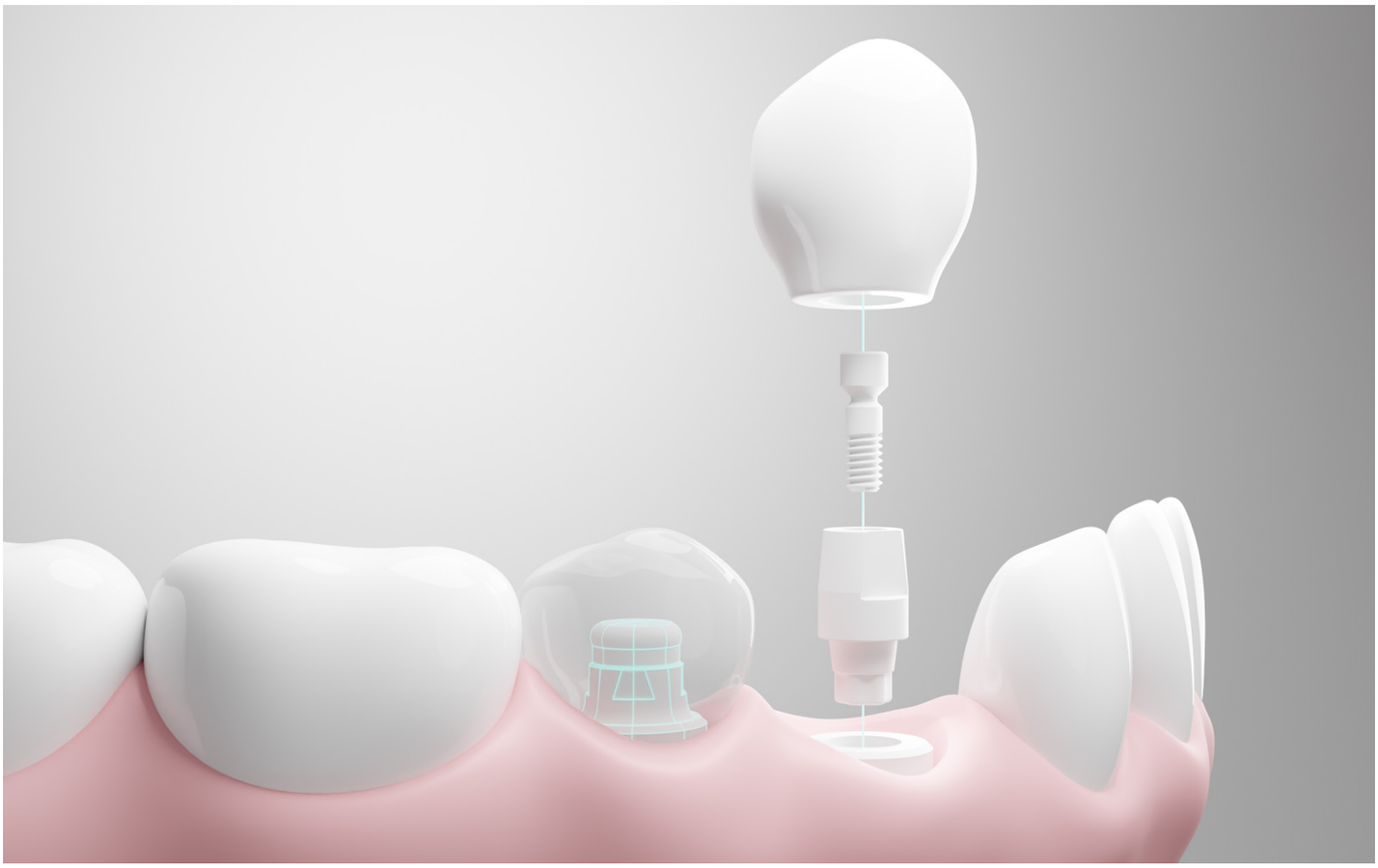


MAKING THE WORLD A HEALTHIER PLACE

PROSTHODONTICS MANUAL

SDS SWISS DENTAL SOLUTIONS

Table of Contents

The SDS IMPLANT SYSTEM

„WE HAVE LEARNED TO THINK IN CERAMICS!"

With a large portfolio of one-piece (SDS1.2) and two-piece (SDS2.2) implants, the implantologist has the right implant for every indication. The standard one-piece and two-piece implants are identical up to the implant shoulder. The treating dentist can decide up to the last moment whether to place a one-piece or two-piece SDS implant. In general, the position of the ceramic implants should be as axial as possible and central to the later crown position ("crown-down planning"), since ceramic implants react more sensitively to lateral forces than titanium implants.

It is important with all SDS implants that they are always placed at tissue level. The very good biocompatibility of the TZP zirconia used by SDS promotes optimal soft tissue management, so that the gingiva can adhere to the zirconia and thus a kind of "sealing" takes place. No microgap at the bone level means the immunological door is closed. We never want to touch this once the bond is established. Therefore "bone-level" Zirconium oxide implants do not meet the required biological criteria in our opinion.

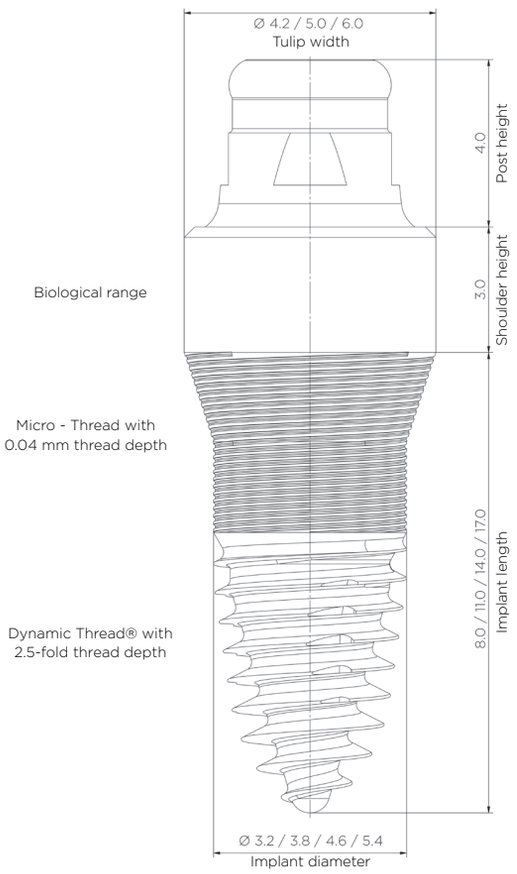
SDS1.2
"one-piece"

SDS2.2
"two-piece"

Design features of the SDS implants

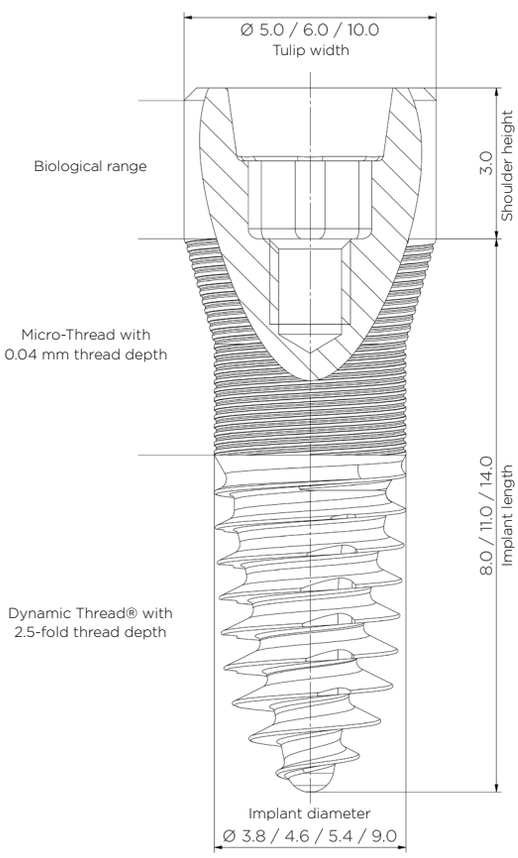
SDS1.2 "ONE-PIECE"

The one-piece implants are used if the restoration with a long-term temporary prosthesis (LTP) is possible without risk, few leverage forces act on the implant and good primary stability could be achieved. For precise indications, please refer to the indication descriptions in the SDS product catalog. The abutment can optionally be ground deep into the tulip area with a red ring diamond grinding instrument to match the course of the gingiva (see page 6) and can then be used as a standard abutment for cementing crown/bridge restorations without any further steps after direct impression taking.



SDS2.2 "TWO-PIECE“

The two-piece implant series is used when leverage forces must be avoided (low primary stability, little bone contact, terminal position) for both immediate and late implant placement. For precise indications, please refer to the indication descriptions in the SDS product catalog.

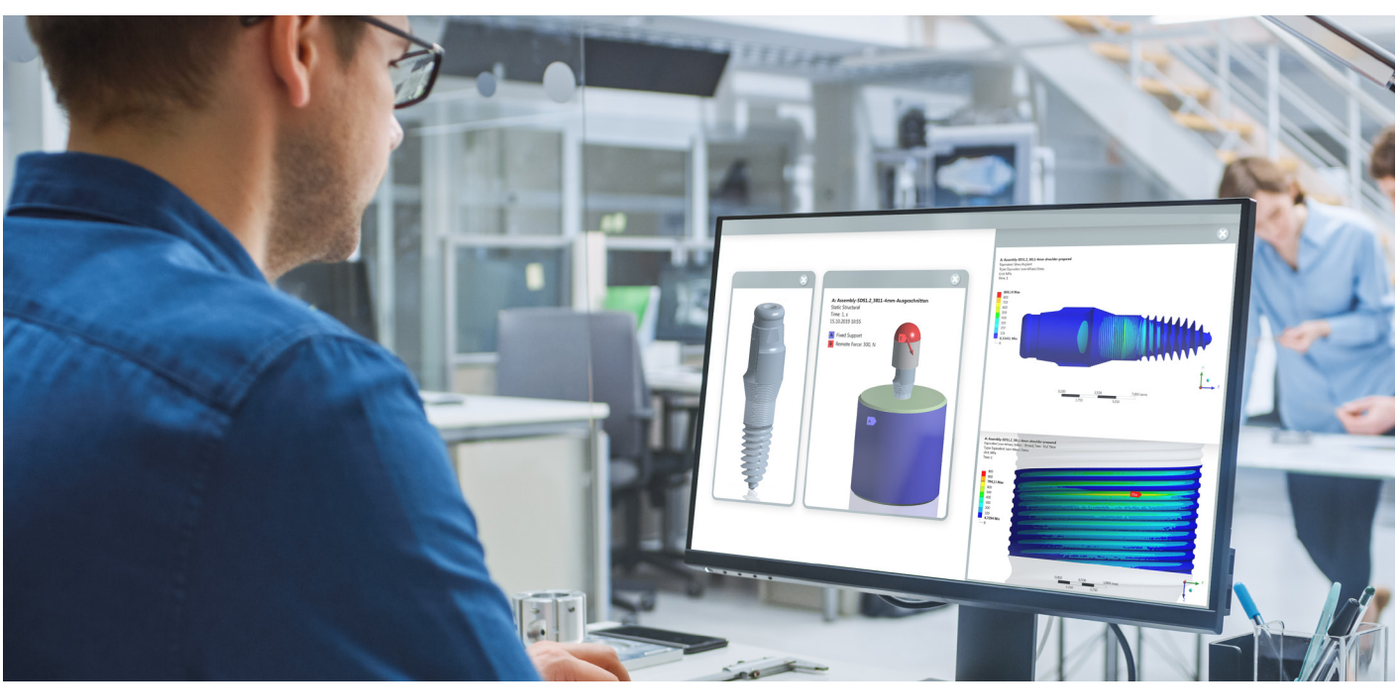


Grinding of SDS implants

In material tests according to DIN ISO 14801, SDS has found no difference in the flexural strength under continuous loading of milled and non-milled implants - provided that the milling process is carried out according to the protocol (preparation rules) we have specified. SDS ceramic implants can be grinded without any problems both intraoperatively and directly before the impression is taken, e.g. to prepare an individual exit profile in the tulip area or to adapt the position of the crown margin to the gingival line. The following preparation rules must be observed:

GRINDING OF SDS IMPLANTS - SUMMARY

- Diamond-coated grinding instrument, grit size 46 µm (red ring)
- Spray jet cooling not less than 50 ml/min
- Observe the operating instructions of the grinding instrument manufacturer regarding maximum speed (caution: please observe the transmission ratio of your contra-angle handpiece)
- Application pressure via the rotating instrument max. 20 N



HIGHEST DEMANDS ON QUALITY AND STABILITY

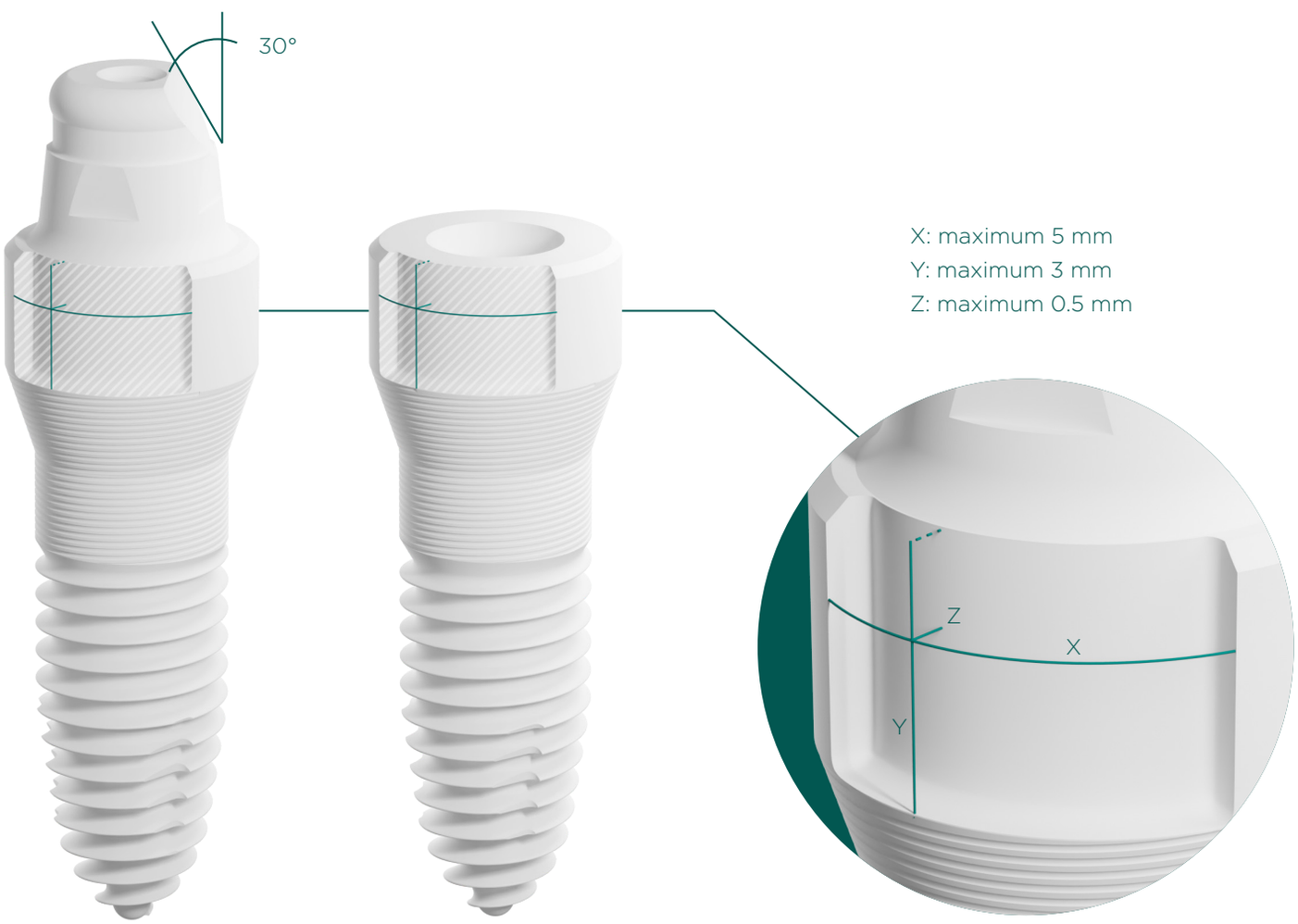
CADFEM Medical GmbH is a certified simulation service provider and software manufacturer in the field of medicine and medical technology and is one of the pioneers of in silico medicine. SDS SWISS DENTAL SOLUTIONS proves, on the basis of an FEM analysis by CADFEM Medical, that for one-piece SDS1.2 implants with a post height of 4 mm, the values of the permanent load do not change. They, therefore, do not lead to a reduced service life if these ceramic implants are grinded within the framework of the grinding protocol approved by SDS SWISS DENTAL SOLUTIONS.

INFORMATION ON GRINDING SDS1.2 IMPLANTS (ONE-PIECE):

- SDS1.2 3.2 mm Ø implant must not be ground.
- SDS1.2 3.8/4.6/5.4 mm Ø implants may only be prepared in the area of the implant shoulder in the visible / aesthetic area in order to optimally adapt them to the course of the gingiva. The outer diameter of the implant shoulder may be reduced by a maximum of 0.5 mm. The implant shoulder may be reduced horizontally (Y axis) by a maximum of 3 mm up to the start of the fine thread. In the area of the shoulder radius at the level of the preparation margin, the expansion should not exceed 5 mm.
- The abutment of the SDS1.2 implant can be trimmed up to an angle of 30° without any problems.

INFORMATION ON GRINDING SDS2.2 IMPLANTS (TWO-PIECE):

- SDS2.2 3.8 mm Ø implant must not be ground.
- SDS2.2 4.6/5.4 mm Ø Implants may only be prepared in the area of the implant shoulder in the visible / aesthetic area in order to optimally adapt them to the course of the gingiva. The outer diameter of the implant shoulder may be reduced by a maximum of 0.5 mm. The implant shoulder may be reduced vertically (Y axis) by a maximum of 3 mm up to the start of the fine thread. In the area of the shoulder radius at the level of the preparation margin, the expansion should not exceed 5 mm.



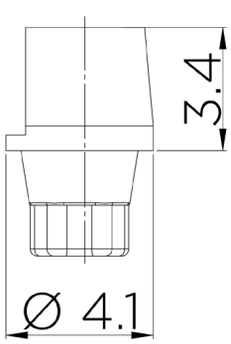
SDS2.2 - Components

DESIGN FEATURES

SDS2.2 - The two-piece implant system is based on over 18 years of experience in the development of ceramic implants. The load-bearing upper implant part and the implant-to-post connection have been designed to be extremely stable. The connection is not located in the implant but in the lower part of the abutment, the so-called tulip. This results in a highly stable one-piece implant again after cementing and screwing, which accommodates the crown at tissue level. Thus, there are no moving parts and only one bacteria-proof connection point at gingival level. This guarantees perfect periodontal hygienic results. The stepped implant design and the proven self-tapping DYNAMIC THREAD® thread are excellent in all bone classes and indications. The two-piece design enables concealed healing with its high success rates, especially in the posterior region and in “free-end” situations.

SDS2.2_AB-S “STANDARD ABUTMENTS”

More precisely, the three different abutments (straight, +1.5 mm and 15° angled) are only “abutment posts”, since the lower part of the abutment is already integrated into the implant shoulder. Two different screw types (titanium and PEEK metal-free) can be selected.



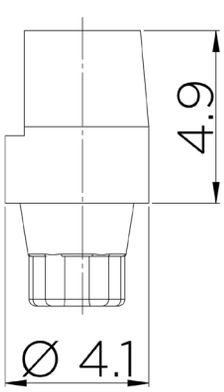
SDS2.2_AB-S

Abutment height 3.4 mm

suitable for all SDS2.2 implants

Standard abutment

Indication: cemented single crown and bridge restorations in standard situations



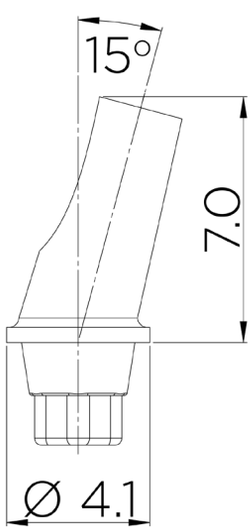
SDS2.2_AB-S+1.5

Abutment height 4.9 mm

suitable for all SDS2.2 implants

Standard abutment + 1.5 mm

Indication: cemented single crown and bridge restorations with larger gaps to the antagonist



SDS2.2_AB-S15°

Abutment height 7.0 mm

suitable for all SDS2.2 implants

Standard abutment + 15° angled

Indication: cemented single crown and bridge restorations for implant axial divergences

SDS2.2 - Cementing the abutment

CEMENTING THE SDS2.2-AB-S “STANDARD ABUTMENT”

The abutment must always be cemented with a glass ionomer cement (GIZ), preferably Ketac™ Cem!

The standard PEEK or titanium screw is used exclusively to fix the abutment during cementation.

Please note during prosthetic planning that the subsequent crown must rest on the shoulder of the implant.

Before the actual cementing, the optimum position of the abutment is determined (internal geometry of the implant that has a hexagon shape) and, if necessary, marked with a waterproof pencil.

The tip of the mixing capsule is now used to pour the cement into the dry opening of the implant and the abutment is inserted in the intended position. The excess cement can now flow out through the hole in the abutment so that no excess pressure is created.

In addition to cementing, SDS recommends fixing the abutment with the titanium screw or (for metal-sensitive patients) with the PEEK screw. This provides additional stability and ensures that the abutment cannot rise or slip during the curing phase. The screw is only hand-tightened: do not use a ratchet!

PREPARING THE ABUTMENT - SUMMARY

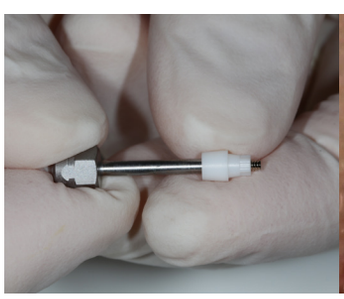
- Always cement the abutment with a glass ionomer cement (GIC).
- Crown must rest on the implant shoulder.
- Determine the optimal position of the abutment.
- Use the tip of the mixing capsule to apply the cement.
- Place the abutment in the intended position.
- Secure the abutment with the PEEK screw to prevent positional changes during the curing phase.

1. Healed implants with cover screw

2. Remove cover screw

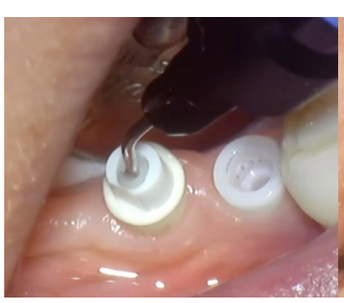
3. Fitting the abutment

4. GIC, e.g. Ketac™ Cem for cementing the abutments



5. Abutment and screw prepared with screwdriver

6. Cemented abutment, screw is used for fixation during cementation process



7. Filling the screw channel with “Flow”

8. Preparing the implant shoulder using a red ring diamond grinding instument

SDS1.2/SDS2.2 Preparation of a long-term temporary prosthesis (LTP)

Provisional restorations must likewise be performed carefully and with extreme caution, as this is a key determinate for success. Provisional restorations must be passively fixed into place without any friction by cementing with Durelon™ and must be stabilised by as many teeth as possible. As the number of stable teeth in the temporary decreases, the number of occlusal contacts and paths is reduced.

FILLING AND DRYING

After taking the impression, the mold is filled layer upon layer in the incisal to coronal direction with Luxatemp™. The assistant then dries the area before the abutment is also coated.

FITTING THE MOLD

The mold is then fitted and fixed onto the other teeth, the gingiva or gum. Let the patient bite down firmly and massage the material out of the interdental spaces with your finger. The mold is withdrawn from the mouth in its viscoelastic phase and the LTP is then removed. Any excess is trimmed off with scissors. The LTP is then sprayed with cold water and reinserted in the mouth for 2-3 minutes. Gently remove with Furrer forceps and finish.

FINISHING

The LTP is repositioned again. At this point, let the patient firmly bite down on an occlusion foil. The finishing work on the LTP is carried out, any friction is reduced to a minimum - the LTP must literally “fall” onto the stumps - and subsequently cemented with Durelon™

SPLINTING

(only during the post-surgical LTP healing phase) Always include at least three teeth, i.e. a single anterior implant is interlocked using the AET (acid etching technique) to both adjacent teeth with Flow. Two implants are glued to at least one other tooth, preferably with the rests milled into the old fillings or by splinting LTP s to adjacent teeth.

LOADING

Occlusion and articulation are adjusted.

LONG-TERM TEMPORARY PROSTHESIS - SUMMARY

- Fill moulded part evenly from incisal side
- Dry the teeth/implants + overmould
- Place moulded part, allow to close
- Remove, cool with water, cut out
- Reposition, bite firmly, finish
- No friction, Durelon™ + Flow if necessary
- Occlusion/articulation: not on implants

1. Astringedent to stop bleeding and dry the stumps.

2. Fabricate the LTP. Inject Luxatemp™ around the margins and stumps.

3. Insert Luxatemp™ into the mold and into the mouth

4. Let patient bite

5. Carefully remove the molded part

6. Remove excess with scissors

7. Gently remove LTP with Furrer pliers and finish

8. Cementing with Durelon™, adjust occlusion

Prosthodontics

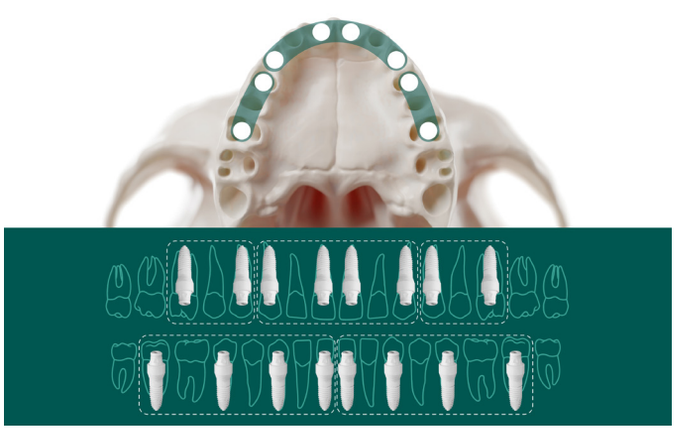
Crowns should be perfectly fitted at the margins and should not exhibit any friction. Crowns must “fall” onto the abutments and only be passively fixed during the cement curing phase. Otherwise, this friction would, on the one hand, exert orthodontic forces on the implant (which could lead to later loosening) and, on the other hand, introduce permanent tension into the prosthetics or the ceramic implant itself. In principle, all implant crowns should be splinted together, as this improves handling during fitting and insertion as well as cleanability. Exception: the symphyses should not be splinted to avoid unpleasant feelings of tension for the patient.

These symphyses are located exactly in the midline in the lower jaw and in the area of the canines in the upper jaw, which is why a separation should be planned here before or after the canines. This should be taken into account by the implantologist when planning the implant. It is absolutely contraindicated to connect ceramic implants with natural teeth. Even with titanium implants, this is now classified as a treatment error. This is even more serious with ceramics, as ceramics have no flexibility whatsoever.

Free-end pontics should be avoided and terminal abutments should be included in the implant planning. Implant diameters up to 3.8 mm should support a maximum of one pontic in premolar width. Implant diameters of 4.6 mm or more may support a maximum of one pontic in molar width. The occlusion must be adjusted by the dental technician (and checked by the dentist) in such a way that the shimstock foil can just be pulled through in the area of the implant restoration. Laterotrusion and balance paths should be completely avoided on ceramic implants. This applies in particular to the molar region. Using a canine as guidance on a single-tooth implant is not state of the art - here, group guidance from the anterior region to the premolars is preferrable. Group guidance should also be established for a complete restoration. Materials: if both jaws (e.g. in an edentulous patient) are restored with pure implants, a restoration with monolithic zirconium oxide should be provided in any case to avoid chipping.

IMPRESSION TAKING

Under no circumstances should a gingival retraction cord be placed or excess gingiva removed with an electrosurgical unit. This is absolutely contraindicated for ceramic implants, as the gingiva grows onto the ceramic and the bond would be destroyed again. Excess gingiva is removed in the same preparation step with the egg-shaped red ring diamond tool - there is no gentler modelling tool for the gingiva than the red ring diamond!



PROSTHODONTICS – SUMMARY

- The crown must rest on the shoulder of the implant
- Perfect marginal fit, no friction
- Splinting with one another - but not with natural teeth
- No splinting on the upper jaw in the molar area and on the lower jaw in the centre of the jaw
- No free-end pontics, 3.8 mm Ø implant - max. 1 pontic in premolar width, 4.6 mm Ø implant or above - max. 1 pontic in molar width)
- Reduced occlusion (pull shimstock foil through), no lateral trajectories
- Monolithic zirconia for maxillary and mandibular complete restoration

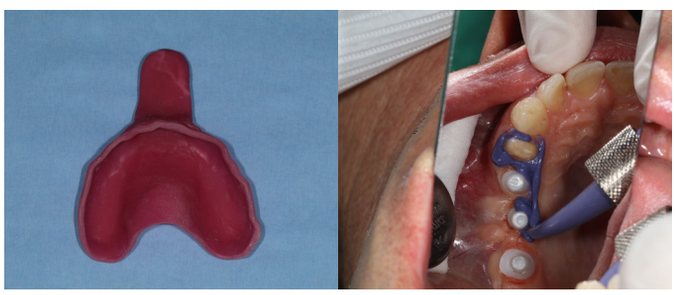
SDS1.2/SDS2.2 Prosthetic restoration

SPECIAL FEATURES SDS1.2

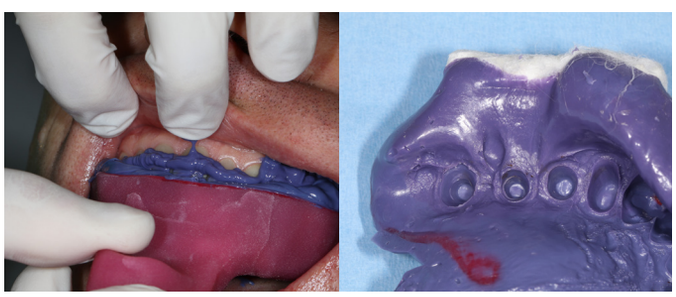
The abutment was intentionally designed to be not too high in order to improve safety in cases of unprotected healing. Of course, the implant can also be placed slightly higher so that the high tulip can then be prepared in the prosthetic phase and used as an additional friction surface for the crown.

If the post of the SDS1.2 is at the correct height, but the interocclusal distance makes decementing likely due to the high crown height, the dental technician can create another groove in the crown directly corresponding to the circumferential groove below the ring in the abutment. These two corresponding grooves unite during cementation to form a ring filled with GIZ, which represents a cement lock and prevents possible decementation.

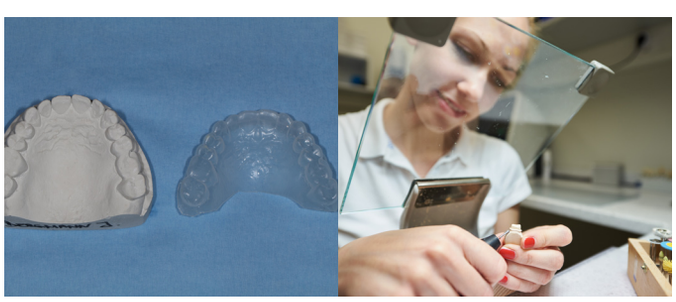
SDS1.2 Cement ring/cement lock (green)



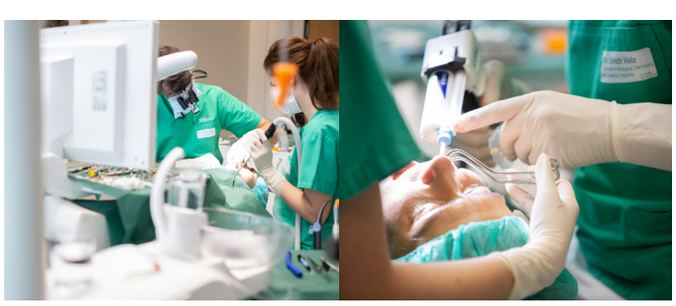
1. Custom impression tray
2. Inject Impregum™ around the edges and stumps



3. Impression taking e.g. with Impregum™ filled custom tray
4. Impression



5. Plaster model with molding
6. Fabrication of crowns/bridges by a dental technician



7. Insertion of the final prosthesis
8. Cementing the final work with Ketac™ Cem

Insertion of the dental prosthesis

FUNDAMENTAL PRINCIPLES

Before inserting the prosthesis, the prosthodontist must ensure that the occlusion and articulation correspond to the guidelines of prosthetic dentistry. This must be checked again after cementation and corrected if necessary.

Any friction that may still be present must be completely eliminated by removing material from the crown.

The surface must be completely dry before cementing. Under no circumstances should a retraction suture be inserted. GIC (glass ionomer cement, e.g. Ketac™ Cem is always used as cement. No other cement ranks higher in terms of bonding properties when cementing "zirconium oxide to zirconium oxide". Biocompatibility and removal properties of GIC are also superior to those of other cements, for example those based on metacrylates. GIC is inserted into the crown cavity in a thin but sufficiently thick layer, then the crown is fitted and firmly pressed onto the implant post for a few seconds to squeeze out any excess material.

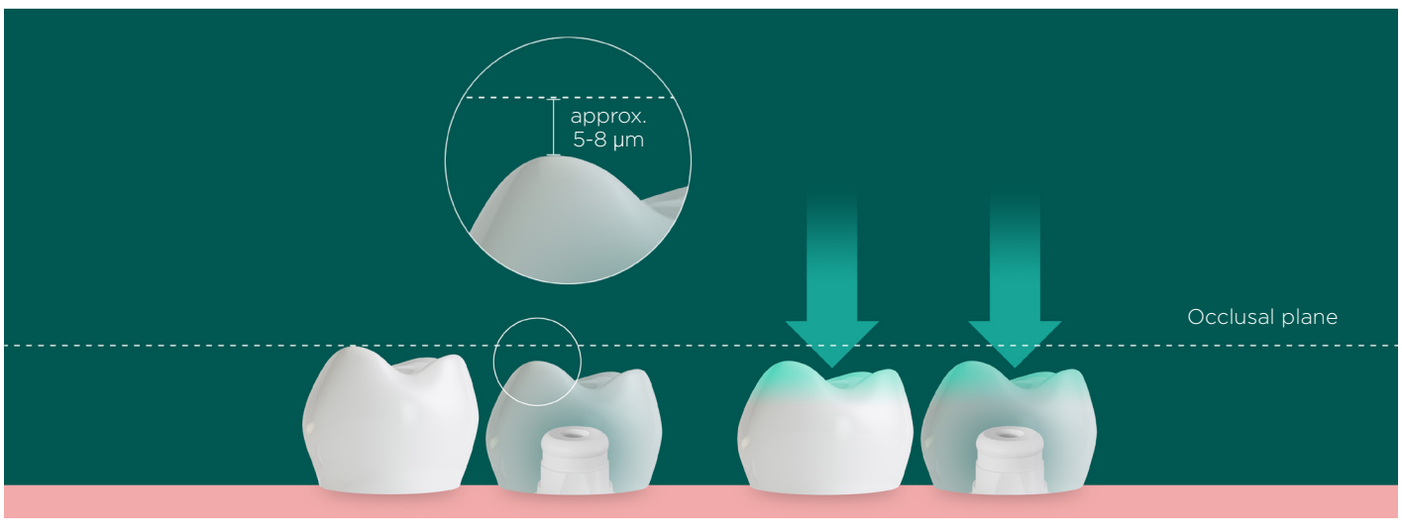
Then the pressure is reduced and the superstructure is held passively in position to avoid building up tension. For the same reason, do not let the patient bite down on a cotton roll, or only do so very gently. It should be more of a "hold" than a "push". The excess cement is removed at the exact stage when it is almost hardened but still has some residual flexibility. Therefore, the practitioner must stay with the patient during cementation and wait for this exact moment to remove the excess material "en bloc" using a cow horn probe or, preferably, a plastic or carbon scaler. However, it must also not be removed too early, as in this case cement material could be torn out of the cementation joint. For forensic reasons, we recommend that a complete photo documentation is always made, that the fit is documented by a new OPG after cementation and that the occlusion and articulation are documented by final impressions (situation models). In case of dispute, the absence of these documents will automatically be interpreted to the disadvantage of the practitioner (documentation obligation).

INSERTION/CEMENTATION OF THE DENTAL PROSTHESIS - SUMMARY

- Pre-check occlusion, articulation and friction
- Dry without using retraction cords, use GIZ
- Cement sparingly into the crown, set firmly for a short time, then only hold passively
- Remove excess in the viscoplastic phase (plastic scaler)
- Check occlusion and articulation again
- Documentation: photo, OPG, situation models

Occlusal design

If the occlusion were to be designed to the same extent on an implant as on a natural tooth, the implant crown would experience overloading due to the intrusion of 5-8 µm of the natural tooth during loading. Therefore, the implant-supported crown is reduced by the amount of approx. 5-8 µm, so that when the natural tooth is intrusive, both crowns experience the same load. For this purpose, an approx. 5-8 µm thin occlusion foil is used and the patient is asked to bite lightly. The foil should "hold" on the natural tooth, but not on the implant crown. Only when the patient bites down firmly should the foil also hold on the implant crown.



Animation demonstrating the occlusion concept of an implant-supported crown next to natural teeth.

Bridge pontics and splinting

No more than one pontic may be placed between zirconia implants. For implant diameters of 3.8 mm: anterior tooth or premolar width. For implant diameters of 4.6 mm: molar width.

SDS Media Library

CERAMICS ARE EASIER - BUT DIFFERENT

In the SDS Media Library at www.swissdentalsolutions.com/videothek, you will find a variety of videos and webinars in our video portal in which Dr Karl Ulrich Volz from the SWISS BIOHEALTH CLINIC in Kreuzlingen/Switzerland explains his concept of biological dentistry with ceramic implants in detail.

In addition, the individual treatment steps are explained in detail step by step in topic-oriented short videos.

Instructions for dental prosthetics

Under the heading "Prosthodontics", all essential treatment steps of this prosthodontics manual are provided with the corresponding videos.

AUGMENTED REALITY SDS1.2

Simply scan the following QR code to view our SDS 1.2 implant as a 3D model from all sides. Using the AR function at the bottom right of the website, it is also possible to display the implant directly in the room you are in.

SDS 1.2 Implant

Direct links to videos and webinars

Cementing the abutment on the two-part SDS2.2

Grinding the shoulder of the SDS2.2 two-piece implant

Temporary Solutions and Impression

Cementation of the dental prosthesis

Summary

- No impression posts or laboratory analogues are required
- For the two-piece implant SDS2.2 only abutment + screw + screwdriver are required
- For the one-piece implant SDS1.2 no materials or instruments are needed
- Two-piece SDS2.2: cement with GIC, gently screw by hand with screw (titanium or PEEK)
- Preparation with new Rotring diamond, max. water cooling, pressureless, at gingiva level (equigingival)
- No thread, hemostasis with AdstingedentTM
- Impression taking with polyether, silicone or also digital
- Cementation of the crown with GIC, no pressure during curing
- No friction, reduced occlusion on the implant crowns

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2nd Edition