Prosthetics Manual.
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The tioLogic® implant system.

The tioLogic® implant types.

- Crestal fine thread
- Thread pitch 1.3 mm
- Cylindrical-conical design
- Sandblasted/etched implant surface
- CBS surface technology
- Thread pitch 1.7 mm
- Progressive coarse thread
- Optimal thread geometry
- Rounded apex

Integrated platform-switching.
FEM-optimized implant shape and thread geometry.\(^1,2,3\)

**External geometry.**

The shape of the tioLogic\(^\circledR\) implant type form and the thread geometry were calculated using FEM analyses\(^1\) and documented in scientific studies\(^2\). Tests show a uniform, gentle loading of the bone which prevents local overloading and stress peaks that could damage the bone.

The tioLogic\(^\circledR\) implants have a cylindrical-conical external geometry and a rounded apex. The polished cervical chamfer (integrated platform-switching) of the implant shoulder is 0.3 mm high and takes the biological width into account.

**tioLogic\(^\circledR\) – in the crestal region, the implant has a fine thread that is adapted to the cortical bone density.** The progressive coarse thread, which follows on seamlessly from the fine thread, is tailored to the density of the cancellous bone and has three radial vertical grooves. The design of the thread flanks and the contour of the thread depth and pitch of the implant have been developed to provide optimum load distribution in the bone. The endosseous region of the tioLogic\(^\circledR\) implant has a Ceramic Blasted Surface (CBS).

**tioLogic\(^\circledR\) ST –** the modified thread geometry and reduced thread pitch of the tioLogic\(^\circledR\) ST enable a quick and atraumatic implant insertion and a high level of primary stability. The endosseous region of the tioLogic\(^\circledR\) ST implant surface is blasted and etched. The tioLogic\(^\circledR\) ST 7.0 mm implant also extends the indication range with reduced vertical bone availability.

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1. A. Rahimi, F. Heinemann, A. Jäger, C. Bourauel: Biomechanische Untersuchungen des Einflusses von Geometrievarianten des tioLogic\(^\circledR\) Implantats (Biomechanical analyses of the influence of tioLogic\(^\circledR\) implant geometry variations); University of Bonn 2006.
3. I.Hasan, L. Keilig, H. Stark, C. Bourauel: Biomechanische Analyse der tioLogic\(^\circledR\) ST Implantate (Biomechanical studies on the tioLogic\(^\circledR\) ST implant); University of Bonn, Germany 2012
The tioLogic® implant system.

Internal geometry.

The design of the internal cylinders and the rotationally secure internal geometry (PentaStop©) of tioLogic® implant types was calculated and verified in FEM analyses and physical tests by the Fraunhofer Institute for Material Mechanics using an ISO 14801-compliant fatigue test. In each of the FEM simulations the internal geometry, which was based on the results of the FEM analyses, shows a high distortional and flexural strength and a high flexural strength in the physical studies of the fatigue test under continuous load.

The internal geometry comprises an upper cylindrical contact surface, the PentaStop© rotational security, and a lower cylindrical contact surface.

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4 F. O. Kumala: Analyse des tioLogic® Implantats mittels FEM (Analysis of the tioLogic® implant using FEM); CADFEM Stuttgart 2006.
FEM-optimized internal geometry\textsuperscript{4} and ISO-compliant fatigue strength.\textsuperscript{5}

The upper cylindrical contact surface is shortened. This precise cylindrical connection guarantees optimal centering of the system components and transmits the transversal forces into the internal geometry. The integrated PentaStop\textsuperscript{©} rotational security is designed to ensure maximum rotational stability and excellent flexibility when positioning the system components.

The prosthetic components can be optimally aligned using the 5 positioning options; incorrect positioning is easily detected. The lower cylindrical contact surface is positioned directly below the rotational security and is longer. Any bending moments are smoothly transmitted by this contact surface. The cylinder also allows accurate guidance and quick, reliable orientation in the longitudinal axis of the implant before the PentaStop\textsuperscript{©} rotational security engages.
The tioLogic® implant system.

S-M-L concept.

5 implant diameters. 5 implant lengths. 3 series of abutments.

Integrated platform-switching.

The optimal grading of implant diameters and lengths ensures that the appropriate implant is used for the indication. Components of the 3 series of abutments are made of plastic (temporaries), titanium and precious metal and include CAD/CAM, bar, ball, bridge, AngleFix, and LOCATOR® abutments. The construction components S are used for the implant diameter 3.3 mm, the construction components M for the implant diameters 3.7 mm and 4.2 mm, and the construction components L for the implant diameters 4.8 mm and 5.5 mm. For exact identification all components are laser-marked with S, M or L.
3 series of abutments.

5 implant diameters.

ST

ø 3.3 mm
tioLogic®

ø 3.7 mm
tioLogic®

ø 4.2 mm
tioLogic®

ø 4.8 mm
tioLogic®

ø 5.5 mm
tioLogic®

5 implant lengths.

7.0 mm

9.0 mm

11.0 mm

13.0 mm

15.0 mm

All abutments and implants on a scale of 1:1.
Introduction Prosthetics Manual

A convincing concept - state of the art.

The prosthetic restoration represents an important aspect if implantation is to be successful long-term. Close contact between the clinician and dental technician, careful pre-prosthetic planning and taking the patient’s wishes into account are all important for the implant-borne restoration to succeed.

The healing phase in the mandible usually takes between three and six months. This phase may be faster or slower depending on the bone quality, healing process and anatomy. Once the healing phase is over and gingiva forming completed, the prosthetic restoration can be commenced.

This laboratory manual uses actual cases to provide a general overview of various types of prosthetic restorations which represent state-of-the-art scientific knowledge at the time of going to press. The types of prosthetic restoration shown are subject to continual further development. For further information, please refer to current literature.

The Dentaurum Implants Hotline is manned by experienced implantologists and dental technicians who will be pleased to answer any questions you may have. It provides reassuring information on surgery, implantology and dental technology.
Dental practice record card.

To ensure optimal information flow between the operator and dental technician, all relevant data, e.g. the implant diameter, implant length and planned prosthetic restoration, is noted in a record card (REF 989-966-21).

The card is kept with the prosthetic restoration during the entire fabrication procedure. At the fitting stage it is given to the operator along with the finished prosthetic restoration. It contains all the important information for fitting the restoration.
Diagnosis and planning.

This section provides a general overview of diagnosis and planning. For more detailed information on these aspects, please refer to current literature. Implantologists and dental technicians with many years of experience are available to answer any questions that you may have.

The integrated tioLogic® training program also ensures that all the dentists, dental technicians and dental assistants involved in the implant procedure are optimally prepared by experienced lecturers. Dentaurum Implants provides numerous training courses at different levels tailored to suit the target group, the level of knowledge and individual interests.

Indications.

tioLogic® implant types can be used both in the mandible and maxilla for surgical immediate implantation, delayed immediate implantation and delayed implantation using either the one-stage or two-stage technique. Indications for implant insertion are small- and large-bounded saddles (one-tooth restorations, increasing the number of abutments) in the maxilla and mandible, a shortened dentition or an edentulous jaw. The possible benefits and disadvantages as well as the risks involved in implant treatment and alternative treatments should be taken into account when considering whether implant treatment is indicated.

In any implantological case the implant diameter and length of the tioLogic® implant types should be in proportion to the prosthetic restoration.

Implants with a minimum diameter of 4.2 mm should always be used for restorations that subject the implant and superstructure to high mechanical loading, if this is practical within the particular oral situation.

The tioLogic® implant types S ø 3.3 mm are available for patients with narrow alveolar ridges. Due to the smaller diameter and low load capacity (compared to the tioLogic® M ø 4.2 mm implants), these implants have a limited range of indications. In fully edentulous cases, four or more tioLogic® implants with a splinted bar restoration without extension must be inserted. In partially edentulous cases, implant supported restorations must be combined with tioLogic® ø 4.2 mm, ø 4.8 mm or ø 5.5 mm implants and a splinted fixed prosthetic restoration.

In single restorations, tioLogic® ø 3.3 mm implants should only be used for the lower incisors or the upper lateral incisors and only with a minimum 11.0 mm implant length. Single restorations on tioLogic® ø 3.7 mm, ø 4.2 mm, ø 4.8 mm or ø 5.5 mm implant types require a minimum 9.0 mm implant length.

Care should be taken to avoid an excessive mechanical loading when using ball head abutments together with ø 3.3 mm implants.
Contraindications.

Implants with a diameter of 3.3 mm are not suitable for single-tooth restorations of the central incisor in the maxilla or the canines, premolars or molars in the maxilla or the mandible. It is not permitted to use telescope crown constructions on these implants. The use of LOCATOR® abutments for non-parallel abutments of 10° or more per implant is contraindicative.

General contraindications for dental surgery procedures apply. These include:

- reduced immunodeficiency
- steroid treatment
- blood coagulation disorders
- uncontrolled endocrine diseases
- rheumatic disorders
- bone system diseases
- cirrhosis of the liver
- drug, alcohol or tobacco abuse
- depression, psychopathic disorders
- poor patient compliance
- chronic inflammatory diseases

Local contraindications / personal contraindications

- osteomyelitis
- radiotherapy in the head region
- recurring mucosal diseases
- temporomandibular joint dysfunctions
- parafunctions
- lack of vertical or horizontal bone availability, jaw defects, inadequate bone quality
- poor oral hygiene

It should be taken into account that these contraindications may be long- or short-term depending on the extent, duration and individual conditions. The current position of scientific implantological associations relating to indications and contraindications and current literature should be taken into consideration when planning implant treatment.
Working procedures.

Temporary restoration.

Temporary denture.  
(non-implant-borne)

A temporary prosthetic restoration should not be fitted until at least 14 days after implant placement. Always ensure that there is no mechanical loading on the placed implant. The restoration should be relieved over the implants and fitted with soft lining. If there are residual teeth, a temporary prosthetic restoration is generally fabricated on the abutment teeth prior to implant placement or an existing denture is converted.

Immediate restoration.  
(temporary abutment)

It is possible to fit a long-term, non-functional immediate temporary restoration on implants if there is absolute primary stability and no recession of the implant site. In aesthetically relevant areas the peri-implant structures are retained with a temporary abutment. An optimal impression can then be taken.

Temporary abutments are available for the S, M and L series of abutments. They are supplied non-sterile and made from high-strength plastic (PEEK), which can be quickly and easily customized.

The temporary abutment can be faced directly with composite or fitted with a temporary crown or bridge. In both cases the abutment is secured intra-orally with the screw for the temporary abutment; the contours are marked and adjusted extra-orally. The operator can use the polishing aid and AnatomicHold for a better grip. The restoration can only be shortened as far as the upper edge of the screw for the temporary abutment.

With a direct build-up of the facing, the temporary abutment is faced with composite extra-orally and then secured to the implant using the correct torque. With a crown restoration, the temporary abutment is fitted before sealing the screw aperture with wax and placing the temporary restoration. The crown should only be retained with temporary cement.

Tightening torque
- Temporary abutment intra-orally: 15 Ncm
- Temporary abutment on the model: manually
Implant exposure.

The implant is exposed after the healing stage. The patient should be prepared in the same way as for other surgical procedures. The patient is given a local anaesthetic.

For detailed information on implant insertion and implant exposure, please refer to the Surgery Manual (989-959-20).

Gingiva forming.

Gingiva formers, conical or cylindrical, or, bar, bridge, AngleFix abutments – particularly gentle on the tissue – are available for the operator to ensure optimal management of the gingiva. The conical gingiva formers are designed to form a wide gingival contour. Depending on the type of prosthetic restoration, this can make it easier for the operator to fit the restoration. The gingiva formers are selected according to the series of abutments, gingival height and insertion depth of the implant. They are available for the series of abutments S, M or L and in different gingival heights (laser-printed on gingiva former).

Tightening torque

- Gingiva former: manually or 15 Ncm
- Bar, bridge, AngleFix abutment: 35 Ncm
- Bar, bridge, AngleFix closure screw: 15 Ncm

Important: Gingiva formers can also be used with open healing of the implant for specific indications and for preserving the soft tissue.

If a temporary restoration is fitted, the denture should be relieved during gingiva forming. The impression should not be taken until the tissue is completely free of inflammation.
Working procedures.

Impression-taking.

The impression can be taken using either the open or closed technique. Relevant components are available for both impression techniques.

In the case of removable restorations (restorations with bars, bridges, ball abutments, LOCATOR®, AngleFix) the impression can also be taken with other special impression components over the respective primary abutments.

Silicone or polyether impression materials are recommended for impression-taking due to their high precision and elastic recovery.

Dental practice record card.

To ensure optimal information flow between the operator and dental technician, all relevant data, e.g. the implant diameter, implant length and planned prosthetic restoration, is noted in a practice record card (REF 989-966-22). The card is kept with prosthetic restoration during the entire fabrication procedure. At the fitting stage it is given to the operator along with the finished prosthetic restoration. It contains all the important information for fitting the restoration.
After the impression has been taken, an individual tray is fabricated. This is strengthened and perforated in the region of the implants.

The temporary restoration and gingiva formers should be removed prior to taking the impression.

The screw is pushed down before fitting the impression post. This provides additional guidance when fitting the post. The inner connection is shorter with an open impression to ensure a compression-free impression even with divergent axes.

Open impression technique.
Impression posts are available for the series of abutments S, M and L in lengths of 10.0 mm and 14.0 mm with the corresponding screws to cater for different occlusal spaces. The impression posts are laser-printed with S, M or L on the retention surface and at the interface.

In order to make the abutment series more recognizable, the interface is additionally marked with dots:
- 1 dot is equivalent to abutment S
- 2 dots are equivalent to abutment M
- 3 dots are equivalent to abutment L

Tightening torque
- Sure-grip screw impression post intra-orally: manually or 15 Ncm
- Sure-grip screw impression post in the laboratory implant: manually or 15 Ncm
Working procedures.

Impression-taking.

The impression post corresponding to the series of abutments S, M or L (here M) is fitted until the rotational security engages. A congruent fit of the implant post on the implant shoulder is indicated when an optical mark on the screw is level with the upper edge of the impression post (screw should only be inserted and not tightened). If the rotational security is not engaged, the mark on the screw is not visible. The impression post should be realigned and checked to ensure that it fits correctly (x-ray check).

When fitting the custom tray, ensure that there is no contact between the impression posts or screws and the tray at the perforations.
Impression post M in the open impression tray.

The tray with the screws is sent to the dental laboratory.

The dental technician obtains all the relevant information from the practice record card (REF 989-966-22).

The respective gingiva formers are refitted after the impression has been taken.
Working procedures.

Impression-taking.

To achieve a stable apposition of the gingiva with bar, bridge and AngleFix abutments, you can either take an impression on implants according to conventional methods or take an impression on bar, bridge and AngleFix abutments that are fitted in the mouth.

The impression can be taken using either the open or closed technique. The impression is taken with special impression components, which are identical for the series of abutments S, M and L, over the respective bar, bridge and AngleFix abutments.

Silicone or polyether impression materials are recommended for impression-taking due to their high precision and elastic recovery.

Dental practice record card.

To ensure optimal information flow between the operator and dental technician, all relevant data, e.g. the implant diameter, implant length and planned prosthetic restoration, is noted in a practice record card (REF 989-966-22). The card is kept with prosthetic restoration during the entire fabrication procedure. At the fitting stage it is given to the operator along with the finished prosthetic restoration. It contains all the important information for fitting the restoration.
Taking an impression over bar, bridge and AngleFix abutments.

To achieve a stable apposition of the gingiva with bar, bridge and AngleFix abutments, you can either take an impression on implants (as described on p. 17) or on bar, bridge and AngleFix abutments that are fitted in the mouth.

To that end, the bar, bridge or AngleFix abutment is fixed on the implant and the corresponding open impression post is placed. A congruent fit of the impression post on the abutment is indicated when an optical mark on the screw is level with the upper edge of the impression post (screw is only pushed into place, not fixed). If the impression post does not fit flush, the marking on the screw will not be visible. The impression post should be aligned again, checked for correct fit and fixed with the screw.

Following this, the impression is taken with an open impression tray. Once the impression material has set, the sure-grip screws are loosened, pushed upwards and the impression tray is removed together with the impression posts. The abutments are then covered with the corresponding closure screws.

In the laboratory, the laboratory implant bar, bridge or AngleFix is fixed on the impression post with the screw. The upper section of this laboratory implant is identical to that of the respective abutment.

Tightening torque
- Sure-grip screw impression post: 15 Ncm
- Closure screw on bar, bridge, AngleFix abutment intra-orally: 15 Ncm
Working procedures.

Impression-taking.

Closed impression technique.

Components for the closed impression technique include impression posts, screws, impression caps and bite registration caps. They are laser-printed or marked with the series of abutments S, M or L.

**Tightening torque**

- Screw impression post intra-orally: manually or 15 Ncm
- Screw impression post on the laboratory implant: manually or 15 Ncm

The gingiva formers and temporary restoration are first removed and the relevant impression post S, M or L is secured on the implant with the screw (here M). Check the correct fit of the impression post by means of an x-ray, if deemed necessary.

The corresponding impression aid S, M or L is fitted according to the vertical retention grooves until it perceptibly and audibly clicks into place (here M).

The design of the retention grooves ensures that they can be positioned without coming into contact with the adjacent teeth.

The impression is taken according to the standard criteria (open impression technique p. 17). The tray is removed after the impression material has set.

The dental technician obtains all the relevant information from the practice record card (REF 989-966-22).

The respective gingiva formers are refitted after the impression has been taken.
Impression post M, closed  impression cap M  bite registration cap. M

7.0 mm  6.0 mm  6.0 mm

Impression tray with impression cap M

Bite registration.

Bite registration caps are available for registering the bite before or after taking the impression. These caps, which are also laser-printed with the series of abutment S, M or L (here M). They click, both perceptibly and audibly, into place on the impression posts.

Impression caps and bite registration caps are single-use products. They are not suitable for sterilization. Multiple use results in transfer inaccuracies.

Tightening torque
- Sure-grip screw impression post intra-orally: manually or 15 Ncm
- Sure-grip screw impression post in the laboratory implant: manually or 15 Ncm
Working procedures.

Closed impression technique on bridge and AngleFix abutments.

Impression posts including screws and impression caps are available for taking the closed impression.

When taking the closed impression the AngleFix and bridge abutment is fixed in position in the implant and the corresponding impression post for the closed impression is screw-retained on the abutment. The appropriate impression cap is fitted taking into account the vertical retention grooves until it can be clearly felt and heard snapping into position. The retention grooves are designed so that it is possible to position a groove without touching adjacent teeth.

The impression is taken according to the usual criteria (see section closed impression technique) p. 22. After the impression material has cured, the tray is removed. The impression posts with screws are delivered to the laboratory together with the impression.

**Tightening torque**

- Sure-grip screw impression post: 15 Ncm
- Closure screw on AngleFix or bridge abutment intra-orally: 15 Ncm
Quality is your demand and our expertise.

Dental technology setting standards.

The Dentaurum Group develops, produces and sells products for dentists and dental technicians worldwide. The variety of products for dental technology, orthodontics and implantology is unique in the dental world. Dentaurum Implants, a manufacturer of implants, is a subsidiary of Dentaurum.

Quality inspires confidence.

As the oldest dental company in the world, we have worldwide experience with high-quality dental products. Our market success is based on consistent implementation of customer and market demands. This is why we are committed to the constant further development of the company and to continuous improvement of the quality of our processes and products.

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Working procedures.

Casting the model.

Open impression technique.

In order to check the exact fit of the impression post, the impression material is removed from the occlusal surface to the top edge of the impression post. Before the laboratory implant is inserted, it can be clearly read off the impression post interface whether an S, M or L abutment is required.

Before the laboratory implant is inserted, the screw is pushed downwards into the impression post. This guarantees additional guidance during insertion.

The laboratory implant corresponding to the abutment S, M or L is put into place (in this case M), until the rotational security engages. The impression post fits the laboratory implant congruently when the visible marking on the screw is in line with the upper edge of the impression post (screw is only pushed into place, not fixed). If the rotational security is not engaged, then the marking on the screw is not visible. The impression post should be adjusted again and re-checked for correct fit.

Tightening torque

- Sure-grip screw impression post in the laboratory implant: manually or 15 Ncm

Fabricating the gingival mask.

An elastic gingival mask is recommended for use on implant restorations. This provides the optimal reproduction of the crown contour and, when removed, it allows a full view of the implant cervical section. This allows the exact fit of the abutment to be checked and monitored.

The elastic gingival mask is applied directly to the implant area within the impression.

Caution: The two types of silicone could bond inseparably, it is therefore essential to first apply a separating agent.

In the case of removable restorations (restorations with bars, bridges, ball abutment, LOCATOR®, AngleFix) the impression and model casting can also be effected with other special impression components.
Casting the plaster model.
After the gingival mask material has set, the impression can be cast in plaster. The dental arch is cast in the usual manner and the base added. The laboratory implants must fit precisely. The screws must be removed before the impression tray is lifted off.
Closed impression technique.

All laboratory implants, impression posts and impression caps are laser-printed or marked with the appropriate abutment series S, M or L.

The S, M or L laboratory implant is wound into the respective impression post. Next, the impression post is placed in the impression cap, taking the diameter S, M or L, and the vertical retention groove into consideration, until a click can be both heard and felt. The laboratory implant, screwed to the impression post, must be placed into the impression cap and this securely fixed into the impression material.

Impression caps and bite registration caps are disposable items. They are not suitable for sterilisation. Multiple use leads to transfer discrepancies. Both components can be re-ordered separately.

Tightening torque

- AnoTite screw impression post in laboratory implant: Manually or 15 Ncm

The gingival mask and the plaster model are fabricated using the same method as described in the section Casting the model – the open impression technique. Loosening and removal of the sure-grip screw is not applicable to the closed impression method. The impression tray can be released directly from the model.

In the case of removable restorations (restorations with bars, bridges, ball abutment, LOCATOR®, AngleFix) the impression and model casting can also be effected with other special impression components.
The open impression technique bridge, bar and AngleFix.

In order to check the exact fit of the impression post, the impression material is removed from the occlusal surface to the top edge of the impression post. Before each laboratory implant is inserted, the screw is pushed downwards into the impression post. This guarantees additional guidance during insertion.

Tightening torque
- Sure-grip screw impression post: In laboratory implant manually or 15 Ncm

Fabricating the gingival mask.
An elastic gingival mask is recommended for fabricating a gingival mask. This provides the optimal reproduction of the suprastructure and, when removed, it allows a full view of the implant cervical section. This allows the exact fit of the abutment to be checked. The elastic gingival mask is applied directly to the implant area within the impression.
Caution: The two types of silicone could bond inseparably, it is therefore essential to first apply a separating agent.

Casting the plaster model.
After the gingival mask material has set, the dental arch is cast in the usual manner and the base added. The laboratory implants must fit precisely. The screws must be removed before the impression tray is lifted off.

The closed impression technique bridge and AngleFix.

The laboratory implant is screwed into the respective impression post. Next, the impression post is placed in the impression cap, taking the vertical retention groove into consideration, until a click can be both heard and felt. The laboratory implant, screwed to the impression post, must be placed into the impression cap and this securely fixed into the impression material.

Tightening torque
- AnoTite screw impression post in laboratory implant: Manually or 15 Ncm

Fabricating the gingival mask.
The gingival mask and the plaster model are fabricated using the same method as described in the section Casting the model – the open impression technique. Loosening and removal of the sure-grip screw is not applicable to the closed impression method. The impression tray can be released directly from the model.

Impression caps and bite registration caps are single-use products. They are not suitable for sterilization. Multiple use results in transfer inaccuracies. Both components can be re-ordered separately.
Selection aid S

Selection aid M

Selection aid L
**Wax-up / set-up, lingual overcast or palatal overcast.**

An overcast can be adapted to the lingual or palatal aspects of the model, in order to determine the amount of space available. For this, a silicone overcast is built over a wax-up / set-up of the planned prosthetic restoration. The overcast is cut in half along the occlusal medial line producing a lingual overcast and a palatal overcast. With this overcast it is possible to determine the amount of space available exactly.

**Abutments – selection aids**

After having completed the models with the overcasts, the abutment components may be selected. This selection depends upon the implant axis, gingival height, amount of space available to the antagonists and the material to be used for the abutment and planned restoration.

In order to simplify matters for the dental technician, there are various acrylic selection aids available for the abutment series S, M and L. These were designed specifically as selection aids for the laboratory and must not be used for the actual prosthetic restoration.
Every implant restoration requires exact pre-prosthetic planning. Apart from the anatomical aspects, the prosthetic components and processing (cementation/screw fixation) are also determined.

For every abutment series there are S, M or L components available in the materials ceramic (case 1), precious metal (case 2) and titanium (case 3) for individual, fixed restorations on implants.

Single restorations

The decisive factor for a single restoration is the optimal proportion – crown length to implant length. In order to achieve a long term, stable, single restoration, an optimal proportion between crown and inserted implant length must be ensured (see practice record card). If this value is exceeded, then it is preferable to fabricate a bridge restoration on two or more abutment teeth instead.

Case 1:

**Full ceramic anterior restoration, cemented.**

Titanium bases are used for the fabrication of customized hybrid abutments for adhesively bonding CAD/CAM zirconium oxide ceramic mesostructures.

The geometry of the titanium bases was specially designed to ensure a reliable, aesthetic bond with the ceramic mesostructure.
Tightening torque
- Prosthetic screw scan abutment on model and intra-orally: manually
- Prosthetic screw CAD/CAM titanium base on model: manually
- AnoTite screw CAD/CAM titanium base intra-orally: 30 Ncm

**CAD/CAM manufacturing.**
The scan abutments are available in the S, M or L series of abutments. The scan abutment is placed on the implant or on the laboratory implant (pay attention to the rotational security) and fixed with the prosthetic screw L 9.0 mm.

After selecting the indication (here: hybrid abutments) in the tioLogic® data set of the respective software, the scan abutments can be scanned.

The matching process and design are carried out according to the instructions of the software manufacturer and dental rules.

The AnatomicHold (a universal holder) is available with two holders for the milled ceramic sleeve, in order to make processing easier for the technician.

One holder is available for the ceramic sleeve in the abutment series S and M and the second for the abutment series L. The holders are marked accordingly.

The relevant ceramic abutment holder is placed into the AnatomicHold and fixed securely to prevent rotation with a grub screw (SW 0.9). Then the holder fixation screw is slightly loosened and the ceramic sleeve is positioned. Ensure that the rotational stop integrated within the abutment and the holder are congruent.
Dental technical variants.

Fixed restorations.

- The thickness of the ceramic abutment must be no less than 0.5 mm.
- Prepare a chamfer with angled inner edge and a minimum step of 0.5 mm.
- The height of the ceramic abutment must be no less than 7.0 mm in its entire length (not including the titanium base).

The ceramic sleeve is fixed by tightening the fixation screw (manually max. 15 Ncm).

The following parameter must be taken into consideration when designing the ceramic abutment:

- The thickness of the ceramic abutment must be no less than 0.5 mm.
- Prepare a chamfer with angled inner edge and a minimum step of 0.5 mm.
- The height of the ceramic abutment must be no less than 7.0 mm in its entire length (not including the titanium base).
In order to adhesively fix the two objects accurately, the CAD/CAM titanium base is screwed onto the respective polishing aid S, M or L using the prosthetic screw (in this case M). The polishing aid is then fixed to the AnatomicHold which makes handling easier when the CAD/CAM titanium base and ceramic sleeve are glued together.

Before gluing, the head of the prosthetic screw, which fixes to the CAD/CAM titanium base, is covered with wax. The surfaces to be glued on the CAD/CAM titanium base and ceramic abutment are sandblasted with aluminium oxide (50 μm/2 bar).

It is also advisable to use the silanisation method to condition the surfaces to be glued. Before gluing, ensure the surfaces are dry and free from grease. Use the adhesive cement according to the manufacturer’s instructions.

After adhesive fixation, the excess glue is removed and the ceramic abutment is placed on top (observing the rotational security). The full ceramic crown is completed according to the manufacturer’s instructions.
Dental technical variants.

Fixed restorations.

Case 2: Bonded anterior restoration, cemented, precious metal abutment.
Precious metal abutments are available for the abutment series S, M and L. The precious metal abutment consists of a cast-on base made from a precious metal alloy, an acrylic extension and an AnoTite screw. The abutment construction makes individualization easy and is extremely precise, due to the pre-fabricated inner joint.

Tightening torque
- AnoTite screw, precious metal abutment on model: manually
- AnoTite screw, precious metal abutment intra-orally: 30 Ncm

As for case 1 (ceramic abutment, p. 32), the model with the integrated laboratory implant and gingival mask is articulated. The occlusal space is checked.

The precious metal abutment is placed on the laboratory implant (pay attention to the rotational security) and fixed with the prosthetic screw L 9.0 mm.

The acrylic extension is shortened and trimmed according to the amount of space available occlusally and anatomically.

The precious metal abutment is removed, then the mesio construction is waxed-up. A precious metal alloy must be used to cast-on to the precious metal base.
If the cervical cast-on segment is to be bonded with ceramic material, it is important to ensure it has a wall thickness of at least 0.3 mm in order to avoid cracking within the ceramics.

The following precision instruments are available to aid the dental technician when trimming and finishing the piece of work, either before or after having been cast:

- Polishing aid S, M and L
- AnatomicHold (universal holder)

The mesio construction is fixed to the model and the crown is waxed and cast according to conventional PFM prerequisites.

**Tip:** During the wax-up, a notch is integrated into the metal framework design in the palatal / cervical region. Later, this will not be bonded with ceramic and will make crown removal easier (attachment for crown removal instrument).
Dental technical variants.

Fixed restorations.

Case 3: Bonded anterior restoration, cemented, titanium abutment 20°.
Titanium abutments are available in the abutment series S, M and L, in straight, angled (S 15°, M 20° and L 20°) and universal form. The straight and angled titanium abutments can be slightly altered to adapt to the gingival line (straight 1.0 mm, 2.5 mm and 4.0 mm, angled 1.5 mm and 3.0 mm). These abutments have an exactly defined crown margin and an integrated rotational stop. The angled titanium abutments are also available in different gingival heights (labial / palatal). The universal titanium abutments are cylindrical and can be prepared as required.

Tightening torque

- Prosthetic screw, titanium abutment on model: manually
- AnoTite screw, titanium abutment intra-orally: 30 Ncm

The angled titanium abutment M 20°, GH 1.5 mm is used in the case described below. When the abutment is inserted, the occlusal space and the axial direction must be checked. Both can be altered by marking where necessary. The titanium abutment is fixed onto the model with the AnoTite screw. The following precision instruments are available for processing the titanium abutment:
Titanium must not become overheated as this can lead to superficial hardening (alpha-case layer) and could complicate or handicap processing. This applies essentially to the titanium abutments as it is possible that this is where most trimming will take place.

The crown is veneered according to the manufacturer’s instructions for use (e.g. ceraMotion® Me, Dentaurum). If the restoration framework is made from titanium, a suitable titanium ceramic should be used, such as ceraMotion® Ti from Dentaurum.

The mesio construction is fixed onto the model, cast and finished.

Tip:
During the wax-up, a notch can be integrated into the metal framework design in the palatal / cervical region. Later, this will not be veneered and will make crown removal easier (attachment for crown removal instrument).
Dental technical variants.

Fixed restorations.

Bridge restoration.
Free-end cemented, titanium abutment straight.
The straight titanium abutments are selected according to the gingival conditions. There are three different gingival heights available in the abutment series S, M and L (1.0 mm, 2.5 mm and 4.0 mm). The titanium abutments can be customized according to the gingival line. The height of the coronal part of each abutment is 6.0 mm and can be shortened according to occlusal space requirements. The precision instruments (see p. 78 ff.) are suitable for trimming and finishing the piece of work. The titanium abutment is fixed with the supplied AnoTite screw L 9.0 mm.

Tightening torque
- Prosthetic screw, titanium abutment on model: manually
- AnoTite screw, titanium abutment intra-orally: 30 Ncm
The following case uses two straight titanium abutments M, GH 1.0 mm and one straight titanium abutment L, GH 1.0 mm.

Model with marked abutment in position, buccal view.
The crown caps are fabricated and connected using the same fully burn-out resin, in order to achieve an accurate fit of the bridge later.

Next the framework is designed according to dental technical prerequisites (reduced final anatomical shape). The waxes from Dentaurum which also burn without leaving a residue (StarWax range) are suitable.

The metal alloy is cast and processed according to the relevant manufacturer’s instructions.

**Tip:** During the wax-up, a notch can be integrated into the metal framework design in the palatal/cervical region. Later, this will not be veneered which will make crown removal easier (attachment for crown removal instrument).

**Important:** It is essential that the framework has an absolutely passive fit on the titanium abutments.

**Tip:** If the implant abutments have different implant diameters it is a good idea to mark each individual piece in order to avoid any mix-up during insertion or positioning.

The proximal areas should be designed so that the implant neck may be cleaned with an interdental brush.
Dental technical variants.

CAD/CAM.

Dentaurum Implants provides a coordinated complete solution for CAD/CAM processes on tioLogic® implants.

At www.dentaurum-implants.com/cadcam

Dentaurum Implants provides a download service for tioLogic® CAD/CAM data records for 3shape, dental wings and exocad and integrates them into the respective software. The data records were created and verified in collaboration with these manufacturers.

The download begins after selection of the relevant software provider. The download contains all data for every type of restoration as a complete package.

The scan abutments were specially designed for precise digital recording of the geometry directly on the implant shoulder.

Titanium bases are used for the fabrication of customized hybrid abutments for adhesively bonding CAD/CAM zirconium oxide ceramic mesostructures.

The geometry of the titanium bases was specially designed to ensure a reliable, aesthetic bond with the ceramic mesostructure.

Original tioLogic® CAD/CAM titanium blocks are available during fabrication of customized one-piece abutments.

CAD/CAM manufacturing.

The scan abutments are available in the S, M or L series of abutments. The scan abutment is placed on the implant or on the laboratory implant (pay attention to the rotational security) and fixed with the prosthetic screw L 9.0 mm.

After selecting the indication (here: one piece abutments or hybrid abutments) in the tioLogic® data set of the respective software, the scan abutments can be scanned.

The matching process and design are carried out according to the instructions of the software manufacturer and dental rules.
1. Data matching

2. Insertion direction

3. Wax-up with opposing teeth.

4. Wax-up.

5. Finished wax up without model.

6. Completely designed one piece abutment.
Dental technical variants.

Operator-removable restorations

Apart from the anatomical aspects, the prosthetic components and their processing techniques (cementation / screw fixation) are also determined during the planning phase.

When constructing an operator-removable prosthetic restoration, it is essential to use only the precious metal abutments, which are available in the abutment series S, M and L.

**Tightening torque**

- Prosthetic screw, precious metal abutment on model: manually
- AnoTite screw, precious metal abutment intra-orally: 30 Ncm

**Single restorations**

**Case: premolar, occlusal screw fixation, precious metal abutment.**

The prosthetic restoration in the case described below uses the precious metal abutment L.

The precious metal base consists of a cast-on precious metal alloy.

The precious metal abutment is placed on the laboratory implant (pay attention to the rotational security) and fixed with the prosthetic screw L 9.0 mm.

The acrylic extension is shortened and trimmed according to the amount of space available occlusally and anatomically.

The wax-up is prepared according to the conventional PFM prerequisites and is then fabricated directly from the gingival margin.
Precious metal abutment with waxed pattern in situ, buccal view.

Using a permanent marker, the gingival line is marked on the abutment.

A precious metal alloy (e.g. DentAurum Bio or DentAurum LFC, from Dentaurum) is used to cast-on to the precious metal base. If the collar of the precious metal base is to be bonded with ceramic material, it is important to ensure it has a wall thickness of at least 0.3 mm in order to avoid cracking within the ceramics.

The following precision instruments are available to aid the dental technician when trimming and finishing the piece of work, either before or after having been cast:

- Polishing aid S, M and L
- AnatomicHold (universal holder)

Trimming and veneering are carried out according to the manufacturer’s instructions. The following procedure warrants an individual marginal design.
Dental technical variants.

Operator-removable restorations

The bar, bridge and AngleFix abutments can be combined and used for bar and bridge constructions depending on the clinical situation.

Bridge restoration.

Bridge abutments are available for the S, M and L series of abutments. The gingival heights are 1.0 mm, 2.5 mm and 4.0 mm. The seating surface of the bridge abutments should be approx. 0.5 mm above the gingiva.

The bridge abutments can compensate for implants which diverge / converge by up to 40°.

Passive fit (“Sheffield Test”).

After lasering or casting, every bridge restoration must be checked for passive fit on the model and prior to placing it intra-orally. This involves placing the bridge restoration on the bridge abutments and fixing it to the bridge abutment with only one prosthetic screw (torque 25 Ncm). If this raises the bar to create a gap between the bridge and abutment, stresses are present and must be eliminated.

For restorations with temporary (case 1) or individually cast (case 2) milled (case 3) bridges, the appropriate caps are secured on the bridge abutments:

Case 1: Titanium cap
Case 2: Plastic cap
Case 3: Scan cap bridge abutment

The seating surface and cone (20 °) for the caps on the bridge abutments is identical (ø 4.1 mm) for the S, M and L series of abutments. The same AnoTite screw, bridge abutment (L 6.0 mm) is used for all caps. The bridge abutment is placed with the bar, bridge, AngleFix abutment insertion key (secure the counter screw!).

Tightening torque
- Bridge abutments on model: manually
- Bridge abutments intra-orally: 35 Ncm
- Cap on bridge abutment on the model: manually
- Cap on bridge abutment intra-orally: 25 Ncm
- Sure-grip screw impression post on bridge abutment intra-orally: 15 Ncm
- Closure screw in bridge abutment intra-orally: 15 Ncm
Case 1: Temporary restoration.
The bridge titanium caps are secured in position on the bridge abutments using the AnoTite screw L 6.0 mm for fabricating a temporary restoration.

The available space is checked using the lingual and palatal overcasts. If there is insufficient space available, the bridge titanium caps can be lightly and easily trimmed.

Titanium must not become overheated as this can lead to superficial hardening (alpha-case layer) and could complicate or handicap processing.

A wax set-up is then fabricated, which can be checked using the lingual and palatal overcasts. Before waxing up the temporary restoration, ensure that there is an adequate, uniform cement gap between the bridge titanium caps and the temporary restoration by blocking out using preparation and casting wax (e.g.: Dentaurum REF 120-025-00). This guarantees a stress-free fixation.

Finishing, trimming and polishing should be completed according to the instructions of the acrylic manufacturer.

PTFE cylinder pins are available for restorations which are bonded in the laboratory. The pins do not bond with the adhesive and prevent it getting into the screw aperture.

Case 2: Bridge long-term restoration.
The bridge plastic caps are secured in position on the bridge abutments using the AnoTite screw L 6.0 mm.

The available space is checked using the lingual and palatal overcasts. If there is insufficient space available, the bridge plastic caps can be lightly and easily trimmed.

A base structure is then fabricated as a strengthener for a long-term restoration. The wax-up is fabricated taking into consideration the lingual and palatal overcasts. The waxes from Dentaurum which burn without leaving a residue (StarWax range) are suitable. This procedure guarantees that there is still sufficient space for subsequent working stages and the pre-prosthetic planning can be maintained.

Case 3: CAD/CAM manufacturing
The scan caps bridge abutments are fixed with the prosthetic screw L 6.0 mm on the bridge abutments.

After selecting the indication (here: bridge abutments) in the tioLogic® data set of the respective software, the scan caps bridge abutments can be scanned.

The matching process and design are carried out according to the instructions of the software manufacturer and dental rules.
Dental technical variants.

Operator-removable restorations

AngleFix restoration.

Due to the steep inclination of the implants a splinted denture is absolutely essential.

Fitting the AngleFix abutments.

When fitting the angulated AngleFix abutments ensure that the abutments have a larger diameter than the implants. As part of the abutments may be below the bone line, the bone may have to be removed in this region, if required, so that the abutment sits flush on the implant. A prerequisite for successful use of the AngleFix system is the best possible accurate angular position of the implant. The more accurate this angle can be maintained, the easier the prosthetic treatment, as the abutments are then positioned parallel to one another.

To ensure that the implants are reliably placed in this angle we recommend the use of navigated implant placement with the tioLogic® pOsition system (see Surgery Manual pOsition for tioLogic® REF 989-999-20).

Alternatively or as a control instrument there are angle aids available with 18° and 32°, which are used as orientation for implants in situ.

The AngleFix abutments are provided in 3 angulations: 0°, 18° and 32°. The cone of the AngleFix abutments is always identical (24°), so that only one size of impression posts, closure caps etc. is required. For biomechanical reasons we recommend that the following angulations are not exceeded:

- Abutments with 0°: 0° – 12°
- Abutments with 18°: 6° – 30°
- Abutments with 32°: 20 – 44°
The bar, bridge and AngleFix abutments can be combined and used for bar and bridge constructions depending on the clinical situation.
Dental technical variants.

Operator-removable restorations.

Implant position.

Before beginning treatment adequate vertical and horizontal bone, both in terms of quantity and quality, must be exposed, while paying particular attention to the position of the inferior alveolar canal and the mental foramen in the mandible and the maxillary sinus in the maxilla. A minimum clearance of 3.0 mm should be maintained to these critical anatomical structures.

To ensure adequate stability only tioLogic® implant types with the following dimensions should be used for the AngleFix system:

- The tioLogic® implant types S ø 3.3 mm are available for patients with narrow alveolar ridges. Due to the small diameter and low load capacity (compared to the tioLogic® M ø 4.2 mm implants), these implants have a limited range of indications. In fully edentulous cases, four or more S ø 3.3 mm implants must be inserted with a splinted bar restoration without extension.
- AngleFix restorations on tioLogic® implants require a minimum 11.0 mm implant length.
Implant aligned distally in the posterior region.

In order to achieve an accurate alignment of the angulated cone of the angled abutments the implants should be aligned so that when viewed distally the marking can be seen symmetrically on the placement aid or insertion aid.

First, the two anterior implants are inserted, whereby the paralleling posts can be used to aid parallel alignment.

When handling the AngleFix abutments, ensure that the occlusal screw is not damaged by tweezers etc.

The angulated AngleFix abutments have a larger diameter than the implants. As part of the abutments may be below the bone line, the bone must be removed in this region, if required, so that the abutment sits correctly on the implant.

After fixing the AngleFix abutments in position on the anterior implants, the corresponding angle gauge 18° or 32° is secured on the abutments according to the angular position given from the planning. The pin on the angle gauge functions as a parallel guidance aid for the pilot drill.
Fabricating the restoration.

The AngleFix abutments are available for the series of abutments S, M and L in the straight and angulated (18° and 32°) versions. They are available for the straight abutments in a gingival height of 1.0 mm and in a gingival height of 2.5 mm for the angulated abutments.

The anterior implants are fitted with straight abutments and the posterior region with AngleFix abutments in an angulation of 18° or 32° according to the implant positioning.

Titanium caps or plastic caps can be used for fabricating a restoration on AngleFix abutments. The AngleFix caps fit on all three AngleFix series of abutments (S - M - L), as the fitting surface of all AngleFix abutments and the cone (24°) are identical (Ø 5.3 mm). They are secured in position on the AngleFix abutments using the AnoTite screw L 6.0 mm supplied.

**Tightening torque**
- Cap on AngleFix abutment on the model: manually
- Cap on AngleFix abutment intra-orally: 25 Ncm

**Case 1:**
- Titanium cap
- Plastic cap
- Precious metal cap

**Case 2:**
- Plastic cap
- Precious metal cap
- Titanium cap

**Case 3:**
- Scan cap AngleFix abutment

For restorations with temporary (case 1) or individually cast (case 2) or milled (case 3) AngleFix, the appropriate caps are secured on the AngleFix abutments:

The seating surface and cone (24°) for the caps on the AngleFix abutments is identical (Ø 5.3 mm) for the S, M and L series of abutments. The same AnoTite screw, bridge abutment (L 6.0 mm) is used for all caps. The AngleFix abutment is placed with the bar, bridge, AngleFix abutment insertion key (secure the counter screw!).

**Operator-removable restorations.**

<table>
<thead>
<tr>
<th>0°</th>
<th>18°</th>
<th>32°</th>
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<tr>
<td>AngleFix abutment M 0° GH 1.0 mm</td>
<td>AngleFix abutment M 18° GH 2.5 mm</td>
<td>AngleFix abutment M 32° GH 2.5 mm</td>
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</table>
Case 1: Temporary restoration.
The AngleFix titanium caps are secured in position on the AngleFix abutments using the AnoTite screw L 6.0 mm for fabricating a temporary restoration.

The available space is checked using the lingual and palatal overcasts. If there is insufficient space available, the AngleFix titanium caps can be lightly and easily trimmed.

Titanium must not become overheated as this can lead to superficial hardening (alpha-case layer) and could complicate or handicap processing.

A wax set-up is then fabricated, which can be checked using the lingual and palatal overcasts.

Before waxing up the temporary restoration, ensure that there is an adequate, uniform cement gap between the AngleFix titanium caps and the temporary restoration by blocking out using preparation and casting wax (e.g.: Dentaurum REF 120-025-00). This guarantees a stress-free fixation.

Finishing, trimming and polishing should be completed according to the instructions of the acrylic manufacturer.

PTFE cylinder pins are available for restorations which are bonded in the laboratory. The pins do not bond with the adhesive and prevent it getting into the screw aperture.
Working procedures.

Operator-removable restorations.

Case 2: AngleFix long-term restoration.
The AngleFix plastic caps are secured in position on the AngleFix abutments using the AnoTite screw L 6.0 mm.

The available space is checked using buccal and lingual overcasts. If there is insufficient space available, the AngleFix plastic caps can be lightly and easily trimmed.

A base structure is then fabricated as a strengthener for a long-term restoration. The wax-up is fabricated taking into consideration the lingual and palatal overcasts. This procedure guarantees that there is still sufficient space for subsequent working stages and the pre-prosthetic planning can be maintained.

Case 3: CAD/CAM manufacturing
The scan caps AngleFix are fixed with the prosthetic screw L 6.0 mm on the AngleFix abutments.

After selecting the indication (here: AngleFix abutments) in the tioLogic® data set of the respective software, the scan caps AngleFix can be scanned.

The matching process and design are carried out according to the instructions of the software manufacturer and dental rules.
Framework design in CAD/CAM-Software.

Milled zirconia framework.

Firing the gingiva section in ceramic.

Labial view of model with finished ceramic crowns.

Bonding of the zirconium framework on the AngleFix caps.

Finished ceramic restoration on the AngleFix abutments.
Dental technical variants.

Removable restorations.

Various types of removable prosthetic restoration are feasible:

- Telescopic restoration
- Ball abutment restoration
- LOCATOR® restoration

Telescopic restoration.

**Case: Precious metal abutments.**

Precious metal abutments are used for telescopic restorations. They are available for the S, M and L series of abutments and comprise a cast-on precious metal base, a plastic extension and an AnoTite screw. The precious metal abutments with their prefabricated precious metal bases guarantee high precision of fit on the implant. The plastic extension allows the individual telescopes to be custom-designed.

**Tightening torque**

- Prosthetic screw, precious metal abutment on model: manually
- AnoTite screw, precious metal abutment intra-orally: 30 Ncm

Precious metal abutments are positioned onto the laboratory implants and fixed with the prosthetic screws L 9.0 mm (observing the rotational stop). The space available is checked using the lingual overcast and palatal overcast and the acrylic extension is adapted accordingly.
The primary crowns are fabricated according to the space available within the overcasts. This procedure ensures that enough space is available for all further working steps, such as the fabrication of secondary crowns and the dimensions of the metal strengthener, as determined in the pre-prosthetic plan.

The waxed-up primary crowns are milled (e.g. using the milling machine Paramil 3, from Dentaurum). The crowns are placed onto the model, checked and then the sprues are applied. Before the objects to be cast are invested, the sub-gingival region is waxed in a conical shape. A precious metal alloy must be used to cast-on to the precious metal base.

**Tip:**
The casting sprues are marked on the model according to their position.
Dental technical variants.

Removable restorations.

Model with cast precious metal abutment, without gingival mask, labial view.

Cast, trimmed precious metal abutment with overcast, labial view.

Cast precious metal abutment with gingival mask and secondary telescope crowns (electroformed caps), oral view.

After having been cast, the primary telescope crowns are replaced onto the model and checked, finished and polished.
In order to produce a long term, durable restoration, a metal strengthening structure is constructed to which each individual, electroformed secondary telescope is cemented.

Each primary telescope is marked for identification and to show its correct position on the implant, so that no mistakes are made during insertion.
Dental technical variants.

Removable restorations.

Bar restoration.
Bar abutments are available for the S, M and L series of abutments. The gingival heights are 1.0 mm, 2.5 mm, 4.0 mm and 5.5 mm. The seating surface of the bar abutments should be approx. 0.5 mm above the gingiva.

The bar abutments can compensate for implants which diverge / converge by up to 80°.

Passive fit ("Sheffield Test").
After lasering or casting, every bar restoration must be checked for passive fit on the model and prior to placing it intra-orally. This involves placing the bar restoration on the bridge abutments and fixing it to the bar abutment with only one prosthetic screw (torque 25 Ncm). If this raises the bar to create a gap between the bar and abutment, stresses are present and must be eliminated.

For restorations with prefabricated or individually cast (case 2) or milled (cases 2, 3 + 4) bars, the appropriate caps are secured on the bar abutments.

Case 1:  • Titanium cap
  • Plastic cap
  • Precious metal cap

Case 2:
  • Plastic cap
  • Precious metal cap
  • Titanium cap

Case 3:
  • Plastic cap
  • Titanium cap

Case 4:
  • Scan cap bar abutment

The seating surface for the caps on the bar abutments is identical (ø 4.5 mm) for the S, M and L series of abutments. The same AnoTite screw, bar abutment (L 6.0 mm) is used for all caps. The bar abutment is placed with the bar abutment insertion key (secure the counter screw!).

Tightening torque
  • Bar abutments on model: manually
  • Bar abutments intra-orally: 35 Ncm
  • Cap on bar abutment on the model: manually
  • Cap on bar abutment intra-orally: 25 Ncm
  • Sure-grip screw impression post on bar abutment intra-orally: 15 Ncm
  • Closure screw in bar abutment intraorally: 15 Ncm
Case 1: Prefabricated bar (lasered or cast)
Criteria for positioning a bar (bar attachment):

**Horizontal bar positioning.**
To ensure that the masticatory forces are directed correctly, the bar must be positioned horizontally to the ideal occlusal plane. Tilting the bar would load the implants incorrectly and cause excessive pressure to be exerted on the mucous membranes.

**Vertical bar positioning.**
With fixed/free dentures, the bar attachment acts as an axis of rotation. To ensure that the alveolar ridges are loaded uniformly, the bar must be aligned at an angle of 90° to the bisection angle of the teeth.

Laser techniques, titanium caps.
Depending on the impression technique, the prefabricated conical titanium caps should be secured on the bar abutments or bar laboratory implants with the enclosed AnoTite L 6.0 mm screw. They fit all three bar abutments (S - M - L). The seating surface of all bar abutments is identical (ø 4.5 mm).
Dental technical variants.

Removable restorations.

The prefabricated titanium bars are shortened and fixed in the correct horizontal axis for laser-welding with a parallelometer/fixator (e.g. Paralas, Dentaurum).

The bar components and titanium caps are then lasered together. The only filler material which can be used is pure titanium wire (e.g. Dentaurum). Should further questions arise on lasering and processing titanium, please call the Dentaurum Hotline at: + 49 72 31 / 803 -410.

After laser-welding, the titanium bar should be trimmed and polished (e.g. with a Dentaurum rematitan® trimming set).

The titanium bar rider is then lasered to the titanium retainer and polymerized into the denture.
Casting, plastic caps.
Depending on the impression technique, plastic caps or cast-on precious metal caps can be fixed to the bar abutments or laboratory implant. They fit all three bar abutments (S - M - L). The seating surface of all bar abutments is identical (ø 4.5 mm). Precious metal caps are processed in virtually the same manner as plastic caps – just the differences relevant to casting-on have to be taken into account (refer to section Dental technical variants – Telescopic restorations). In this case, plastic caps were used.

Where space is at a premium, the plastic caps can be easily trimmed.

A prefabricated plastic bar is waxed to the plastic caps.

Casting, trimming and polishing should be carried out according to the alloy manufacturer’s instructions. For the post-processing of the screw aperture respectively the screw seating, a countersink or cutter are available.
Dental technical variants.

Removable restorations.

Case 2: Milled bar, plastic caps.
Adhesive plastic caps, precious metal caps or titanium caps can be used on bar abutments for fabricating a milled bar. They fit all three bar abutments (S - M - L). The seating surface of all bar abutments is identical (ø 4.5 mm). They are secured on the bar abutments with the enclosed prosthetic screw L 6.0 mm.

Palatal view of model with plastic caps on bar abutments and overcast, oral view.

If there is insufficient space available, the plastic caps can be lightly and easily trimmed.

Model with shortened plastic caps on bar abutments, oral view.

In this case, plastic caps were used. Precious metal caps are processed in virtually the same manner as plastic caps – just the differences relevant to casting-on have to be taken into account (refer to section Dental technical variants – Telescopic restorations). The processing of titanium caps for bonding is explained on p. 67.

Model with plastic bar secured in position and palatal overcast, labial view.

The plastic caps are bonded to the acrylic.
Following this, the pattern for the individual bar is fabricated and paralleled with a milling machine.
Dental technical variants.

Removable restorations.

Casting, trimming and polishing must be carried out according to the manufacturer’s instructions. After casting, the reamer is used for finishing the screw aperture, the countersink is used for the screw seat and the cutter for the seating surface of the plastic cap.

The attachments are then placed in position.

In this case the restoration is fabricated with an electroplated mesostructure. For static reasons, this is provided with a chrome cobalt strengthenener (e.g. Dentaurum, remanium® GM 800+).
Case 3: 
Milled bar, titanium caps for adhesive technique.
Adhesive titanium caps are available for adhering cast bars intra-orally. They fit all three bar abutments (S - M - L). The seating surface of all bar abutments is identical (ø 4.5 mm). Adhering the titanium caps can compensate for imprecise casting and possible differences during impression-taking or model casting.

3 adhesive titanium caps on bar abutment on model, labial view.

With restorations supported on four implants, adhesive titanium caps are secured on three bar abutments with an AnoTite L 6.0 mm screw. These three act as adhesive bases.

3 adhesive titanium caps and a plastic cap with overcast, oral view.

Either a plastic cap or a precious metal cap is fixed to the fourth bar abutment. In this case a plastic cap was selected.

Model with plastic bar fixed in place, oral view.
Dental technical variants.

Removable restorations.

The titanium caps and plastic caps are bonded together with acrylic. The screw in the plastic cap must be loosened before raising the pattern. This screw keeps the cast bar in place during bonding. The following steps for cast bars are the same as described for case 2 (milled bar).

Prior to bonding, the contact surfaces of the titanium caps and the inner aspects of the bar must be provided with additional retention and conditioned according to the adhesive manufacturer’s instructions. The inner hex of the AnoTite screw must be sealed with wax.

Once the adhesive has been mixed, it is applied to both contact surfaces of the three connectors, the cast bar placed intra-orally and the cast plastic cap fixed over the guide screw.

To ensure that the prosthetic screws can be loosened easily, any excess adhesive above them must be removed before it hardens. Once the adhesive has hardened, all prosthetic screws should be loosened and all other excess adhesive removed. The cast bar is then replaced on the model before processing the restoration further.
Case 4: CAD/CAM manufacturing

The scan caps bridge are fixed with the prosthetic screw L 6.0 mm on the bridge abutments.

After selecting the indication (here: bridge abutments) in the tioLogic® data set of the respective software, the scan caps bridge can be scanned.

The matching process and design are carried out according to the instructions of the software manufacturer and dental rules.
Ball abutment restoration.

Ball-anchored dentures are implant-borne, mucosa-supported. When using ball abutments existing coverdentures can be used as temporary dentures or modified with a chrome cobalt framework – alternatively a new coverdenture can be fabricated. Ball anchors function in such a manner that it is advisable to support the denture on two implant abutments. The implants must not diverge / converge by more than 20°.

Care should be taken to avoid an excessive mechanical loading when using ball head abutments together with ø 3.3 mm implants.

The ball abutment is available in gingival heights of 1.5 mm, 3.0 mm and 4.5 mm for S, M and L abutments. The gingival height is the distance between the uppermost edge of the implant and the lowermost edge of the hex of the ball abutments.

This lower edge should be placed approx. 1.0 mm above the gingival line. To achieve optimum retention, all ball abutments should be positioned at the same level. The ball is 2.25 mm in diameter. The components of the ball abutment may not be modified. Only the matrix withdrawal force can be adjusted by activating the inner matrix. The ball abutment is placed with the ball abutment insertion key.

Ball head with Matrix, Dalbo®-Plus.

Matrices.

The withdrawal force of the matrix Dalbo®-PLUS can be adjusted to suit the individual patient. Through rotational movements by means of a screwdriver for the matrix Dalbo®-PLUS, the lamellae are activated or deactivated. If necessary, the inner matrix can be replaced as well with the screwdriver.

**Tightening torque**

- Ball abutment on a model: manually
- Ball abutment intra-orally: 35 Ncm
Working procedures (direct / indirect).
The direct technique involves processing the matrix into an existing denture directly in the patient’s mouth without fabricating a model (case 1). Neither an impression post nor a laboratory implant are required.

The indirect technique requires an impression and a model. The matrix is processed into the denture in the laboratory (case 2).

Case 1 direct version.
The ball abutments are attached to the implants intra-orally. During the clinical procedures, the undercuts should be protected with a rubber dam. It is formed over the matrix to prevent cold-curing resin filling the undercuts in the mouth which would prevent the denture being removed after the resin has cured. Please adhere strictly to the resin manufacturer’s instructions.

Case 2 indirect version.
Impression.
With the indirect version, the impression can not only be taken using the closed technique described in the section Impression – Closed impression technique (page 28), but also directly over the ball abutments fixed in the mouth. The correct ball abutments for the gingival height and S, M or L abutment should be selected, the closure screws or gingiva formers removed and the ball abutments secured in the implants. Impression material is applied around all ball abutments, the closed impression tray loaded with impression material and the impression taken. As soon as the impression material has set, the tray can be removed. Ensure that the impression has captured the ball abutments exactly.

The ball laboratory implant is then repositioned in the impression in the laboratory. The flat surfaces beneath the ball ensure that the implant axes are transferred precisely. The model is then fabricated as described in the section Casting the model – Closed impression technique. A ball laboratory implant is available for all series of abutments as all balls have a diameter of 2.25 mm.

In this case a closed putty / wash impression was taken over the ball abutments.
Dental technical variants.

Removable restorations.

Laboratory.
In the laboratory the ball laboratory implants are repositioned in the impression and the model fabricated.

Ball abutment with matrix Dalbo®-Plus.

The matrices are placed over them and their angle of insertion aligned parallel and axially to one another.

In order to protect the balls against acrylic seeping in and ensure that the matrices are parallel with the angle of insertion, the undercuts must be blocked out with wax.

Opening in the denture for finishing.

The denture must be relieved adequately above the ball abutments to allow sufficient clearance for the matrices. To permit the matrices to be checked for exact fit, an opening should be drilled in the lingual or palatal aspect of the denture.
Cold-curing resin is applied through the opening to secure the matrices in the denture. The instructions for the resin should be adhered to strictly. Once the resin has cured, the denture is removed from the model. The excess resin on the lower margins of the matrices must be removed before smoothing and polishing the denture.

A new full denture is fabricated using exactly the same procedures except that the matrices are processed into the denture base.

Recall appointment.

Dentures and their retention units must be examined at six-monthly intervals. The following points, inter alia, must be taken into account:

- Eliminate unfavorable movements of the denture (reline the denture to optimize it, activate or replace the matrices)
- Check the fit of the ball abutments on the implant (tightly if necessary)
- Oral hygiene (remove plaque and calculus and, if necessary, re-instruct the patient on cleaning implants)
LOCATOR® restoration.

The LOCATOR® technique is for fabricating implant-borne, membrane-supported restorations with a very low overall height. Existing coverdentures can be modified or remade. The LOCATOR® can be used for membrane-supported coverdentures with two to four implant abutments. The intermaxillary space should be at least 4.0 mm. Special retainers (green and red) compensate for diverging / converging implants of up to 40° (not applicable to tioLogic® implants S ø 3.3 mm). LOCATOR® components must not be modified. Only the withdrawal forces of the LOCATOR® matrices can be adjusted as required using the exchangeable retention inserts.

LOCATOR® abutment.

LOCATOR® abutments are available for S, M and L abutments in gingival heights of 1.0 mm, 2.0 mm, 3.0 mm, 4.0 mm and 5.0 mm. The gingival height refers to the cylindrical section of the LOCATOR® abutment. Its upper edge should be placed approx. 1.0 mm above the gingival line. The head with retainer is identical for all LOCATOR® abutments. The LOCATOR® abutment is inserted with the LOCATOR® insertion key.

LOCATOR® matrices.

The LOCATOR® matrix comprises a metal base with inner retention insert. It is for polymerizing into an existing or new coverdenture.

The withdrawal force of the LOCATOR® matrix is regulated with an exchangeable retention insert which is available in the following versions:
- transparent (medium)
- pink (low)
- blue (very low)
- green (increased extension) – not for use with tioLogic® implants S ø 3.3 mm
- red (increased angulation) – not for use with tioLogic® implants S ø 3.3 mm

The LOCATOR® matrix is supplied with a black retention ring inserted (polymerizing in), a white spacer ring (blocking out undercuts) and the definitive retention rings in transparent, pink and blue.

The retention inserts of LOCATOR® matrices can be exchanged with the LOCATOR® retention key. To do so, the pointed section of the LOCATOR® retention key is pressed into the lower side corner of the retention insert which is then pulled downwards and out.
The new retention insert is inserted into the empty metal housing by exerting firm pressure with the pressing tool on the LOCATOR® retention key. The retention insert must be felt to click in and come to rest flush with the lower edge of the metal housing.

The LOCATOR® angle measuring post and the LOCATOR® angle measuring device are used for determining the divergence to the pillars / posts.

**Tightening torque**
- LOCATOR® abutment on the model: manually
- LOCATOR® abutment intra-orally: 30 Ncm

**Working procedures (direct / indirect).**
The direct technique involves processing the LOCATOR® matrix into an existing denture directly in the patient’s mouth without fabricating a model (case 1). Neither an impression post nor a laboratory implant are required.

The indirect technique requires an impression and a model. The LOCATOR® matrix is processed into the denture in the laboratory (case 2).

**Case 1: direct version.**
The appropriate LOCATOR® abutments (S, M or L) are secured on the appropriate implants intra-orally. The LOCATOR® matrices are processed into the coverdenture with cold-curing resin in the mouth. The instructions for the resin should be adhered to strictly.

**Case 2: indirect version.**
**Inserting LOCATOR® abutments.**
The matching LOCATOR® abutment for the gingival height and S, M or L abutment series should be selected. The closure screws or gingiva formers are removed and the LOCATOR® abutment secured on the appropriate implant.

**Taking an impression over LOCATOR® abutments.**
Apart from the open impression technique on implants described on p. 74, the impression can also be taken over LOCATOR® abutments fitted in the mouth.

This involves plugging a LOCATOR® impression cap (black inner retention insert) onto every LOCATOR® abutment. This must be felt to click into place.

Impression material is then applied around all LOCATOR® abutments and the closed impression tray loaded with impression material which is allowed to set before removing the impression. Ensure that the LOCATOR® impression cap is seated precisely.
Dental technical variants.

Removable restorations.

In this case, the impression was taken over the LOCATOR® abutments with the LOCATOR® impression caps and an existing denture modified.

In the laboratory the LOCATOR® laboratory implant is inserted into the LOCATOR® impression cap and checked for precise fit. The model is fabricated as described in the section Casting the Model – Closed impression technique, page 28. One single LOCATOR® laboratory implant is available for S, M and L series abutments as the head and retainer of all LOCATOR® abutments are identical.

On the model a white spacer ring is placed on every LOCATOR® abutment. This prevents resin flowing beneath the matrices while polymerizing the LOCATOR® matrices into the denture. The LOCATOR® matrices (black inner retention inserts) are then plugged onto the LOCATOR® abutments. These must be felt to click into place.

The denture must be relieved above the LOCATOR® abutments to provide adequate clearance for the LOCATOR® matrices. To permit the LOCATOR® matrices to be checked for exact fit, an opening should be drilled in the lingual or palatal aspect of the denture.

Cold-curing resin is applied through the opening to secure the LOCATOR® matrices in the denture. The instructions for the resin should be adhered to strictly.

Once the resin has cured, the denture is removed from the model. The excess resin on the lower margins of the LOCATOR® matrices must be removed before smoothing and polishing the denture.
The black retention inserts are removed using the LOCATOR® retention key and the desired transparent, pink, blue, green or red retention insert slipped in (green and red are not for use with $5 \text{ mm}$ implants).

The LOCATOR® matrices must be checked for correct functioning on the working model.

**Placement.**
The LOCATOR® matrices must be checked for correct functioning in the patient’s mouth. If a new full denture is being fabricated, the procedure is virtually identical – except that the matrices are processed into the acrylic denture base.

**Temporary restoration.**
If a new denture is being fabricated, the existing denture should be relieved around the LOCATOR® abutments and soft-lined.

**Recall appointment.**
Dentures and their retention units must be examined at six-monthly intervals. The following points, inter alia, must be taken into account:

- Eliminate unfavorable movements of the denture (reline the denture to optimize it, activate or replace the retention elements)
- Check the fit of the LOCATOR® abutments on the implant (tighten if necessary)
- Oral hygiene (remove plaque and calculus and re-instruct the patient on cleaning implants)
Technical information.

Precision instruments / Selection aids.

The tioLogic® range of products includes precision instruments and selection aids for dental technicians. This simplifies prosthetic procedures even more.

<table>
<thead>
<tr>
<th>Handhold AnatomicHold</th>
<th>For gripping the polishing aids and holders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polishing aid</td>
<td>For gripping denture sections during trimming and polishing; made of titanium to withstand long periods of use under the influence of rotary instruments.</td>
</tr>
<tr>
<td>S, M and L</td>
<td></td>
</tr>
<tr>
<td>Ceramic abutment holder</td>
<td>For gripping ceramic abutments during processing, rotationally stable.</td>
</tr>
<tr>
<td>S, M and L</td>
<td></td>
</tr>
<tr>
<td>Handhold AnatomicTwist</td>
<td>For gripping and controlled rotation of the instrument sets.</td>
</tr>
<tr>
<td>Milling cutter,</td>
<td>Reworking the basal surfaces of cast plastic bar caps.</td>
</tr>
<tr>
<td>diamond-coated (bar abutment)</td>
<td></td>
</tr>
<tr>
<td>Countersink – Screw seat</td>
<td>Tungsten carbide for trimming the screw seat precisely.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Drill for guide sleeve</td>
<td>Pre-drill for pre-drilling in the surgical stent.</td>
</tr>
<tr>
<td>Dalbo®-Plus torque key</td>
<td>For adjusting the withdrawal force of the Dalbo®-Plus matrix.</td>
</tr>
<tr>
<td>LOCATOR® retention key</td>
<td>Pointed tool for replacing the retention insert in LOCATOR® matrices. Pressing tool for inserting a new retention insert into an empty LOCATOR® metal housing.</td>
</tr>
<tr>
<td>Selection aid set S, M and L</td>
<td>Set containing plastic reproductions of the most important abutments such as titanium and bar abutments. For evaluating the gingival height and total height prior to ordering the abutments. S - M - L test sleeves for checking the abutment line of a tiolLogic® abutment (begin with test sleeve S).</td>
</tr>
</tbody>
</table>
Technical information.

Data, abutments.

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<thead>
<tr>
<th>For example, the M series of abutments</th>
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</thead>
<tbody>
<tr>
<td>Guide sleeve, titanium L 6.0 mm</td>
<td>Impression post M, open, incl. screw</td>
</tr>
<tr>
<td></td>
<td>Screw, for impression post, open</td>
</tr>
<tr>
<td></td>
<td>Impression post M, open, incl. screw</td>
</tr>
<tr>
<td></td>
<td>Screw, for impression post, open</td>
</tr>
<tr>
<td>X-ray reference sphere</td>
<td>Impression post M, closed</td>
</tr>
<tr>
<td></td>
<td>Impression cap M</td>
</tr>
<tr>
<td></td>
<td>Bite registration cap M</td>
</tr>
<tr>
<td></td>
<td>Laboratory implant M</td>
</tr>
<tr>
<td>Gingiva former M, conical</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Gingiva former M, cylindrical</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Temporary abutment M</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Screw for temporary abutment</td>
<td></td>
</tr>
</tbody>
</table>
### For example, the M series of abutments

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurements</th>
<th>Image</th>
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</thead>
<tbody>
<tr>
<td><strong>Scan abutment M</strong></td>
<td>12.0 mm</td>
<td><img src="image1" alt="Scan abutment M" /></td>
</tr>
<tr>
<td><strong>CAD/CAM titanium bloc M, PreForm</strong></td>
<td>1.5 mm 3.9 mm</td>
<td><img src="image2" alt="CAD/CAM titanium bloc M" /></td>
</tr>
<tr>
<td><strong>CAD/CAM titanium base M</strong></td>
<td>3.5 mm 8.5 mm</td>
<td><img src="image3" alt="CAD/CAM titanium base M" /></td>
</tr>
<tr>
<td><strong>Precious metal abutment M, cast on</strong></td>
<td>3.7 mm 11.4 mm 2.6 mm</td>
<td><img src="image4" alt="Precious metal abutment M" /></td>
</tr>
<tr>
<td><strong>Titanium abutment M, straight</strong></td>
<td>2.8 mm 0.6 mm</td>
<td><img src="image5" alt="Titanium abutment M, straight" /></td>
</tr>
<tr>
<td><strong>Titanium abutment M, angled</strong></td>
<td>20° 0.6 mm</td>
<td><img src="image6" alt="Titanium abutment M, angled" /></td>
</tr>
<tr>
<td><strong>Titanium abutment M, adjustable, anatomical</strong></td>
<td>3.8 mm 2.5 mm 3°</td>
<td><img src="image7" alt="Titanium abutment M, adjustable, anatomical" /></td>
</tr>
<tr>
<td><strong>Titanium abutment M, adjustable, cylindrical</strong></td>
<td>5.8 mm 2.5 mm</td>
<td><img src="image8" alt="Titanium abutment M, adjustable, cylindrical" /></td>
</tr>
<tr>
<td><strong>Bar abutment M</strong></td>
<td>4.5 mm</td>
<td><img src="image9" alt="Bar abutment M" /></td>
</tr>
<tr>
<td><strong>Impression post, bar incl. screw</strong></td>
<td>1.0 / 2.5 / 4.0 / 5.5 mm 4.5 mm</td>
<td><img src="image10" alt="Impression post, bar incl. screw" /></td>
</tr>
<tr>
<td><strong>Screw impression post, bar</strong></td>
<td>10.0 mm</td>
<td><img src="image11" alt="Screw impression post, bar" /></td>
</tr>
<tr>
<td><strong>Laboratory implant, bar</strong></td>
<td>10.0 mm</td>
<td><img src="image12" alt="Laboratory implant, bar" /></td>
</tr>
<tr>
<td><strong>Titanium cap, bar</strong></td>
<td>3.0 mm 4.5 mm</td>
<td><img src="image13" alt="Titanium cap, bar" /></td>
</tr>
<tr>
<td><strong>Titanium cap, bar, adhesive technique</strong></td>
<td>3.0 mm 4.5 mm</td>
<td><img src="image14" alt="Titanium cap, bar, adhesive technique" /></td>
</tr>
<tr>
<td><strong>Precious metal abutment, bar</strong></td>
<td>3.0 mm 4.5 mm 0.6 mm 6.0 mm</td>
<td><img src="image15" alt="Precious metal abutment, bar" /></td>
</tr>
<tr>
<td><strong>Plastic cap, bar</strong></td>
<td>3.0 mm 4.5 mm</td>
<td><img src="image16" alt="Plastic cap, bar" /></td>
</tr>
<tr>
<td><strong>Scan cap, bar</strong></td>
<td>10.0 mm 4.5 mm</td>
<td><img src="image17" alt="Scan cap, bar" /></td>
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</tbody>
</table>
## Technical information.

### Data, abutments.

<table>
<thead>
<tr>
<th>Bridge abutment M</th>
<th>AngleFix abutment M</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Bridge abutment M image" /></td>
<td><img src="image2" alt="AngleFix abutment M image" /></td>
</tr>
<tr>
<td>4.1 mm</td>
<td>5.3 mm</td>
</tr>
<tr>
<td>10.7 mm</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Impression post bridge, open, incl. screw</th>
<th>AngleFix abutment M incl. AnoTite screw</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Impression post bridge, open, incl. screw image" /></td>
<td><img src="image4" alt="AngleFix abutment M incl. AnoTite screw image" /></td>
</tr>
<tr>
<td>11.5 mm</td>
<td>4.0 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impression post bridge, closed, incl. screw</th>
<th>AngleFix impression post open, incl. screw</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Impression post bridge, closed, incl. screw image" /></td>
<td><img src="image6" alt="AngleFix impression post open, incl. screw image" /></td>
</tr>
<tr>
<td>7.5 mm</td>
<td>13.0 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laboratory implant bridge</th>
<th>AngleFix impression post, closed, incl. screw</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Laboratory implant bridge image" /></td>
<td><img src="image8" alt="AngleFix impression post, closed, incl. screw image" /></td>
</tr>
<tr>
<td>14.1 mm</td>
<td>7.5 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plastic cap, bridge</th>
<th>AngleFix impression cap closed</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image9" alt="Plastic cap, bridge image" /></td>
<td><img src="image10" alt="AngleFix impression cap closed image" /></td>
</tr>
<tr>
<td>5.3 mm</td>
<td>10.8 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Titanium cap, bridge</th>
<th>AngleFix laboratory implant</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image11" alt="Titanium cap, bridge image" /></td>
<td><img src="image12" alt="AngleFix laboratory implant image" /></td>
</tr>
<tr>
<td>10.8 mm</td>
<td>16.0 mm</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Scan cap, bridge</th>
<th>AngleFix plastic cap</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image13" alt="Scan cap, bridge image" /></td>
<td><img src="image14" alt="AngleFix plastic cap image" /></td>
</tr>
<tr>
<td>10.5 mm</td>
<td>3.3 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AngleFix titanium cap</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image15" alt="AngleFix titanium cap image" /></td>
</tr>
<tr>
<td>3.2 mm</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>AngleFix scan cap</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image16" alt="AngleFix scan cap image" /></td>
</tr>
<tr>
<td>5.3 mm</td>
</tr>
<tr>
<td>For example, the M series of abutments</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Ball abutment M</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Matrix Dalbo*-PLUS</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Ball laboratory implant</td>
</tr>
<tr>
<td>LOCATOR* abutment M</td>
</tr>
<tr>
<td>LOCATOR* matrix</td>
</tr>
<tr>
<td>LOCATOR* impression cap</td>
</tr>
<tr>
<td>LOCATOR* Laboratory implant</td>
</tr>
</tbody>
</table>

- Ball abutment M:
  - Size: 2.25 mm
  - Length: 5.8/6.0/4.5 mm

- Matrix Dalbo*-PLUS:
  - Size: 3.6 mm
  - Length: 3.1 mm

- Ball laboratory implant:
  - Size: 2.25 mm
  - Length: 10.0 mm

- LOCATOR* abutment M:
  - Size: 1.0/1.5/2.0/3.0/4.0/5.0 mm

- LOCATOR* matrix:
  - Size: 5.5 mm
  - Length: 2.25 mm

- LOCATOR* impression cap:
  - Size: 5.3 mm
  - Length: 4.4 mm

- LOCATOR* Laboratory implant:
  - Size: 5.2 mm
  - Length: 10.0 mm
Description.

The torque ratchet is a precision instrument that can be disassembled. To ensure that it always functions perfectly, the torque ratchet should be disassembled, cleaned, disinfected and lubricated and then sterilized after reassembly in accordance with the instructions for use (p. 89 torque ratchet) before using for the first time and immediately after each use.

It is important to read the instructions for use carefully and check the function of the torque ratchet before each use to ensure the precision of the torque. The torque ratchet should make a uniform sound when functioning properly; the ratchet head should not be blocked. After use, the tension of the torque ratchet spring should be released by loosening the adjusting screw. The torque ratchet should be recalibrated annually.

Accuracy of the torque ratchet according to manufacturer + / - 10 %.
Use.

The torque ratchet can be used for the surgical procedure, implant insertion, securing the closure screws, gingiva formers and impression posts and for temporary and permanent prosthetic restorations. Different inserts are available depending on the application (p. 86).

The ratchet is set to the required torque using the adjusting screw. To set the correct torque, the adjusting screw is turned clockwise to the required torque line.

The torque ratchet is additionally provided with a block function. To set the block function, turn the adjustment screw to the ‘∞’ symbol. Do not turn too tightly! For storage, turn the torque adjustment screw back until the spring is as relaxed as possible!

The pressure point for exact torque release is on the head of the torque adjustment screw. When the adjusted torque has been reached, the scale sleeve will bend around the axis in the ratchet head. The release is audible and perceptible. After the torque release, do not apply more pressure; this could damage the ratchet. When you let go of the torque adjustment screw, the ratchet returns to its initial position.

Exceeding the torque specified by Dentaurum Implants can cause mechanical damage to components, the implants, and destruction of bony structures.

The block function mode should be used with extreme caution. After use the value must be reset to standard torque to prevent mistakes next time it is used.

The word ‘IN’ on the ratchet head shows that the ratchet is in the correct tightening position. The word ‘OUT’ stands for loosening the torque.

When fitting the permanent prosthetic restoration, all prosthetic screws should be tightened with the torque ratchet set at the relevant torque (p. 87 table for torque ratchet settings) and then re-tightened after approx. 5 minutes using the same torque. It is important that the insertion key fits flush in the prosthetic screw. We recommend using a new AnoTite prosthetic screw for the final fitting.
Overview – Inserts for the torque ratchet.

Depending on the application there are different inserts available.

- Hex key SW 1.3 – ratchet, L 26.0 mm.
- Hex key SW 1.3 – ratchet, L 16.0 mm.
- Hex key SW 2.5 – ratchet, L 23.0 mm.
- Hex key SW 2.5 – ratchet, L 13.0 mm.
- Hex key SW 2.5 – ratchet, L 8.0 mm.
- Insertion key ball abutment ratchet, L 15.0 mm.
- Insertion key LOCATOR® abutment, L 15.0 mm.
- Insertion key bar/bridge/ AngleFix abutment ratchet, L 16.0 mm.
- Adapter – ISO shank hexagon / ratchet.
Table – Tightening torques for implants and prosthetic components.*

The torque ratchet is only intended for clinical use. Prosthetic screws should be tightened manually in the laboratory.

<table>
<thead>
<tr>
<th>Component</th>
<th>Torque (Ncm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implant (depending on bone density) max. 40 Ncm</td>
<td></td>
</tr>
<tr>
<td>Closure screws Implant</td>
<td>15 Ncm or manually</td>
</tr>
<tr>
<td>Closure screws bar abutment</td>
<td>15 Ncm or manually</td>
</tr>
<tr>
<td>Closure screws bridge abutment</td>
<td>15 Ncm or manually</td>
</tr>
<tr>
<td>Closure screws AngleFix abutment</td>
<td>15 Ncm or manually</td>
</tr>
<tr>
<td>Gingiva former</td>
<td>15 Ncm or manually</td>
</tr>
<tr>
<td>Screw for impression post</td>
<td>15 Ncm or manually</td>
</tr>
<tr>
<td>Screw for temporary abutment</td>
<td>15 Ncm or manually</td>
</tr>
<tr>
<td>AnoTite screw 9.0 mm</td>
<td>30 Ncm</td>
</tr>
<tr>
<td>Bar abutment</td>
<td>35 Ncm</td>
</tr>
<tr>
<td>Bridge abutment</td>
<td>35 Ncm</td>
</tr>
<tr>
<td>AngleFix abutment 0º GH 1.0 mm</td>
<td>35 Ncm</td>
</tr>
<tr>
<td>Bar, bridge, AngleFix AnoTite screw L 6.0 mm</td>
<td>25 Ncm</td>
</tr>
<tr>
<td>Ball abutment</td>
<td>35 Ncm</td>
</tr>
<tr>
<td>LOCATOR® abutment</td>
<td>30 Ncm</td>
</tr>
</tbody>
</table>

* primary stable and osseointegrated
Torque ratchet.

Disassembling.
Completely loosen torque adjustment screw ⑥ and remove the spring ⑦. Pull ratchet head ② with the threaded rod from the scale sleeve ③.

Removing ratchet wheel
Pull back the pin ⑤ in the direction of the arrow using your thumb and index finger and remove the ratchet wheel ①.

Blocking function – “∞” mark.
Assembling.
To assemble the torque ratchet correctly, connect the components in the following order: first remove the pin ➅ as described above and insert the ratchet wheel ➊.

Note: To avoid mistakes, the ratchet wheel ➊ can only be inserted on one side.

Lubricating points (●)
Lubricate the areas marked with the drop symbol with care oil for handpieces. Then assemble the ratchet components as described below and perform a function test.

Slide the spring ➃ over the torque adjustment screw ➄. Pass the ratchet head ➋ with the threaded rod through the scale sleeve ➌ and screw to torque adjustment screw ➄.

After assembly and before each use, check the correct function of the torque ratchet. If there is an audible regular ratchet noise and the mechanism of the torque limit functions, the instrument is functioning correctly.

Sterilization.
The instrument must be sterilized with steam at 134 °C / 273 °F for 18 min.

Apply the regulations in force in the country where the torque wrench is used.

Before sterilization, the torque ratchet must be completely assembled and set to the lowest torque.

Sterilize the key according to cycles of sterilization recommended by the manufacturer of the autoclave. We recommend the use of devices equipped with a vacuum pump (type B) to decrease the risk of formation of air pockets.

We advise against the use of a hot air sterilizer because it can lead to ageing of the spring and subsequently bring about a change of the torque value. Find more information on the preparation of medical devices at www.rki.de or www.a-k-i.org.

### Pure titanium DIN EN ISO 5832-2

<table>
<thead>
<tr>
<th>Chemical composition (% by mass)</th>
<th>O</th>
<th>0.4 % max.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fe</td>
<td>0.5 % max.</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>0.1 % max.</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.05 % max.</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>0.012 % max.</td>
</tr>
<tr>
<td></td>
<td>Ti Residue</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical and mechanical properties</th>
<th>0.2 % yield strength</th>
<th>520 MPa min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tensile strength</td>
<td>680 MPa min</td>
</tr>
<tr>
<td></td>
<td>Elongation at rupture</td>
<td>10 % min.</td>
</tr>
</tbody>
</table>

### Titanium alloy DIN EN ISO 5832-3

<table>
<thead>
<tr>
<th>Chemical composition (% by mass)</th>
<th>Al</th>
<th>5.5 % – 6.75 %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V</td>
<td>3.5 % – 4.5 %</td>
</tr>
<tr>
<td></td>
<td>Fe</td>
<td>0.3 % max.</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>0.08 % max.</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.05 % max.</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>0.015 % max.</td>
</tr>
<tr>
<td></td>
<td>O</td>
<td>0.2 % max.</td>
</tr>
<tr>
<td></td>
<td>Ti</td>
<td>Residue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical and mechanical properties</th>
<th>0.2 % yield strength</th>
<th>780 MPa min.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tensile strength</td>
<td>860 MPa min.</td>
</tr>
<tr>
<td></td>
<td>Elongation at rupture</td>
<td>10 % min.</td>
</tr>
</tbody>
</table>
### Precious metal alloy

**Chemical composition (% by mass)**

- Au: 60 %
- Pt: 19 %
- Pd: 20 %
- Ir: 1 %

**Physical and mechanical properties**

- Density: 17.5 g/cm³
- Melting range: 1400 °C – 1490 °C
- Tensile strength: > 750 MPa
- Hardness: > 215 HV5
- 0.2 % yield strength: > 650 MPa
- Modulus of elasticity: 136 GPa
- Elongation at rupture: > 2%

- CTE 25 – 500°C: 11.9 x 10⁻⁶ K⁻¹
- CTE 25 – 600°C: 12.2 x 10⁻⁶ K⁻¹
- Condition: 15 – 75 % KV

**Precious metal abutment**

- S: approx. 0.307 g
- M: approx. 0.359 g
- L: approx. 0.482 g
- Cap, bar: approx. 0.260 g

### PEEK

**Chemical composition (% by mass)**

- Thermoplastic high-performance polymer

**Physical and mechanical properties**

- Yield strength: 95 MPa
- Elongation: > 25 %
- Modulus of elasticity: 4.2 GPa
- Operating temperature: 260 °C / 300 °C (continuous / temporary)
Safety instructions.

Manufacturer
Dentaurum Implants GmbH  I  Turnstr. 31
75228 Ispringen  I  Germany

Brief description.
tioLogic® implants are designed for insertion in the endosteal region of the maxilla or mandible. Depending on the indication, corresponding transgingival abutments are secured on the implants and fitted with a prosthetic superstructure.
The tioLogic® implant system contains specially coordinated instruments, abutments and accessories for placement of the implants and fabrication of the prosthetic restoration. Only original components of the tioLogic® implant system should be combined in accordance with the instructions for use / user manuals.

Further information
Though placement of dental implants has a high rate of success and implants have a high survival rate, successful treatment cannot be guaranteed. The operator should note and document any problem cases and inform the manufacturer Dentaurum Implants. An inadequate number of implants, implants with insufficient length or diameter, unfavorable positioning of the implants or a statically poor prosthetic restoration can cause premature implant loss and fatigue fractures in implants, abutments and prosthetic screws under biomechanical loading. Placement of the implants and fabrication of the prosthetic restoration should take into account the particular oral situation to avoid overloading the components. Using tioLogic® implant system components in combination contrary to the instructions for use / manuals and which are not described as being specifically combinable, can also cause mechanical failure, damage to the tissue or unsatisfactory aesthetic results.
tioLogic® implant types are not known to have any side effects or produce any interaction at the time of going to press. It cannot, however, be ruled out that in rare cases reactions to components used in the materials of the tioLogic® implant system may occur or that there may be electrochemically-induced discomfort.

Application, availability, precautions, documentation.
The tioLogic® product range is supplied exclusively to doctors, dentists and dental technicians. It should only be used by doctors, dentists or dental technicians who are familiar with dental implantological procedures, including diagnosis, preoperative planning, surgical technique and prosthetic treatment. Before use, operators should ensure that they have carefully read and understood the full tioLogic® instructions for use / manuals.
As the instructions and manuals cannot provide all information for immediate use, we strongly recommend that, before using the system, operators attend a tioLogic® system training course offered by Dentaurum Implants to learn the correct techniques.

- Refer to the Product Catalog and the Surgery Manual for information on precautions and the selection of components for the surgical procedure.
- Refer to the Product Catalog and the Prosthetic Manual for information on precautions and the selection of components for the prosthetic procedure.

Before using this product, the operator must give the patient a thorough examination and a detailed explanation of the product. Dentaurum Implants recommends full clinical, radiological, photographic and statistical documentation.

The tioLogic® implant system components can be documented, e.g. in the patient file or PatientPass, (REF 989-961-10) using the additional labels.

The operator should ensure the products cannot be aspirated during intra-oral use.

Not all components are available in every country.

Quality, warranty and liability.

Development, clinical testing, production and quality control of the tioLogic® product range are completed in accordance with the Medical Device Directive 93/42/EEC.

Sections 9 and 10 of our General Terms of Delivery and Payment apply with regard to warranty or liability – unless stated otherwise in the Instructions for Use / Manual.

Warranty and liability are rendered void in particular if the products are not used by the operator or a third party in accordance with the instructions for use; this also applies if the tioLogic® product range is used in combination with products from other manufacturers, which have not been specifically recommended for use by Dentaurum Implants.

Dentaurum Implants has no control over processing and application of the product. These are the sole responsibility of the user.
Dentaurum Group

Germany | Benelux | España | France | Italia | Switzerland | Australia | Canada | USA
and in more than 130 countries worldwide.

For more information on our products and services, please visit www.dentaurum.de

Date of information: 08/17
Subject to modifications

www.dentaurum.com