

# Prosthetics Manual



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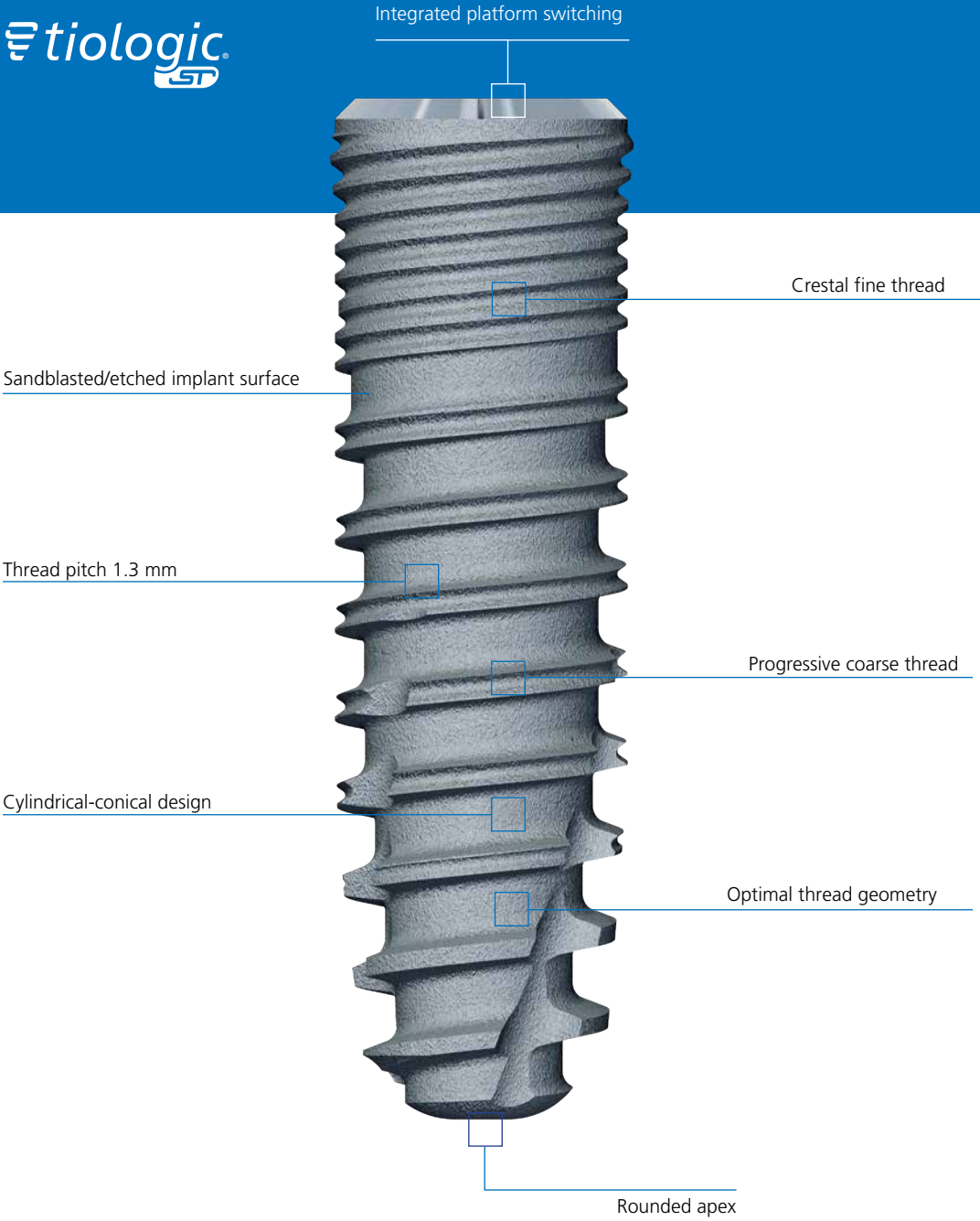
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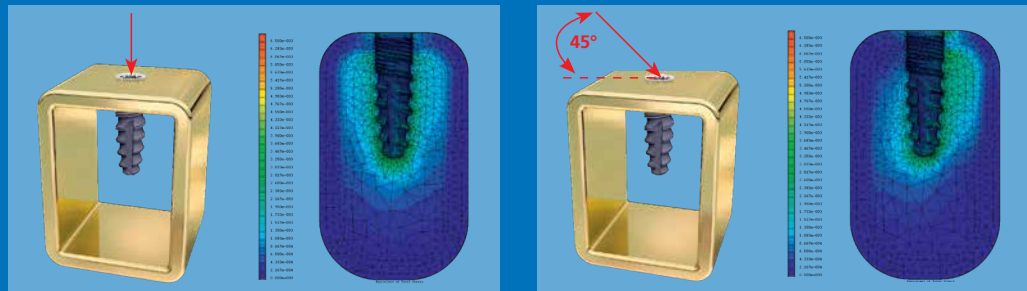
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# The tioLogic® ST implant system.



## FEM-optimized implant shape and thread geometry.<sup>1,2,3</sup>



### External geometry.

The shape of the tioLogic® ST implant type and the thread geometry were calculated using FEM analyses<sup>1</sup> and documented in scientific studies<sup>2</sup>. Tests show a uniform, gentle loading of the bone which prevents local overloading and stress peaks that could damage the bone.

The tioLogic® ST 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® ST – the modified thread geometry and reduced thread pitch of the tioLogic® ST implants enable a quick and atraumatic implant insertion and a high level of primary stability. The osseous region of the tioLogic® ST implant surface is blasted and etched. The tioLogic® ST 7.0 mm implant also extends the range of indications for reduced vertical bone availability.

<sup>1</sup> A. Rahimi, F. Heinemann, A. Jäger, C. Bourauel: Biomechanische Untersuchungen des Einflusses von Geometrievarianten des tioLogic® Implantats [Biomechanical analyses of the influence of tioLogic® implant geometry variations]; University of Bonn 2006.

<sup>2</sup> Bibliography (studies and publications) Dentaurum, REF 989-767-10, 2011.

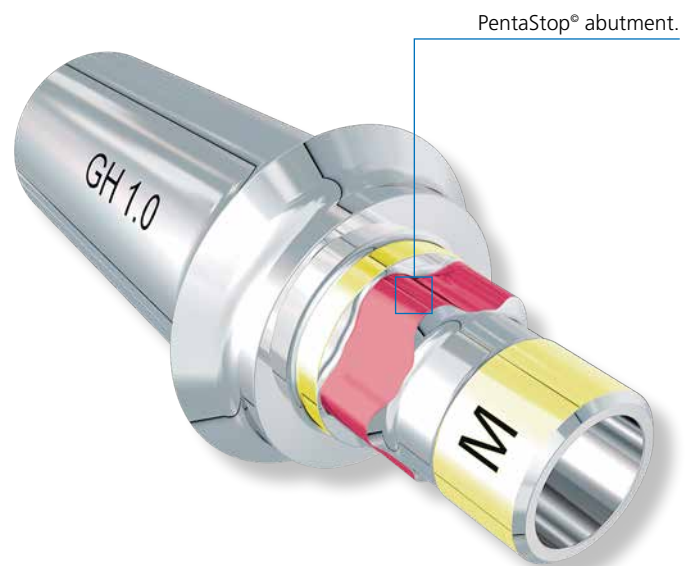
<sup>3</sup> I.Hasan, L. Keilig, H. Stark, C. Bourauel: Biomechanische Analyse der tioLogic® ST Implantate [Biomechanical studies on the tioLogic® ST implant]; University of Bonn, Germany 2012

# The tioLogic® ST implant system.

## Internal geometry.

The design of the internal cylinders and the rotationally secure internal geometry (PentaStop®) of tioLogic® ST implant types was calculated and verified in FEM analyses<sup>4</sup> and physical tests by the Fraunhofer Institute for Material Mechanics using an ISO 14801-compliant fatigue test<sup>5</sup>. 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 as well as 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.



<sup>4</sup> F. O. Kumala: Analyse des tioLogic® Implantats mittels FEM [Analysis of the tioLogic® implant using FEM]; CADFEM Stuttgart 2006.

<sup>5</sup> R. Schäfer, R. Jaeger, D. Ulrich, U. Köster: Bestimmung der Ermüdungsfestigkeit eines Dentalimplantats [Determination of the fatigue strength of a dental implant]; Fraunhofer Institut Werkstoffmechanik Freiburg, Germany, 2006. DIN EN ISO 14801: 2003, Ermüdungsprüfung für endossale dentale Implantate [Fatigue test for endosteal dental implants], DIN – Deutsches Institut für Normung (German Institute for Standardization), Berlin, Germany.



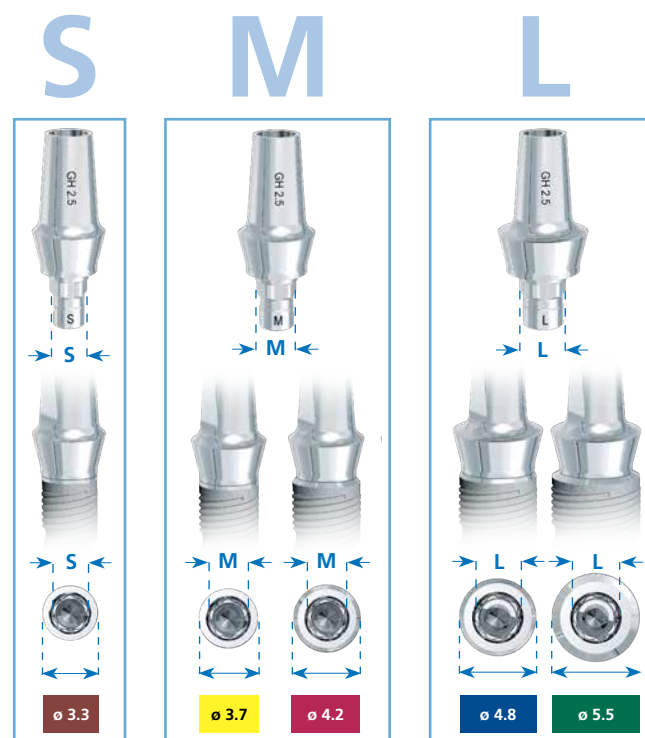
# The tioLogic® ST implant system.

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. The 3 series of abutments contain components made of plastic (temporaries), titanium, as well as CAD/CAM ball, bar, bridge, AngleFix and tioLOC 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. All components are laser-marked with S, M or L for exact identification.



**3** series of abutments.

**5** implant diameters.



Prosthetic screw



S M L

3 series of abutments.



5 implant diameters.

ø 3.3 mm tioLogic® ST  
 ø 3.7 mm tioLogic® ST  
 ø 4.2 mm tioLogic® ST  
 ø 4.8 mm tioLogic® ST  
 ø 5.5 mm tioLogic® ST

5 implant lengths.

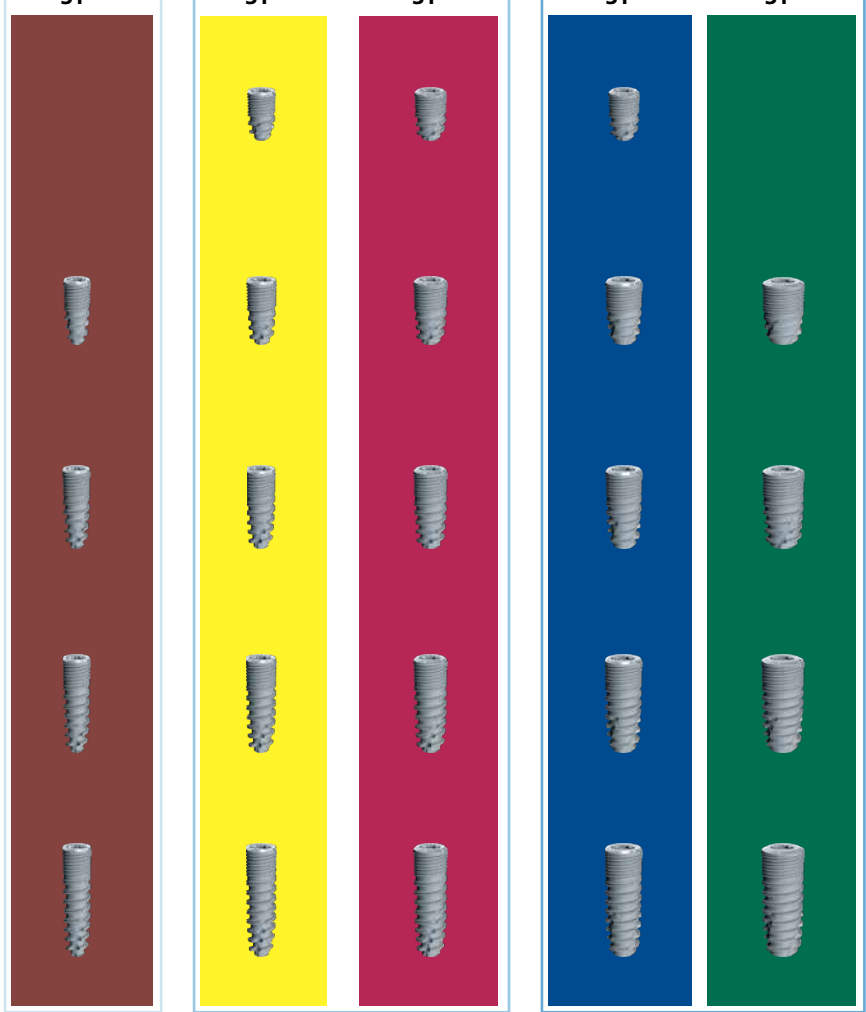
7.0 mm

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 implantologist 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 stage is over and gingiva forming completed, the prosthetic restoration can be fabricated.

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 Dentaforum Hotline is staffed 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.





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

## Indications.

tioLogic® ST 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 implantology in general, the implant diameter and length of the tioLogic® ST 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 with the particular oral situation.

We offer tioLogic® ST implant type S  $\varnothing$  3.3 mm for patients with narrow alveolar ridges. Due to the smaller diameter and lower load capacity (compared to the tioLogic® ST  $\varnothing$  4.2 mm implants), these implants have a limited range of indications. In fully edentulous cases, four or more tioLogic® ST implants with a splinted bar restoration without extension must be inserted. In partially edentulous jaws, implant-supported restorations must be combined with tioLogic® ST implants  $\varnothing$  4.2 mm,  $\varnothing$  4.8 mm or  $\varnothing$  5.5 mm and a splinted fixed prosthetic restoration.

With single-tooth restorations, tioLogic® ST  $\varnothing$  3.3 mm implants should only be used for lower incisors or upper lateral incisors and only with a length of minimum 11.0 mm. Single restorations on tioLogic® ST  $\varnothing$  3.7 mm,  $\varnothing$  4.2 mm,  $\varnothing$  4.8 mm or  $\varnothing$  5.5 mm implant types require a minimum 9.0 mm implant length.

Care should be taken to avoid excessive mechanical loading when using ball head or tioLOC abutments together with  $\varnothing$  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 tioLOC 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

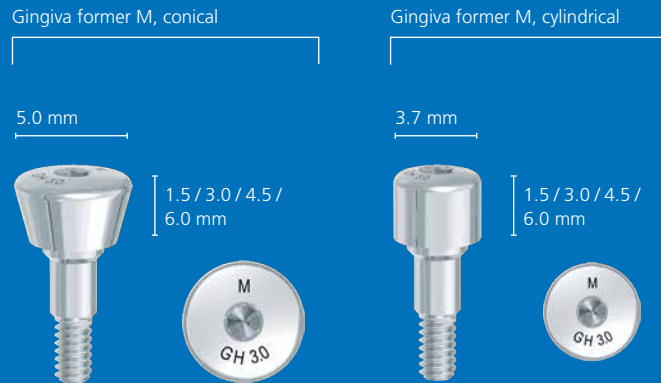
## Local contraindications/personal contraindications.

- 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 circumstances. 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 procedure.

## Temporary restoration.



### Temporary restoration. (non-implant-borne)

A temporary prosthetic restoration should not be fitted until at least 14 days after implant insertion. 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 adequate primary stability and no recession of the implant site. In aesthetically relevant areas, the peri-implant structures are preserved and formed with a temporary abutment. An optimal impression can then be taken.

The temporary abutment is 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 implantologist can use the polishing aid and AnatomicHold for a better grip. The restoration should 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 (REF 989-959-20).

## Gingiva forming.

Gingiva formers, conical or cylindrical, or bar, bridge, AngleFix abutments - particularly gentle on the tissue - are available for the implantologist 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 implantologist 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

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

Important: The gingiva formers and the bar, bridge and AngleFix abutments should be cleaned and sterilized before insertion in the implant.

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.

### Tightening torque

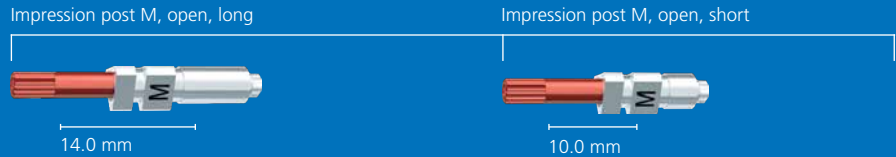
- Gingiva former: manually or 15 Ncm
- Bar, bridge, AngleFix abutment: 35 Ncm
- Bar, bridge, AngleFix closure screw: 15 Ncm

## Safety information.

- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- The gingiva former is designed for single use only. Reconditioning of a gingiva former that has been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- The tioLogic® ST gingiva formers are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized gingiva formers may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com)

# Working procedure.

## Impression-taking.



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

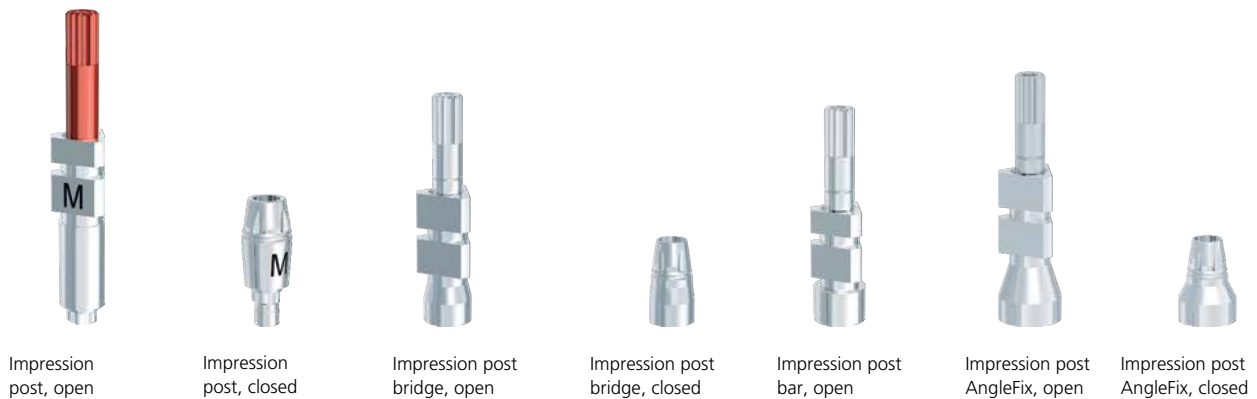
In the case of removable prosthetic restorations (restorations with bar, bridge, ball, tioLOC, AngleFix), the impression can also be taken with other special impression components over the respective primary abutments.

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

As an alternative to the classic impression method, the intra-oral situation can also be digitally transferred via scan abutments in titanium or 4Base scan abutments in titanium.

### Practice record card.

To ensure optimal information flow between the implantologist and dental technician, all relevant data, e.g. the implant diameter, implant length and planned prosthetic restoration, are noted on a record card (REF 989-966-22). The card is kept with the prosthetic restoration during the entire fabrication procedure. At the fitting stage, it is given to the implantologist along with the finished prosthetic restoration. It contains all the important information for fitting the restoration.





## 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-marked 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

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 of an open impression post is shorter to ensure a compression-free impression even with divergent axes.

The enclosed red sure-grip screw has a shortened thread which will only grip in the (laboratory) implant if the impression post has been inserted in the correct position into the connection.



Scan abutment titanium



Scan cap bar, titanium



Scan cap bridge, titanium



Scan cap AngleFix, titanium

### Safety information.

- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Impression posts and impression caps (closed impression-taking) are designed for single use only.  
Reconditioning of an impression post or impression cap that has been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- The tioLogic® ST impression components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized components for impression-taking may be used if bleeding occurs. Additional information can be found at [www.dentaurum.com](http://www.dentaurum.com).

# Working procedure.

## Impression-taking.

Groove on sure-grip screw.



Marking at interface M.



When preparing the individual impression tray, ensure that there is no contact between the impression posts or screws and the tray at the perforations.

Impression post M in situ.

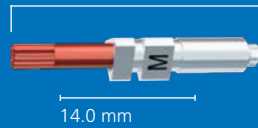


Impression post M in the open impression tray.

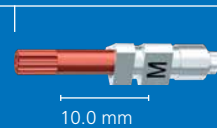


The impression post corresponding to the series of abutments S, M or L (here M) is fitted until the rotational security engages. A congruent fit of the implant post on the implant shoulder is indicated when an optical mark on the screw is level with the upper edge of the impression post (screw should only be inserted and not tightened). If the rotational security is not engaged, the mark on the screw is not visible. The enclosed red sure-grip screw also has a shortened thread which will only grip in the (laboratory) implant if the impression post has been inserted in the correct position into the connection. The impression post should be realigned if necessary and checked to ensure that it fits correctly (x-ray check).

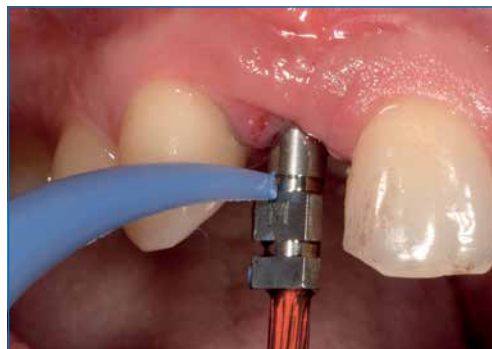
Impression post M, open, long



Impression post M, open, short



Impression post M prior to impression-taking.



Loosening the sure-grip screw.



Impression post M, open, at impression-taking.



Impression post M in the open impression tray.

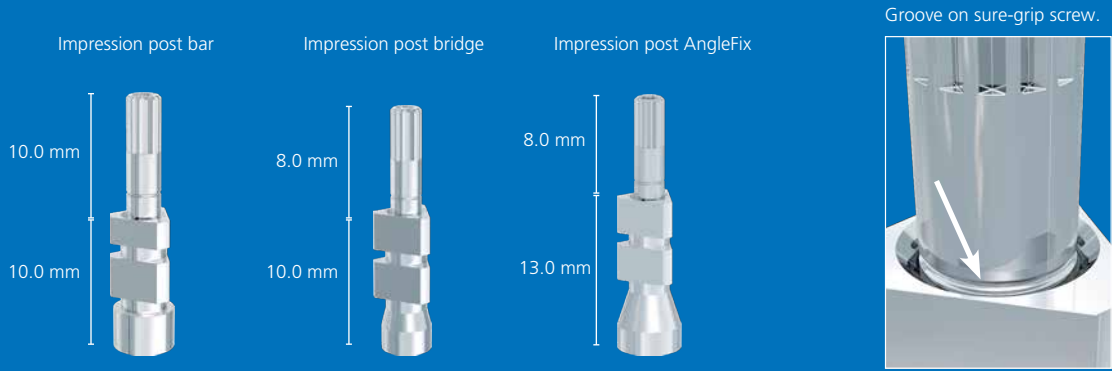


The impression should be taken with a material based on silicone or polyether. The impression posts are secured in the impression material by the retention. Ensure that the peri-implant region is accurately reproduced in the impression.

The screws are loosened and retracted to remove the impression tray. The tray with the screws is sent to the dental technician.

The dental technician obtains all the relevant information from the record card (REF 989-966-22). The respective gingiva formers are refitted after the impression has been taken.





**Taking an impression over bar, bridge and AngleFix abutments.**

To achieve a stable apposition of the gingiva, it is possible to either take an open impression on the implant or, in the case of restorations with bar, bridge and AngleFix abutments, on the abutment fitted in the mouth.

Bar abutments in situ.



To this end, the bar, bridge or AngleFix abutment is fixed on the implant and the corresponding open impression post is placed in position. 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.

Open impression posts for bar abutments in situ.



Following this, the impression is taken with an open impression tray. Once the impression material has set, the sure-grip screws are loosened, pulled out, 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 procedure.

## Impression-taking.

### Closed impression technique.

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

#### Tightening torque

- Retaining screw impression post, intra-orally: manually, or 15 Ncm
- Retaining screw impression post on laboratory implant: manually, or 15 Ncm

Impression post M, closed



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 retainer screw (here M). Check the correct fit of the impression post by means of an x-ray, if necessary.

Impression post M, closed, with impression cap M.



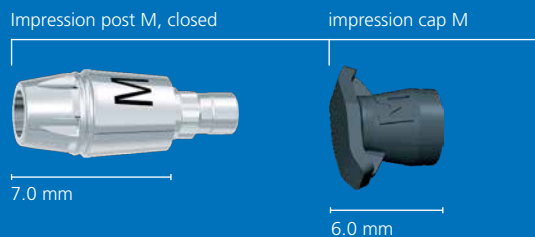
The corresponding impression aid S, M or L (here M) is fitted according to the vertical retention grooves until it perceptibly and audibly clicks into place.

The orientation 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). The tray is removed after the impression material has set.

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

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



Impression tray with impression cap M.



#### Safety information.

- Impression post should fit on the inserted implant without any gaps
  - The impression components should **NOT** come into contact with the individual impression tray
  - Impression caps are single-use items. They are not suitable for sterilization. Multiple use results in transfer inaccuracies.
  - Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
  - Only use tioLogic® ST components in combination with tioLogic® ST implants.
  - Impression posts and impression caps (closed impression-taking) are designed for single use only.  
Reconditioning of an impression post or impression cap that has been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
  - The tioLogic® ST impression components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized components for impression-taking may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com).

# Working procedure.

Impression post bridge, closed, incl. impression cap.



Impression post AngleFix, closed, incl. impression cap.



## Closed impression 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 corresponding impression cap S, M or L is fitted according to the vertical retention grooves until it perceptibly and audibly clicks into place. 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 usual criteria (see chapter Closed impression technique). After the impression material has cured, the tray is removed. The impression posts with screws are delivered to the laboratory together with the separate impression.

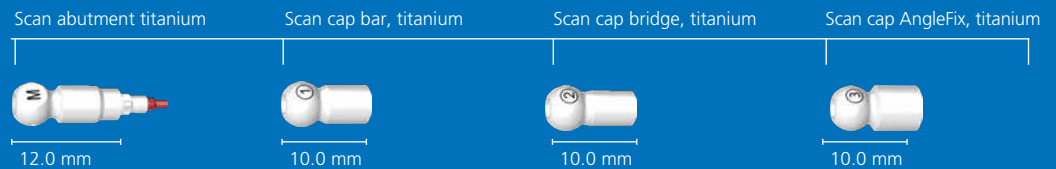
### Tightening torque

- Sure-grip screw impression post: 15 Ncm
- Closure screw on AngleFix or bridge abutment intra-orally: 15 Ncm

### Safety information.

- Impression post should fit on the inserted implant without any gaps
- The impression components should **NOT** come into contact with the individual impression tray
- Impression caps are single-use items. They are not suitable for sterilization. Multiple use results in transfer inaccuracies.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
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- Only use tioLogic® ST components in combination with tioLogic® ST implants.
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Only sterilized components for impression-taking may be used if bleeding occurs. Additional information can be found at [www.dentaaurum.com](http://www.dentaaurum.com).

## Digital impression (scan).

The surfaces of the scan abutment titanium and scan caps titanium are optimized for digital capture, both intra-orally and on the model without scanning spray.

The scan abutments tioLogic® ST are available in the S, M or L series of abutments. The scan abutment is placed on the tioLogic® ST implant (pay attention to the rotational security) and fixed with the red retaining screw.

Scan caps titanium are available for bridge and bar restorations. They can be scanned directly on the bar, bridge or AngleFix abutment in the mouth.

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

# Working procedure.

## Casting the model.

Laboratory implants for cast and printed models can be used in both analog and digital workflows. A description of the processing of laboratory implants in printed models can be found in the manual tioLogic® digital. (REF 989-800-86).

### 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 in the impression post is pushed down. 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

Gingival mask in the impression.



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 silicones used could bond inseparably; it is therefore essential to first apply a separating agent.

In the case of removable restorations (restorations with bars, bridges, ball abutments, tioLOC, AngleFix), the impression and model casting can also be effected with other special impression components.

Groove on sure-grip screw.



Marking at interface M.



Laboratory implant M, for printed and cast models with counter screw



Loosening the sure-grip screws.



Model with gingival mask.



### 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 implant must fit precisely.

The screws must be removed before the impression tray is lifted off.

Model without gingival mask.



# Working procedure.

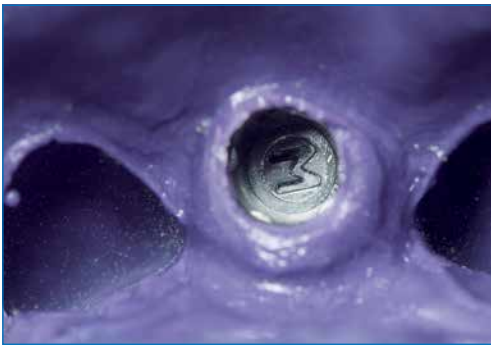
## Casting the model.

Laboratory implants for cast and printed models can be used in both analog and digital workflows. A description of the processing of laboratory implants in printed models can be found in the manual tioLogic® digital. (REF 989-800-86).

### 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.

Impression tray with impression cap M.



The S, M or L laboratory implant is screwed 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 it perceptibly and audibly clicks into place. The laboratory implant, screwed to the impression post, must be placed into the impression cap and the cap securely fixed into the impression material.

### Tightening torque

- Retaining screw impression post on laboratory implant: manually, or 15 Ncm

The gingival mask and the plaster model are fabricated using the same method as described in the chapter 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, AngleFix, ball abutments, tioLOC, ), the impression and model casting can also be effected with other special impression components.

Laboratory implant M,  
for printed and  
cast models  
with counter screw



#### Safety information.

- Impression post should fit on the inserted (laboratory) implant without any gaps.
- The impression components should **NOT** come into contact with the individual impression tray.
- Impression caps are single-use items. They are not suitable for sterilization. Multiple use results in transfer inaccuracies.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.

# Working procedure.

## Casting the model.

### 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 the laboratory implant is inserted, the screw in the impression post is pushed down. This guarantees additional guidance during insertion.

#### 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 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 silicones used could bond inseparably, it is therefore essential to first apply a separating medium.

### 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 implant must fit precisely. The screws must be removed before the impression tray is lifted off.

### Closed impression method 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 the cap securely fixed into the impression material.

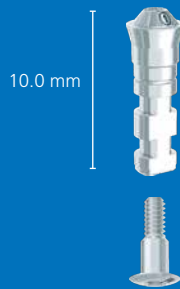
#### Tightening torque

- AnoTite screw impression post in the 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 chapter 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.

Laboratory implant bar,  
for printed and cast  
models with counter  
screw



Laboratory implant  
bridge, for printed  
and cast models with  
counter screw



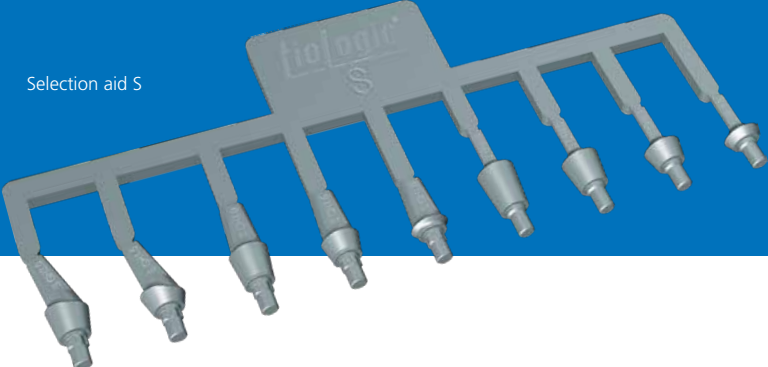
Laboratory implant  
AngleFix,  
for printed and cast models  
with counter screw



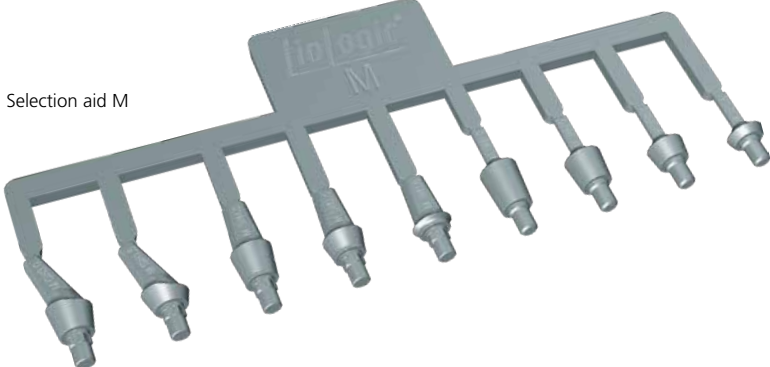
#### Safety information.

- Impression post should fit on the inserted (laboratory) implant without any gaps.
- The impression components should **NOT** come into contact with the individual impression tray.
- Impression caps are single-use items. They are not suitable for sterilization. Multiple use results in transfer inaccuracies.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.

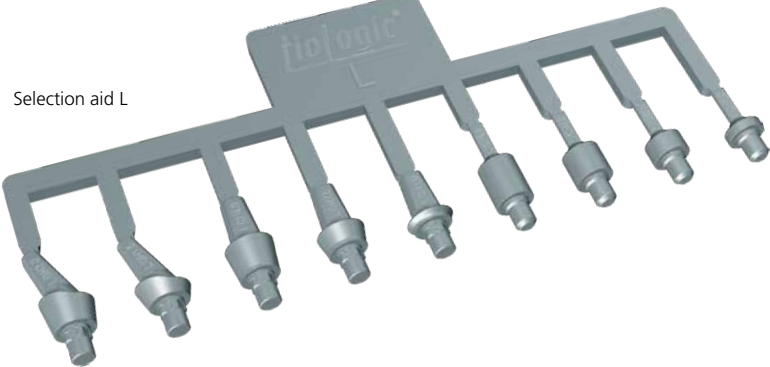
Selection aid S



Selection aid M



Selection aid L





### Wax-up/set-up, lingual overcast/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 or 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.

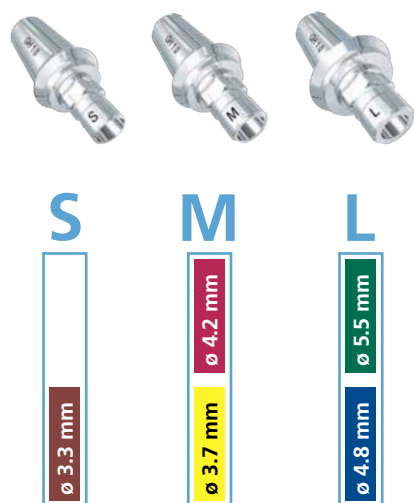
In order to simplify matters for the dental technician, there are various plastic selection aids available for the abutment series S, M and L. These were designed specifically as selection aids for the laboratory and must not be used for the actual prosthetic restoration.

# Dental technical variants.

## Fixed restorations.

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 S, M or L, there are titanium bases for hybrid abutments (case 1), or titanium abutments (case 2) 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 abutments instead.

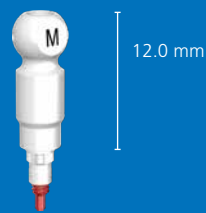
### Case 1:

#### All-ceramic anterior restoration, cemented.

Titanium bases are used for the fabrication of customized hybrid abutments to bond the 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.

Scan abutment titanium M



CAD/CAM titanium base

Ceramic abutment holder M



Polishing aid M



#### Tightening torque

- Retaining screw scan abutment titanium on model and intra-orally: manually
- Prosthetic screw CAD/CAM titanium base on model: manually
- AniTiteScrew 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 retaining screw L 9.0 mm.

After selecting the indication (here: hybrid abutments) in the 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 prosthetic rules.

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

Ceramic abutment on holder.



Ceramic abutment, trimmed.

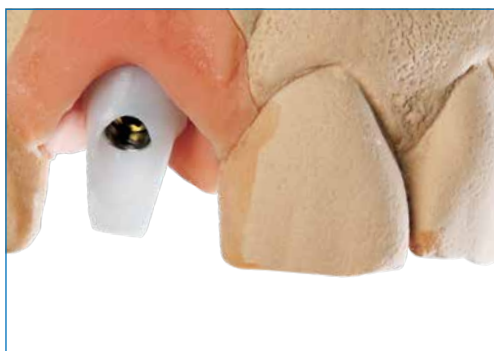


The relevant ceramic abutment holder is placed into the AnatomicHold and fixed securely to prevent rotation with a grub screw (0.9). Then the holder fixation screw is slightly loosened and the ceramic sleeve is positioned. Ensure that the rotational stop integrated within the abutment and the holder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

# Dental technical variants.

## Fixed restorations.

Model with trimmed ceramic abutment, labial view.



Ceramic abutment with CAD/CAM titanium base.



Ceramic abutment with CAD/CAM 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)
- The maximum angulation allowed of the ceramic cervix abutment is:

- S 20°
- M 30°
- L 30°

Before bonding, the head of the prosthetic screw, which fixes the CAD/CAM titanium base, is covered with wax. The surfaces to be bonded on the CAD/CAM titanium base and ceramic abutment are sandblasted with aluminum oxide (50  $\mu\text{m}$ /2 bar).

It is also advisable to use the silanization method to condition the surfaces of the CAD/CAM titanium bases. Before bonding, ensure the surfaces are dry and free from grease. Use the adhesive cement according to the manufacturer's instructions.



Ceramic crown on model with gingival mask, labial view.



After bonding, excess material is removed and the ceramic abutment is put into position (observing the rotational security). The all-ceramic crown is completed according to the manufacturer's instructions.

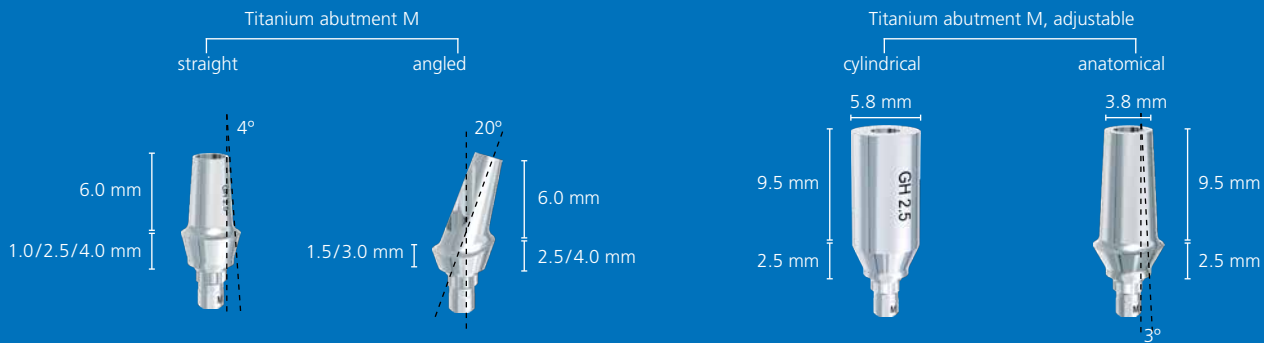


#### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Titanium abutments and bases are designed for single use only. Reconditioning of a titanium abutment or titanium base that has been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Dental technical variants.

## Fixed restorations.



### Case 2:

#### 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 also have different gingival heights (labial/palatal). The universal titanium abutments are cylindrical or anatomical 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.

The occlusal space and the axial direction must be checked when the abutment is inserted. Both can be altered by marking where necessary. The titanium abutment is fixed onto the model with the Anotite screw.

Titanium must not become overheated during preparation as this can lead to differences in surface hardening (alpha-case layer). This could

Angled titanium abutment and gingival mask, labial view.



Angled titanium abutment and gingival mask, oral view.



Model with shortened, angled titanium abutment, labial view.



Angled titanium abutment on polishing aid.



complicate or handicap further processing. This applies essentially to the titanium abutments as it is possible that this is where most trimming will take place.

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

Model with titanium abutment and waxed-up crown, labial view.



Cast and sandblasted crown, labial view.



**Tip:** For easier decementation, a notch can be integrated into the metal framework design in the palatal/cervical region. Later, this will not be veneered (attachment for crown remover). The crown is veneered according to the manufacturer's instructions for use (e.g. ceraMotion® Me, Dentaaurum).

Veneered crown and gingival mask, oral view.



Veneered crown and gingival mask, labial view.



If the restoration framework is made from titanium, a suitable titanium ceramic should be used, such as ceraMotion® Ti from Dentaaurum.

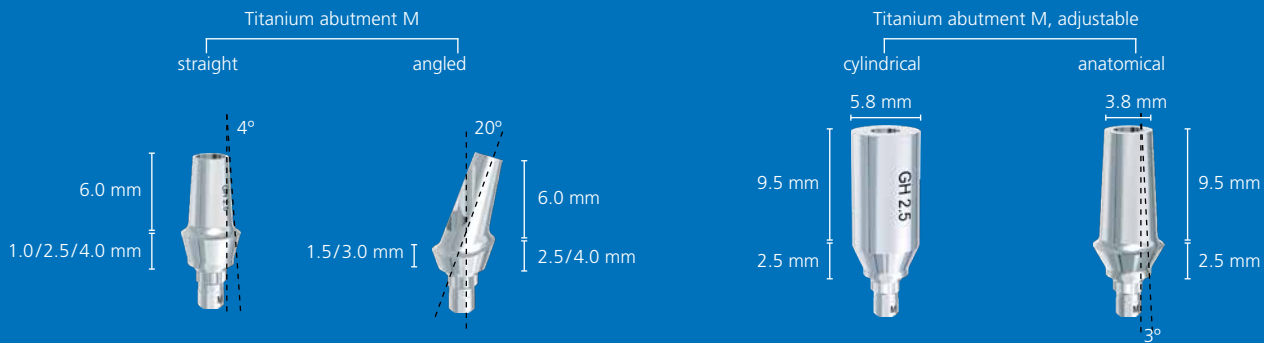
#### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Titanium abutments and bases are designed for single use only.  
Reconditioning of a titanium abutment or titanium base that has been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaaurum generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs.

Additional information can be found at [www.dentaaurum.com](http://www.dentaaurum.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Dental technical variants.

## Fixed restorations.



## Bridge restorations.

### 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. Finishing and precision instruments are suitable for trimming and finishing the work. The titanium abutment is fixed with the supplied AnoTite screw L 9.0 mm.

Model with gingival mask and titanium abutment, buccal view.



Model with marked abutment in position, buccal view.



### 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 gingival mask and waxed-up plastic cap, adhered, 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.

Model with anatomical pattern, mesiobuccal view.



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

Model with cast bridge framework and gingival mask, oral view.



Model with bonded bridge in position, distobuccal view.



**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.

### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- Titanium must not become overheated during preparation as this can lead to differences in surface hardening (alpha-case layer).
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Titanium abutments and bases are designed for single use only.

Reconditioning of a titanium abutment or titanium base that has been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.

- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaaurum generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaaurum.com](http://www.dentaaurum.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Dental technical variants.

## CAD/CAM.



Scan abutment titanium M



CAD/CAM titanium base M



CAD/CAM titanium block M, PreForm

tioLogic® DIGITAL. from Dentaaurum provides a coordinated complete solution for CAD/CAM processes on tioLogic® ST implants.

Dentaaurum offers

[a download service under www.dentaaurum.com/cadcam](http://www.dentaaurum.com/cadcam)

for tioLogic® ST CAD/CAM data records for **3shape**, **dental wings** and **exocad**, and integrates them into the respective software. The data sets 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 surfaces of the scan abutment titanium and scan caps bar, bridge and AngleFix titanium are optimized for digital capture, both intra-orally and on the model without scanning spray.

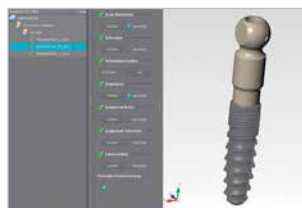
### Download data sets

**3shape**



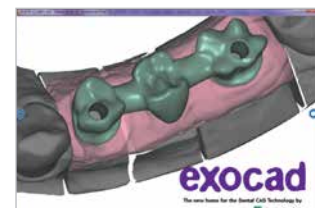
Abutment Designer™

**dental wings**



DWOS

**exocad**



exocad DentalCAD

Titanium bases are used for the fabrication of customized hybrid abutments to bond the 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.

tioLogic® ST CAD/CAM titanium blocks are available for the fabrication of customized one-piece abutments.

Bar, bridge and AngleFix abutments round off the digital portfolio for bridges and bars. Angulations of up to 44° can be compensated using these abutments.

Detailed information on all tioLogic®digital products can be found in the Manual digital. (REF 989-800-86)



[Download data sets](#)



SCAN.

MATERIAL.

DESIGN.

MANUFACTURE.

SERVICE  
DEPARTMENT

# 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 restorations.

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 by up to 40°.

#### Passive fit ("Sheffield Test").

Every bridge restoration must be checked for passive fit on the model after lasering or casting 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



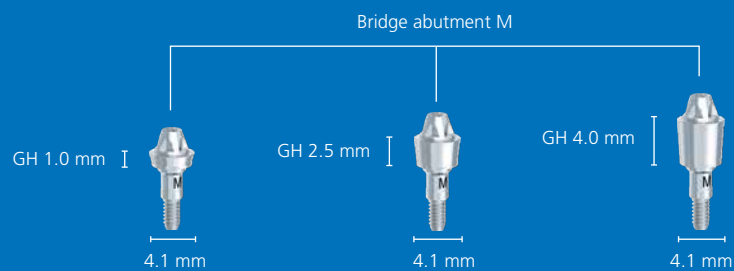
Case 3: ■ Scan cap bridge abutment, titanium



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 abutment on model: manually
- Bridge abutment 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



#### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Bridge abutments and their components are for single use only. Reconditioning of a bridge abutment or components that have been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# 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.



Titanium cap bridge

### Case 1: Temporary restoration.

The bridge titanium caps are secured in position on the bridge abutments using the AniTite screw L 6.0 mm to fabricate 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.

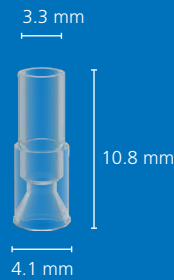
Titanium must not become overheated during preparation as this can lead to differences in surface hardening (alpha-case layer). This could complicate or handicap further processing.

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. Dentaurem REF 120-025-00). This guarantees 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 entering the screw aperture.



Plastic cap bridge



Bridge abutment scan cap, titanium

#### Case 2: Bridge long-term restoration.

The bridge plastic caps are secured in position on the bridge abutments using the AniTite 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 the lingual and palatal overcasts into consideration. The waxes from Dentaurum which burn without leaving a residue (StarWax range) are particularly 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 CAD/CAM 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 prosthetic rules.

# Dental technical variants.

## Operator-removable restorations.



AngleFix abutments 0°, 18° and 32°.

## AngleFix restoration.

### Fitting the AngleFix abutments.

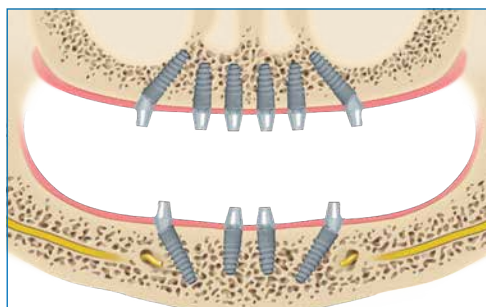
When fitting the angulated AngleFix abutments ensure that the abutments have a larger diameter than the implants. As part of the abutments may be below the bone line, the bone may have to be removed in this region, if required, so that the abutment sits flush on the implant. A prerequisite for successful 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 pOposition for tioLogic® system (see Surgery Manual pOposition for tioLogic® for 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.

AngleFix abutments are provided in 3 angulations: 0°, 18° and 32°. The cone of the AngleFix abut-

Implant position in the mouth

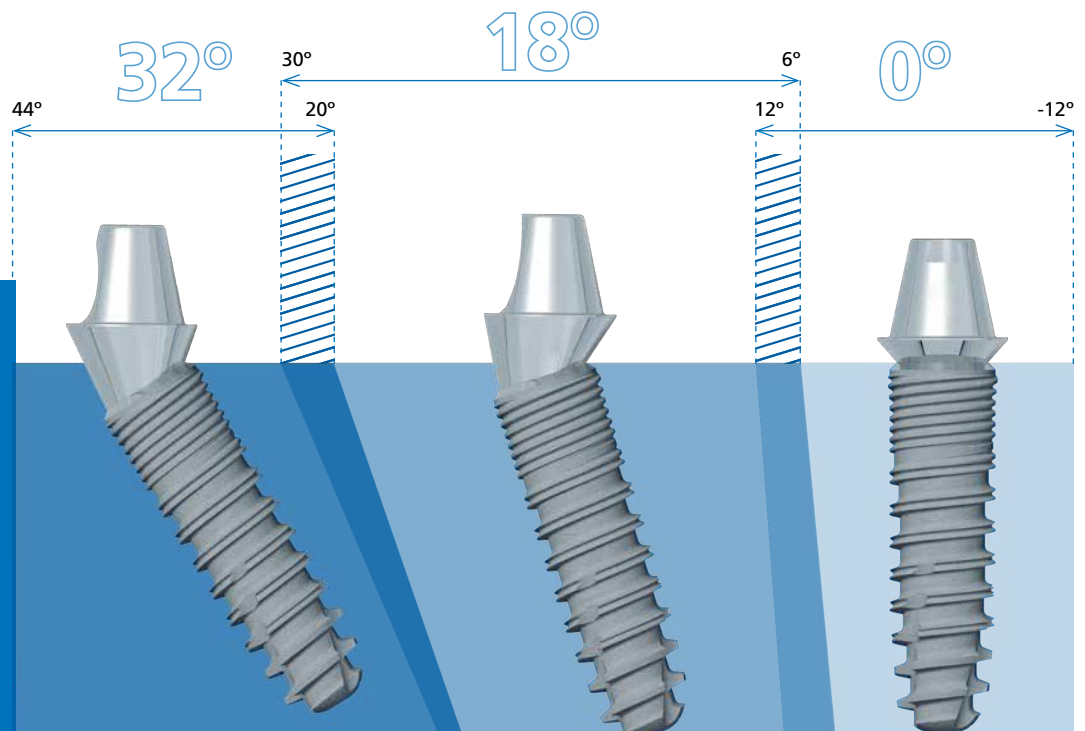


ments is always identical (24°), so that only one size of impression posts, closure caps etc. is required. For biomechanical reasons we recommend that the following angulations are not exceeded:

- Abutment with 0°: 0° – 12°
- Abutment with 18°: 6° – 30°
- Abutment 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.





#### Safety information.

- Due to the steep inclination of the implants, a splinted denture is absolutely essential.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- AngleFix abutments and AngleFix components are designed for single use only. Reconditioning of an AngleFix abutment or AngleFix components that have been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurum.com](http://www.dentaurum.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

## Dental technical variants.

### Operator-removable restorations.



AngleFix measurement guide, 18° and 32°.

### Implant position.

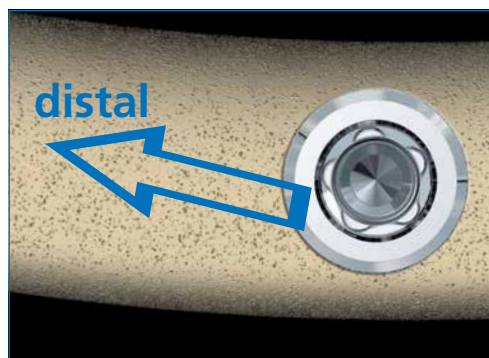
Before beginning treatment, adequate vertical and horizontal bone, both in terms of quantity and quality, must be exposed, while paying particular attention to the position of the inferior alveolar canal and the mental foramen in the mandible and the maxillary sinus in the maxilla. A minimum clearance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

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

The tioLogic® ST implant types S  $\varnothing$  3.3 mm are available for patients with narrow alveolar ridges. Due to the small diameter and low load capacity (compared to the tioLogic® ST M  $\varnothing$  4.2 mm implants), these implants have a limited range of indications. In fully edentulous cases, four or more tioLogic® ST S  $\varnothing$  3.3 mm implants must be inserted with a splinted bar restoration without extension.

Restorations with AngleFix abutments on tioLogic® ST 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 of the posterior implants given from planning. The pin on the angle gauge functions as a parallel guidance aid for the pilot drill.

#### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- **NO** restorations with mixed retention (tooth/AngleFix).
- **NO** grinding or shortening 4Base abutments.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- AngleFix abutments and AngleFix components are designed for single use only. Reconditioning of an AngleFix abutment or AngleFix components that have been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Working procedure.

## Operator-removable restorations.



### 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 AniTite screw L 6.0 mm supplied.

#### Tightening torque

- AniTite screw AngleFix abutment on the model: manually
- AniTite screw AngleFix abutment intra-orally: 30 Ncm

In the cases described, the straight AngleFix abutment M 0° are used in the anterior region and the angulated AngleFix abutments with 32° angulation are used in the posterior region.

#### Tightening torque

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

#### Case 1: ■ Titanium cap

- Plastic cap

#### Case 2: ■ Plastic cap

- Titanium cap

#### Case 3: ■ Scan cap AngleFix-abutment, titanium

For restorations with temporary (case 1), individually cast (case 2) or milled (case 3) AngleFix constructions, 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 AniTite screw (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!).





AngleFix titanium cap

### Case 1: Temporary restoration.

The AngleFix titanium caps are secured in position on the AngleFix abutments using the AniTite 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 during preparation as this can lead to differences in surface hardening (alpha-case layer). This could complicate or handicap further processing.

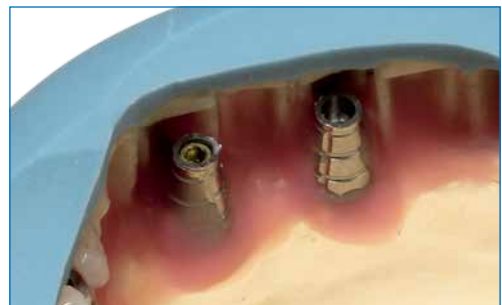
A wax set-up is then fabricated, which can be checked using the lingual and palatal overcasts.

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. Dentaurem REF 120-025-00). This guarantees 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 entering the screw aperture.

Lingual view of the model with shortened titanium caps on AngleFix abutments.



Model with blocked out titanium caps.

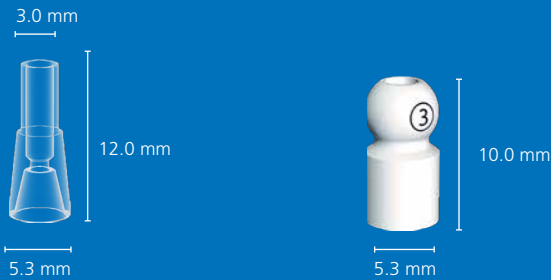


Poured temporary restoration with overcast.



# Working procedure.

## Operator-removable restorations.



AngleFix plastic cap

CAD/CAM scan cap AngleFix, titanium

### 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 the lingual and palatal 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 the lingual and palatal overcasts into consideration. 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 titanium, are fixed with the prosthetic screw L 6.0 mm on the AngleFix abutments.

After selecting the indication (here: AngleFix abutments) in the CAD/CAM 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 prosthetic rules.

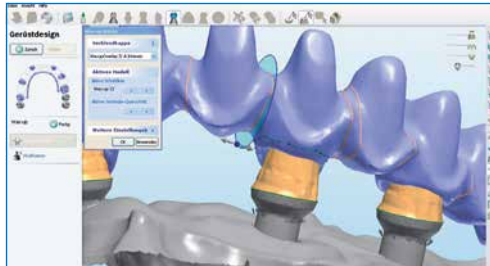
### Passive fit ("Sheffield Test").

After fabrication, every restoration must be checked for passive fit on the model prior to intra-oral placement. This involves placing the construction on the 4Base abutments and fixing it to the 4Base abutment with only one prosthetic screw (torque 25 Ncm). If this raises the construction to create a gap between the construction and 4Base abutments, stresses are present and must be eliminated.

### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- **NO** restorations with mixed retention (tooth/AngleFix).
- **NO** grinding or shortening 4Base abutments.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.

Framework design in CAD/CAM-Software.



Milled zirconia framework.



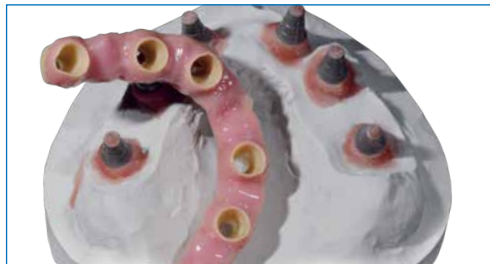
Firing the gingiva section in ceramic.



Labial view of model with finished ceramic crowns.



Bonding of the zirconium framework on the AngleFix caps.



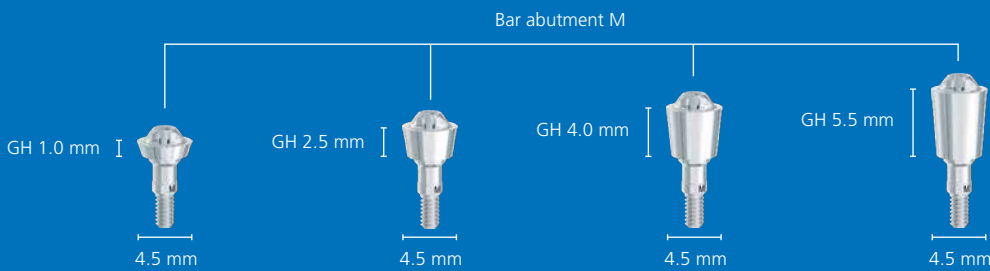
Finished ceramic restoration on the AngleFix abutments.





- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- AngleFix abutments and AngleFix components are designed for single use only. Reconditioning of an AngleFix abutment or AngleFix components that have been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Dental technical variants.

## Removable restorations.



Various types of removable prosthetic restoration are feasible:

- Ball abutment restoration 
- tioLOC restoration 

### 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 by up to 80°.

#### Passive fit ("Sheffield Test").

Every bar restoration must be checked for passive fit on the model after lasering or casting 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

**Case 2:** ■ Plastic cap

- Titanium cap

**Case 3:** ■ Plastic cap

- Titanium cap

**Case 4:** ■ Scan cap bar abutment, titanium



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 (L 6.0 mm) is used for all caps. The bar abutment is placed with the bar, bridge, AngleFix abutment insertion key (secure the counter screw).

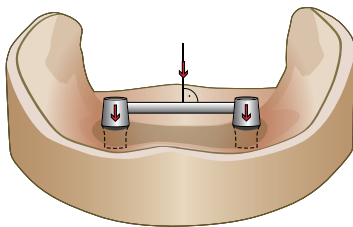
#### Tightening torque

- 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





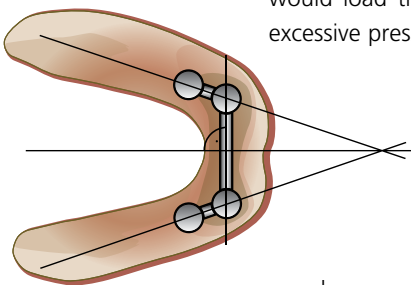
**Case 1: Prefabricated bar (lasered or cast)**  
**Criteria for positioning a bar (bar attachment):**



Horizontal bar positioning.

**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



Vertical bar positioning.

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 bisec-

Bar abutments on model with gingival mask, labial view.



Titanium caps on bar abutments on model, oral view.



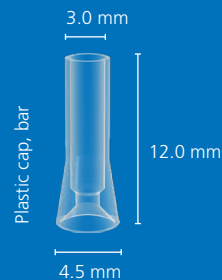
tion angle of the teeth.

**Laser techniques, titanium caps.**

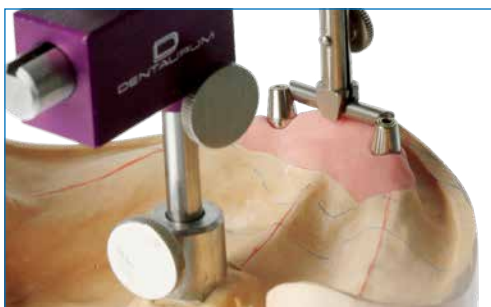
Depending on the impression technique, the prefabricated conical titanium caps should be secured on the bar abutments or bar laboratory implants with the enclosed AnoTite L 6.0 mm screw. They fit all three bar abutments (S - M - L). The seating surface of all bar abutments is identical (ø 4.5 mm).

# Dental technical variants.

## Removable restorations.



Shortened titanium bar with Paralax on the model.



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

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

After laser-welding, the titanium bar should be trimmed and polished (e.g. with a Dentaaurum rematitan® finishing kit).

Trimmed titanium bar.



The titanium bar rider is then laser-welded to the titanium retainer and polymerized into the denture.

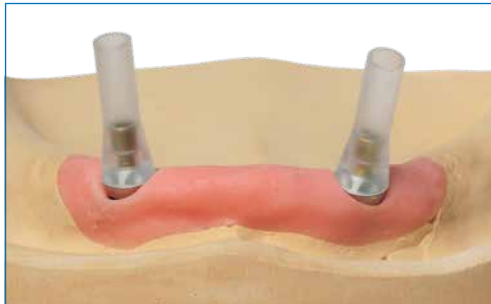
Titanium bar with rider and retainer, occlusal view.



### Casting, plastic caps.

Depending on the impression technique, plastic caps can be fixed to the bar abutments or laboratory implant bar. They fit all three bar abutments (S - M - L). The seating surface of all bar abutments is identical (ø 4.5 mm).

Model with screw-retained plastic caps, labial view.



Model with shortened plastic caps, labial view.



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

Model with plastic bar fixed in place, occlusal view.



A prefabricated plastic bar is waxed to the plastic caps.

Model with finished precious metal bar, labial view.



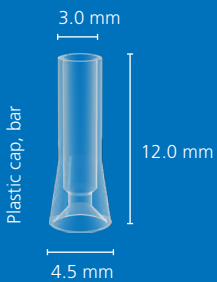
Casting, trimming and polishing should be carried out according to the alloy manufacturer's instructions. A countersink or cutter are available for the post-processing of the screw aperture or the screw seating.

#### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Bar abutments and components are designed for single use only. Reconditioning of an AngleFix abutment or AngleFix components that have been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Dental technical variants.

## Removable restorations.



### Case 2:

#### Milled bar, plastic caps.

Adhesive plastic 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 ( $\varnothing$  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.



In this case, plastic caps were used. The processing of titanium caps for bonding is explained in Case 3: Milled bar, titanium caps for bonding.

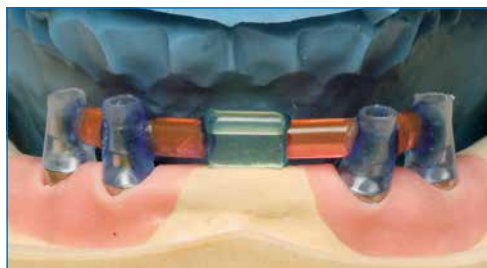
Model with shortened plastic caps on bar abutments, oral view.



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

The plastic caps are bonded to the acrylic.

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



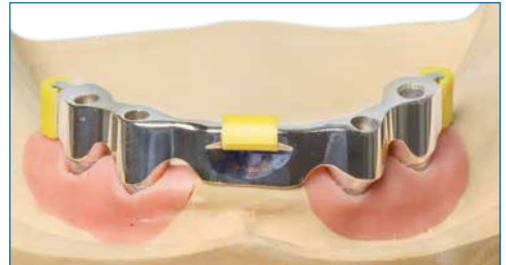
Following this, the pattern for the individual bar is fabricated and paralleled with a milling machine.



Model with milled bar pattern, labial view.



Trimmed bar with attachment parts, labial view.



Model with milled bar pattern and overcast, oral view.



Trimmed bar with overcast and attachment parts, oral view.



For enhanced retention, horizontal and vertical attachments are integrated.

Model with cast bar, labial view.



Mesostructure, basal view.



Model with cast and fine-milled bar, labial view.



Finished case without denture, labial view.



# Dental technical variants.

## Removable restorations.

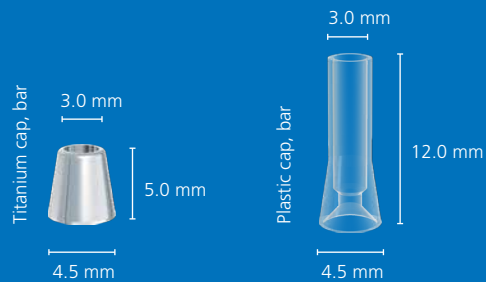
Casting, trimming and polishing must be carried out according to the manufacturer's instructions. After casting, the reamer is used for finishing the screw aperture, the countersink is used for the screw seat and the cutter for the seating surface of the plastic cap.

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 strengthener (e.g. Dentaurem, remanium® GM 800+).

### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Bar abutments and components are designed for single use only. Reconditioning of a bar abutment or components that have been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com) (Processing Instructions Instruments and Accessories REF 989-801-09).



**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 AniTite L 6.0 mm screw. These three act as adhesive bases.

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



A plastic cap is fixed to the fourth bar abutment.

Model with plastic bar fixed in place, oral view.



Milled plastic bar, basal view.



The titanium caps and plastic caps are bonded together with acrylic. The screw in the plastic cap must be loosened before raising the pattern.

# Dental technical variants.

## Removable restorations.

This 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 ti-

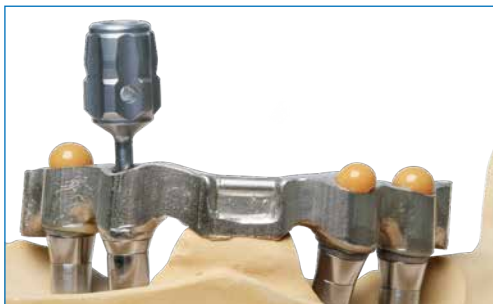
Cast bar and titanium caps for adhering to bar abutments, labial view.



tanium 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 AniTite screw must be sealed with wax.

Once the adhesive has been mixed, it is applied

Model with adhered/screw-retained bar, labial view.



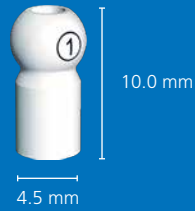
to both contact surfaces of the three connectors, the cast bar placed intra-orally and the cast plastic cap fixed over the guide screw.

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.

### Safety information.

- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.





CAD/CAM scan cap bar, titanium

- Bar abutments and components are designed for single use only. Reconditioning of a bar abutment or components that have been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tiologic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurem.com](http://www.dentaurem.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

#### Case 4: CAD/CAM manufacturing

The scan caps bar abutment, titanium, are fixed with the prosthetic screw L 6.0 mm on the bar abutments.

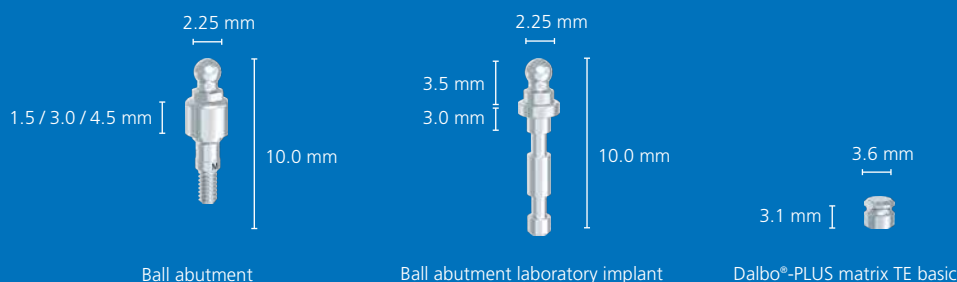
After selecting the indication (here: bar abutments) in the CAD/CAM data set of the respective software, the scan caps bar, titanium, can be scanned.

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



# Dental technical variants.

## Removable restorations.



### 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 partial denture 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 by more than 20°.

Ball head in situ.



Care should be taken to avoid an excessive mechanical loading when using ball head abutments together with  $\varnothing$  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.

### Matrices.

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

Ball head with matrix Dalbo®-PLUS TE basic



### Tightening torque

- Ball abutment on a model: manually
- Ball abutment intra-orally: 35 Ncm

### Different versions of 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. 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.

Processing and integration into the denture should be carried out according to the manufacturer's instructions. Additional information can be found at: [index.php \(cmsa.ch\)](http://index.php/cmsa.ch) (Instructions for use Dalbo® system).

# Dental technical variants.

## Removable restorations.

### Impression-taking.

With the indirect version, the impression can not only be taken using the closed technique, 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.

### Recall.

Dentures and their retention units must be monitored 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 (tighten if necessary)
- Oral hygiene (remove plaque and calculus and, if necessary, re-instruct the patient on cleaning implants)

#### Safety information.

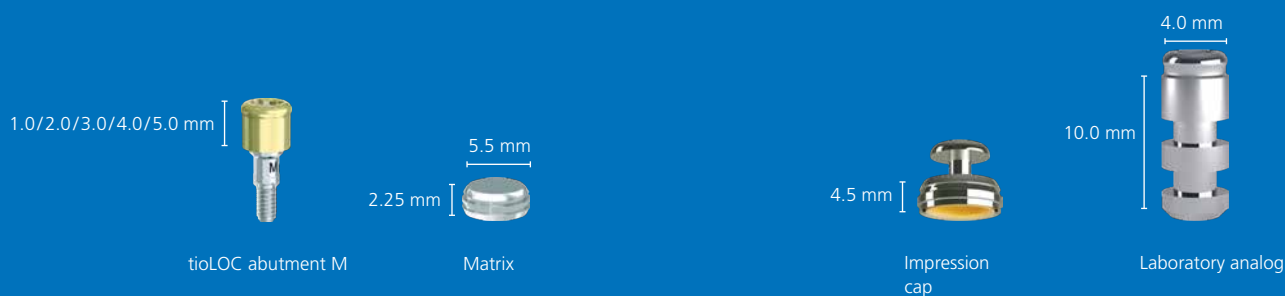
- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- **DO NOT HAVE** an uneven number of implants per jaw.
- **NO** restorations with mixed retention (tooth/implant).
- The implants may not diverge by more than 20°.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- Ball abutments and matrices are designed for single use only. Reconditioning of a ball abutment or matrices that have been inserted previously (recycling) or reuse on patients are not permitted since it can then

no longer be guaranteed that the article can be reprocessed safely or can function safely.

- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurem generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurum.com](http://www.dentaurum.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Dental technical variants.

## Removable restorations.



### tioLOC restoration.

The tioLOC technique is for fabricating implant/tissue-borne restorations with a very low overall height. Existing coverdentures can be modified or remade. tioLOC can be used for tissue-borne coverdentures with two to four implant abutments. The intermaxillary space should be at least 4.0 mm. **The maximum divergence in combination with a tioLogic® ST implant  $\varnothing$  3.3 mm should not exceed 10°.** tioLOC components must not be modified. Only the withdrawal forces of the matrices can be adjusted as required using the exchangeable retention inserts.

#### tioLOC abutment.

tioLOC 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 tioLOC abutment. Its upper edge should be approx. 1.0 mm above the gingival line. The head with retainer is identical for all tioLOC abutments. The tioLOC abutment is inserted with the insertion key tioLOC.

#### Matrices.

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

The withdrawal force of the matrix is regulated with an exchangeable retention insert. This is available in the following versions:

- Yellow 700 g 0–20°
- Pink 900 g 0–20°
- Transparent 1500 g 0–20°
- Violet 2700 g 0–20°

#### CAUTION:

The use of tioLOC abutments for non-parallel abutments of 10° or more per implant  $\varnothing$  3.3 mm is contraindicated.

#### Tightening torque

- tioLOC abutment on the model: manually
- tioLOC abutment intra-orally: 30 Ncm

### Different versions of 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. Neither an impression post nor a laboratory implant are required.

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

Processing and integration into the denture should be carried out according to the manufacturer's instructions. Additional information is available on the internet under "[https://www.rhein83.com/wp-content/uploads/2019/10/Catalogo\\_GER\\_2019\\_MOD\\_D378-REV00\\_del\\_24-07-2019\\_WEB-1.pdf](https://www.rhein83.com/wp-content/uploads/2019/10/Catalogo_GER_2019_MOD_D378-REV00_del_24-07-2019_WEB-1.pdf)" (Catalogo\_GER\_2019\_MOD\_D378-REV00\_del\_24-07-2019\_WEB-1.pdf (rhein83.com) (KATALOG/BEBILDERTES TECHNISCHE HANDBUCH)

### Recall.

Dentures and their retention units must be monitored 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 tioLOC abutments on the implant (tighten if necessary)
- if required, oral hygiene (remove plaque and calculus and re-instruct the patient on cleaning implants)

### Safety information.





- The product should not be used if there is a known allergic reaction to one or more of the material components.
- Different types of alloy in the oral cavity can lead to galvanic reactions.
- **DO NOT HAVE** an uneven number of implants per jaw.
- **NO** restorations with mixed retention (tooth/implant).

- Divergencies in excess of 10 ° with tioLogic® ST implants ø 3.3 mm are not permitted.
- Due to the small size, the article could be swallowed or aspirated. Aspiration could lead to difficulty in breathing or death due to asphyxiation. All articles used intra-orally should therefore be secured against swallowing and/or aspiration.
- All serious incidents arising from the use of the product should be reported to the manufacturer and the competent authority in the country in which the dental professional and/or the patient are resident.
- Only use tioLogic® ST components in combination with tioLogic® ST implants.
- tioLOC abutments and matrices are designed for single use only. Reconditioning of a tioLOC abutment or matrix that has been inserted previously (recycling) or reuse on patients are not permitted since it can then no longer be guaranteed that the article can be reprocessed safely or can function safely.
- tioLogic® ST prosthetic components are delivered non-sterile. They are for single use on one patient only. They must be cleaned and disinfected before being used on a patient. Dentaurum generally recommends that the product be sterilized in addition. Only sterilized prosthetic components may be used if bleeding occurs. Additional information can be found at [www.dentaurum.com](http://www.dentaurum.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

## Technical information.

### Precision instruments/Selection aids.

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

Countersink – Screw seat		Tungsten carbide for trimming the screw seat precisely for cast plastic caps for bar, bridge, AngleFix.
Drill for guide sleeve		Pre-drill for pre-drilling in the surgical stent.
Screwdriver/activator for Dalbo®-PLUS matrix		For adjusting the withdrawal force of the Dalbo®-PLUS matrix.
Elastic cap insertion/ removal tool		For exchanging matrix inserts for tioLOC abutments




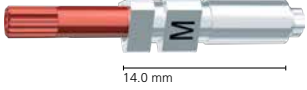

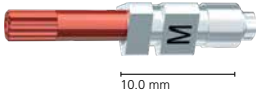




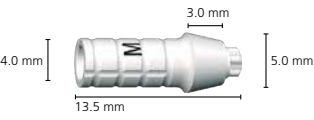


Selection aid set S, M and L

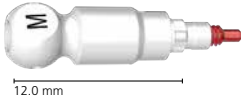






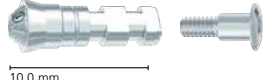
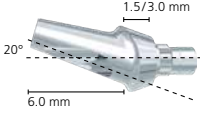




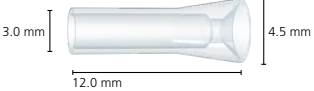




Set containing plastic reproductions of the most important abutments such as titanium and bar abutments. For evaluating the gingival height and total height prior to ordering the abutments.

# Technical information.



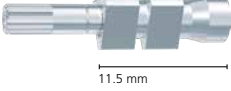


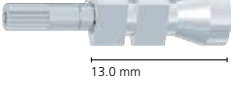
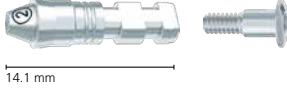

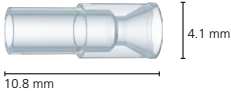



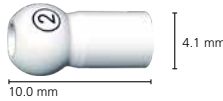
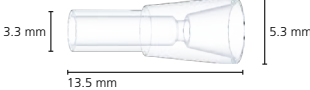
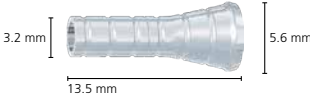

## Data, abutments.



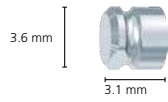

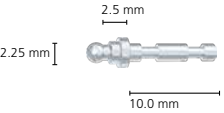




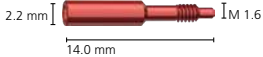
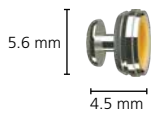

■ For example, M series of abutments	■ For example, M series of abutments
<p>Guide sleeve, titanium L 6.0 mm</p> 	<p>Impression post M, open, incl. screw</p> 
<p>X-ray reference sphere</p> 	<p>Impression post M, open, incl. screw</p> 
<p>Gingiva former M, conical</p> 	<p>Impression post M, closed</p> 
<p>Gingiva former M, cylindrical</p> 	<p>Impression cap M</p> 
<p>Temporary abutment M</p> 	<p>Laboratory implant M</p> 
<p>Screw for temporary abutment</p> 	

■ For example, M series of abutments	■ For example, M series of abutments
Scan abutment titanium M, including retaining screw 	Bar abutment M 
CAD/CAM titanium block M, PreForm 	Impression post, bar incl. screw 
CAD/CAM titanium base M 	Screw impression post, bar 
Titanium abutment M, straight 	Laboratory implant bar, for printed and cast models with counter screw 
Titanium abutment M, angled 	Titanium cap bar 
Titanium abutment M, adjustable, anatomical 	Titanium cap, bar, adhesive technique 
Titanium abutment M, adjustable, cylindrical 	Plastic cap bar 
Scan cap bar, titanium 	Scan cap bar, titanium 

# Technical information.

## Data, abutments.

■ For example, M series of abutments	■ For example, M series of abutments
Bridge abutment M 	AngleFix abutment M 
Impression post bridge, open, incl. screw 	AngleFix abutment M incl. AnoTite screw 
Impression post bridge, closed, incl. screw 	AngleFix impression post, open, incl. screw 
Laboratory implant bridge, for printed and cast models with counter screw 	AngleFix impression post closed, incl. screw 
Plastic cap, bridge 	AngleFix impression cap closed 
Titanium cap bridge 	Laboratory implant AngleFix, for printed and cast models with counter screw 
Scan cap bridge, titanium 	AngleFix plastic cap 
AngleFix titanium cap 	AngleFix scan cap, titanium 

■ For example, M series of abutments	■ For example, M series of abutments
Ball abutment M 	AnoTite screw L 9.0 mm 
Dalbo®-PLUS matrix TE basic 	AnoTite screw bar, bridge, AngleFix, L 6.0 mm 
Ball abutment laboratory implant 	Prosthetic screw, M 1.6, L 9.0 mm 
tioLOC abutment M 	Prosthetic screw, M 1.6, L 6.0 mm 
Matrix 	Retaining screw for scan abutment and closed impression 
Impression cap 	
Laboratory analog 	



## Torque ratchet

### 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, before using for the first time and immediately after each use (Torque ratchet).

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. There are different inserts available, depending on the application.

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 blocking function. To set the blocking 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 Dentaaurum can cause mechanical damage to components, to the implants, and destruction of bone structures.

The blocking 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 position for tightening. The word 'OUT' stands for loosening the torque.

When fitting the final prosthetic restoration, all prosthetic screws should be tightened with the torque ratchet set at the relevant torque (see 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.



## Torque ratchet

### Overview – Inserts for the torque ratchet.

There are different inserts available, depending on the application.



Hex key 1.3 – ratchet,  
L 26.0 mm.



Hex key 1.3 – ratchet,  
L 16.0 mm.



Hex key 2.5 – ratchet,  
L 23.0 mm.



Hex key 2.5 – ratchet,  
L 13.0 mm.



Hex key 2.5 – ratchet,  
L 8.0 mm.



Insertion key ball abutment,  
L 15.0 mm.



Insertion key for tioLOC,  
L 15.0 mm.



Insertion key bar/bridge/  
AngleFix abutment,  
L 16.0 mm.



Adapter – ISO shank  
hexagon/ ratchet,  
L 15.0 mm.



Adapter – ISO shank  
hexagon/ ratchet,  
L 20.0 mm.



Table – Tightening torques for implants and prosthetic components.\*

The torque ratchet is intended for clinical use only.

Prosthetic screws should be tightened with care manually in the laboratory.

Implant types		(depending on the bone density) max. 40 N cm	
Closure screw		15 Ncm or manually	
Implant		15 Ncm or manually	
Closure screw bar		15 Ncm or manually	
Closure screw bridge		15 Ncm or manually	
Closure screw AngleFix		15 Ncm or manually	
Gingiva former		15 Ncm or manually	
Screw for impression post		15 Ncm or manually	
Retaining screw for closed impression		15 Ncm or manually	
AnoTite screw L 9.0 mm		30 Ncm	
Bar abutment		35 Ncm	
Bridge abutment		35 Ncm	
AngleFix abutment 0° GH 1.0 mm		35 Ncm	
AnoTite screw Bar, bridge, AngleFix abutment L 6.0 mm		25 Ncm	
Ball abutment		35 Ncm	
tioLOC abutment		30 Ncm	
AnoTite screw for angulated screw apertures		25 Ncm	

\* Primary stable and osseointegrated

# Torque ratchet.

## Disassembly.

Before cleaning (regardless of the selected cleaning method), the torque ratchet must be dismantled into the individual parts. This can be done without tools. Completely unscrew the torque adjustment screw ⑤, and remove the spring ④ and the ratchet head ② with threaded rod.

Take care not to lose the plastic washer ⑥ as this would have a negative impact on the instrument's precision. (The plastic washer needs only to be removed if there is visible contamination. It can be pulled off if necessary and replaced after cleaning).

## Remove ratchet wheel

Pull back the pin ⑥ in the direction of the arrow using your thumb and index finger and remove the ratchet wheel ①.

## Monitoring

The best method to identify and remove defect instruments is by examining them and carrying out functional tests before and after each use. Specific functional areas (e.g. connection for adapter, torque initiator) and moving parts require special attention.

Allow the parts to cool down to room temperature. Parts with damaged surfaces, chippings, contamination, discoloration or corrosion must be removed. Discard any instruments that are deformed, worn in their functionality or otherwise damaged.

Instruments that are still contaminated should be cleaned and sterilized again.



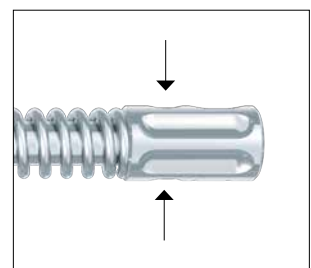
Blocking function – „∞“ mark.



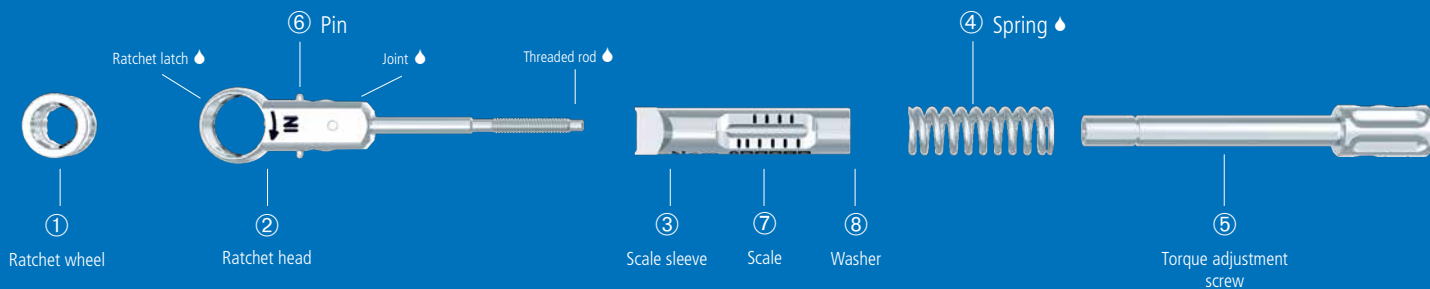
Ratchet head, assembled.



Ratchet head, disassembled.



Never loosen these screws as the ratchet will lose its torque function.



### Maintenance

If several torque ratchets are in use, do not interchange the individual parts. Each individual part belongs to one instrument.

### Lubricating points (💧)

Lubricate the areas marked with the "drop" symbol lightly with maintenance oil for instruments.

Ensure that only instrument oils (paraffinic white oil without corrosion inhibitor or other additives) are used, which – depending on the maximum sterilization temperature used – are approved for steam sterilization and are certified as bio-compatible. The oil should be used sparingly.

Reassemble the ratchet and perform a function test.

### Assembly.

To assemble the torque ratchet correctly, connect the components in the following order: first pull back the pin ⑥ as described above and insert the ratchet wheel ①.

### Caution:

**To avoid confusion, the ratchet wheel ① can only be inserted on one side.**

Slide the spring ④ back over the torque adjustment screw ⑤.

Pass the ratchet head ② with the threaded rod through the scale sleeve ③ and screw to torque adjustment screw ⑤.

After assembly and before each use, check the correct function of the torque ratchet. The instrument is ready for use when there is an audible regular ratchet noise and the mechanism of the torque limit functions.

After reassembly and before sterilization, the torque ratchet should be stress-relieved at max. 10 Ncm.

Additional information can be found at [www.dentaurum.com](http://www.dentaurum.com) (Processing Instructions Instruments and Accessories REF 989-801-09).

# Technical information.

## Material composition.

### ■ Titanium grade 4 (pure titanium) DIN EN ISO 5832-2

Chemical composition (% by mass)	O	0.4 % max.
	Fe	0.5 % max.
	C	0.1 % max.
	N	0.05 % max.
	H	0.012 % max.
	Ti	Rest
Physical and mechanical properties	0.2% yield strength	520 MPa min.
	Tensile strength	680 MPa min.
	Elongation at rupture	10 % min.

### ■ Titanium grade 5 (titanium alloy) DIN EN ISO 5832-3

Chemical composition (% by mass)	Al	5.5 % – 6.75 %
	V	3.5 % – 4.5 %
	Fe	0.3 % max.
	C	0.08 % max.
	N	0.05 % max.
	H	0.015 % max.
	O	0.2 % max.
	Ti	Rest
Physical and mechanical properties	0.2% yield strength	780 MPa min.
	Tensile strength	860 MPa min.
	Elongation at rupture	10 % min.

## ■ 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 (500 °F / 572 °F)  
(continuous / temporary)

The SSCP is available at <https://ec.europa.eu/tools/eudamed> and [www.dentaurum.com](http://www.dentaurum.com).

# General information.

## Manufacturer.

Dentaurum GmbH & Co. KG  
Turnstr. 31 | 75228 Ispringen | Germany

## Brief description.

tioLogic®ST implants are designed for insertion in the endosteal region of the maxilla or mandible. Depending on the indication, appropriate transgingival abutments are secured on the implants and fitted with a prosthetic superstructure.

The tioLogic®ST 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®ST 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 long durability, successful treatment cannot be guaranteed. The implantologist should note and document any problematic cases and inform the manufacturer Dentaurum.

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 the situation of each individual patient into account to avoid overloading the components.

Using tioLogic®ST implant system components in combinations other than those explicitly stipulated in the Instructions for use / manuals can cause mechanical failure, damage to the tissue or unsatisfactory aesthetic results.

At the time of going to press, tioLogic®ST implants are not known to have any side effects or to cause interactions. It cannot, however, be ruled out that in rare cases allergies to components used in the materials of the tioLogic®ST implant system may occur or that there may be electrochemically-induced discomfort.

## Use, availability, precautions, documentation.

The tioLogic®ST 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, implantologists should ensure that they have carefully read and understood all tioLogic®ST Instructions for use/manuals and check that they



are up-to-date. As the instructions and manuals cannot provide all information for immediate use, we strongly recommend that, before using the system, implantologists attend a tioLogic® ST implant system training course offered by Dentaureum 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 patient must be thoroughly examined by the implantologist and given a detailed explanation of the product. Dentaureum recommends full clinical, radiological, photographic and statistical documentation.**

The tioLogic® ST implant system components can be documented, e. g. in the patient file or PatientPass (REF 989-961-20), using the additional labels.

**The implantologist 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® ST product range are completed in accordance with the Medical Device Regulation (EU) 2017/745 and 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 implantologist or a third party in accordance with the Instructions for use; this also applies if the tioLogic® ST product range is used in combination with products from other manufacturers, which have not been specifically recommended for use by Dentaureum.

Dentaureum has no control over processing and use of the product. These are the sole responsibility of the dental professional.

## High-tech in-house.



There is a high level of professional knowledge in our company that has been built up over the years in our own research and development facilities, both in Germany and in France. Highly qualified employees work together in interdisciplinary teams to find answers to the challenges the future poses. At the same time, long-standing cooperations with experts from universities and clinics contribute to finding new developments and innovations.

A further result of these efforts: a comprehensive product portfolio which is one of Dentaaurum's strengths. No other dental company has such an extensive range of products offering a total of more than 8,500 articles.







# Dentaurum

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and in more than 130 countries worldwide.



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