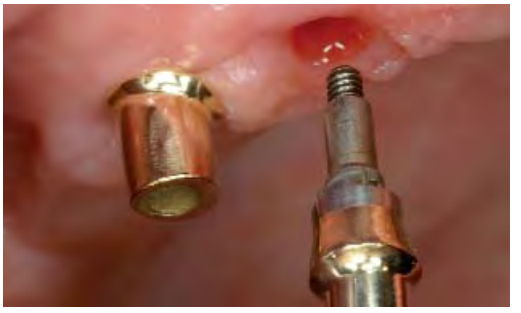
Placement of the denture and aftercare

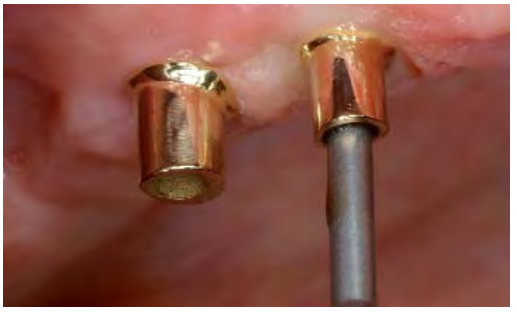
Owing to the conscientious preparation, planning, and coordination between the team of dentist, dental technician, and the surgeon, outstandingly aesthetic results were achieved in all three patient cases.

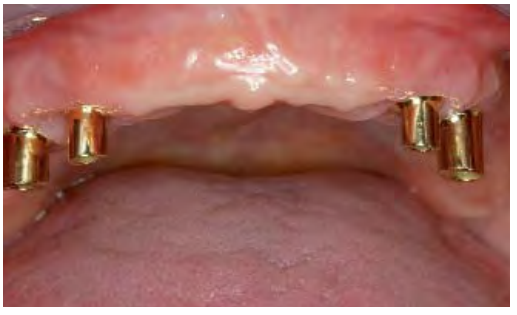
The quality of life also often depends on the looks as well as the function of the dentition. If the treatment of the patient is completed, nothing stands in the way of an active life any longer.

Incorporation



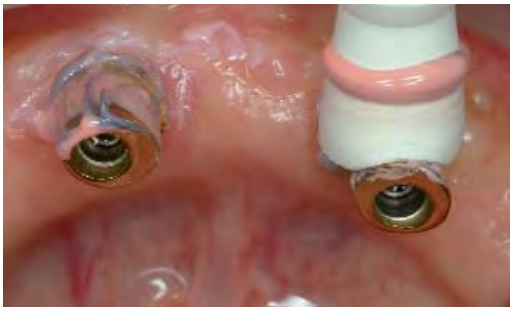
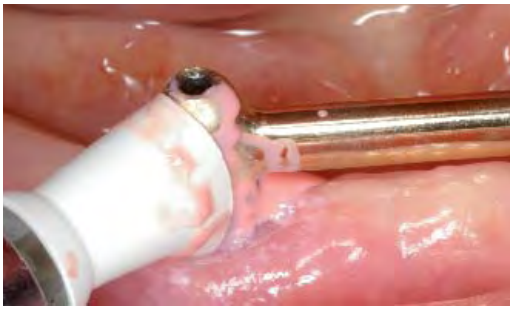




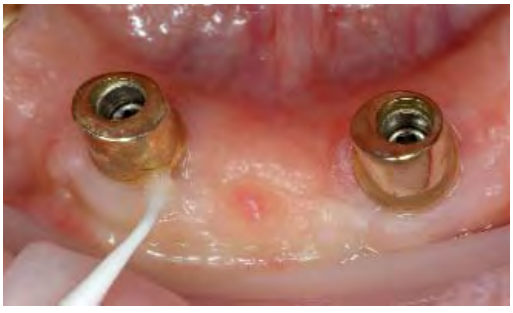
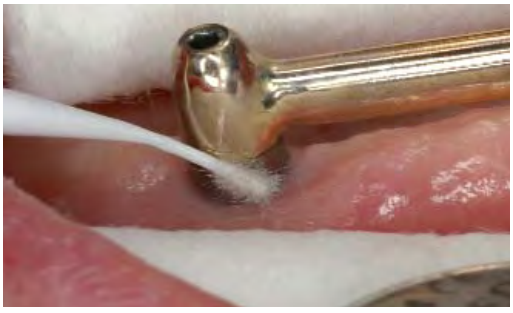


Aftercare

Professional aftercare and check-ups are particularly important for implant-retained restorations. This includes checks of the hygiene measures performed by the patient with the help of clinical plaque index, checks of the abutments as well as the superstructure (accuracy of fit, fractures), and, of course, functional checks (occlusions, percussion, etc.).

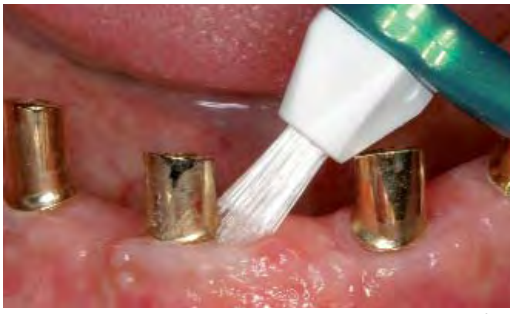



Polishing of the abutments with Proxyt®

Preventive measure: application of a chlorhexidine varnish (Cervitec® Plus)

To ensure that the joy of the newly won quality of life is maintained, the required oral hygiene measures at home must be discussed and determined with the patient both at incorporation and during the subsequent recall appointments.




Oral hygiene performed by the patient at home

TIP:
In addition to manual cleaning with interdental brushes or dental floss, gels, such as Cervitec® Gel, can be used. The chlorhexidine contained in the gel has an antibacterial effect and prevents inflammation.

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Institut Straumann AG

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Ivoclar Vivadent Products

Overview of the Ivoclar Vivadent products used for removable implant-retained superstructures.

SR VivoTAC / SR Ortho TAC
Prefabricated, radiopaque teeth/ radiopaque powder/ monomer system.

SR Ivocap® High Impact
The pre-dosed and very impact resistant denture base material is particularly suitable to meet the high requirements of implant-retained prosthetics with regard to stability and accuracy of fit.

Light Tray
Light-curing single-component composite in preshaped plates (maxilla & mandible) for the fabrication of customized impression trays and templates.

SR Vivodent® PE
This 4-layer anterior tooth demonstrates a high degree of aesthetics, density, solvent resistance, and stability of shade.

Centric Tray
Preformed resin trays for closed-tray impression taking of the maxilla and mandible in implantology with simultaneous determination of the occlusal plane. Especially suitable for preliminary bite registration!

SR Orthosit® PE
This highly aesthetic tooth mould according to the «Orthotyp» principle convinces users with its functional occlusal facets.

ProBase® Cold
The cold-curing ProBase Cold can be processed in the casting and in the packing technique. Given its excellent material properties, it provides durable denture bases.
Complies with ISO EN 1567
In its «clear» version, it is ideal for the fabrication of diagnostic and drill templates. The material is also available as a heat-curing polymer.

SR Ortholingual® DCL
The specialist for implant-retained restorations for which a lingualized occlusion is indicated.

UTS 3D Universal Transferbow System
Universal transferbow for individual skull-/joint-related orientation of the models in the Stratos articulator.

Stratos® 300
Individually adjustable, bio-functional articulator for exacting and complex implant-retained restorations.

Ivoclar Vivadent Alloys
Comprehensive range of alloys for the fabrication of implant superstructures.

Virtual®
Modern polyvinyl siloxane line of impression materials.

Cervitec® Gel / Cervitec® Plus
Oral health care gel with chlorhexidine and sodium fluoride for professional implant care at home. The gel reduces bacteria on prosthodontic work and prevents bad odours. In addition, it protects the implant by maintaining the health of the gingiva and the oral mucous membrane. Cervitec Gel helps to prevent inflammation. The gel can be used as a support during the therapy of patients with periimplantitis.

Proxyt®
The prophylaxis pastes are available in three levels of abrasion for effective, yet gentle cleaning and polishing. Proxyt fine (pink) with RDA 7 is particularly suitable for the care of implant superstructures.

Notes:

Ivoclar Vivadent – worldwide

Ivoclar Vivadent AG
Bendererstrasse 2
FL-9494 Schaan
Liechtenstein
Tel. +423 235 35 35
Fax +423 235 33 60
www.ivoclarvivadent.com

Ivoclar Vivadent Pty. Ltd.
1 – 5 Overseas Drive
P.O. Box 367
Noble Park, Vic. 3174
Australia
Tel. +61 3 979 595 99
Fax +61 3 979 596 45
www.ivoclarvivadent.com.au

Ivoclar Vivadent GmbH
Bremschlstr. 16
Postfach 223
A-6706 Bürs
Austria
Tel. +43 5552 624 49
Fax +43 5552 675 15
www.ivoclarvivadent.com

Ivoclar Vivadent Ltda.
Rua Geraldo Flausino Gomes,
78 – 6.º andar Cjs. 61/62
Bairro: Brooklin Novo
CEP: 04575-060 São Paulo – SP
Brazil
Tel. +5511 5102 2020
Fax. +5511 5102 4704
www.ivoclarvivadent.com

Ivoclar Vivadent Inc.
2785 Skymark Avenue, Unit 1
Mississauga
Ontario L4W 4Y3
Canada
Tel. +1 905 238 5700
Fax +1 905 238 5711
www.ivoclarvivadent.us.com

Ivoclar Vivadent
Marketing Ltd.
Rm 603 Kuen Yang
International Business Plaza
No. 798 Zhao Jia Bang Road
Shanghai 200030
China
Tel. +86 21 5456 0776
Fax. +86 21 6445 1561
www.ivoclarvivadent.com

Ivoclar Vivadent
Marketing Ltd.
Calle 134 No. 7-B-83, Of. 520
Bogotá
Colombia
Tel. +57 1 627 33 99
Fax +57 1 633 16 63
www.ivoclarvivadent.com

Ivoclar Vivadent SAS
B.P. 118
F-74410 Saint-Jorioz
France
Tel. +33 450 88 64 00
Fax +33 450 68 91 52
www.ivoclarvivadent.fr

Ivoclar Vivadent GmbH
Dr. Adolf-Schneider-Str. 2
D-73479 Ellwangen, Jagst
Germany
Tel. +49 (0) 79 61 / 8 89-0
Fax +49 (0) 79 61 / 63 26
www.ivoclarvivadent.de

Ivoclar Vivadent
Marketing Ltd
114, Janki Centre
Shah Industrial Estate
Veera Desai Road,
Andheri (West)
Mumbai 400 053
India
Tel. +91 (22) 673 0302
Fax. +91 (22) 673 0301
www.ivoclarvivadent.firm.in

Ivoclar Vivadent s.r.l. & C. s.a.s
Via Gustav Flora, 32
39025 Naturno (BZ)
Italy
Tel. +39 0473 67 01 11
Fax +39 0473 66 77 80
www.ivoclarvivadent.it

Ivoclar Vivadent K.K.
1-28-24-4F Hongo
Bunkyo-ku
Tokyo 113-0033
Japan
Tel. +81 3 6903 3535
Fax +81 3 5844 3657
www.ivoclarvivadent.com

Ivoclar Vivadent S.A. de C.V.
Av. Mazatlán No. 61, Piso 2
Col. Condesa
06170 México, D.F.
Mexico
Tel. +52 (55) 5062-1000
Fax +52 (55) 5062-1029
www.ivoclarvivadent.com.mx

Ivoclar Vivadent Ltd
12 Omega St, Albany
PO Box 5243 Wellesley St
Auckland, New Zealand
Tel. +64 9 914 9999
Fax +64 9 630 61 48
www.ivoclarvivadent.co.nz

Ivoclar Vivadent
Polska Sp. z.o.o.
ul. Jana Pawla II 78
PL-01-501 Warszawa
Poland
Tel. +48 22 635 54 96
Fax +48 22 635 54 69
www.ivoclarvivadent.pl

Ivoclar Vivadent
Marketing Ltd.
Derbenevskaja Nabereshnaja
11W
115114 Moscow
Russia
Tel. +7495 913 66 16
Fax +7495 913 66 15
www.ivoclarvivadent.ru

Ivoclar Vivadent
Marketing Ltd.
180 Paya Lebar Road
07-03 Yi Guang Building
Singapore 409032
Tel. 65-68469183
Fax 65-68469192
www.ivoclarvivadent.com

Ivoclar Vivadent S.A.
c/Emilio Muñoz, 15
Esquina c/Albarracín
E-28037 Madrid
Spain
Tel. + 34 91 375 78 20
Fax + 34 91 375 78 38
www.ivoclarvivadent.com

Ivoclar Vivadent AB
Dalvägen 14
S-169 56 Solna
Sweden
Tel. +46 8 514 93 930
Fax +46 8 514 93 940
www.ivoclarvivadent.se

Ivoclar Vivadent UK Limited
Ground Floor Compass Building
Feldspar Close
Warrens Business Park
Enderby
Leicester LE19 4SE
United Kingdom
Tel. +44 116 284 78 80
Fax +44 116 284 78 81
www.ivoclarvivadent.co.uk

Ivoclar Vivadent, Inc.
175 Pineview Drive
Amherst, N.Y. 14228
USA
Tel. +1 800 533 6825
Fax +1 716 691 2285
www.ivoclarvivadent.us.com

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