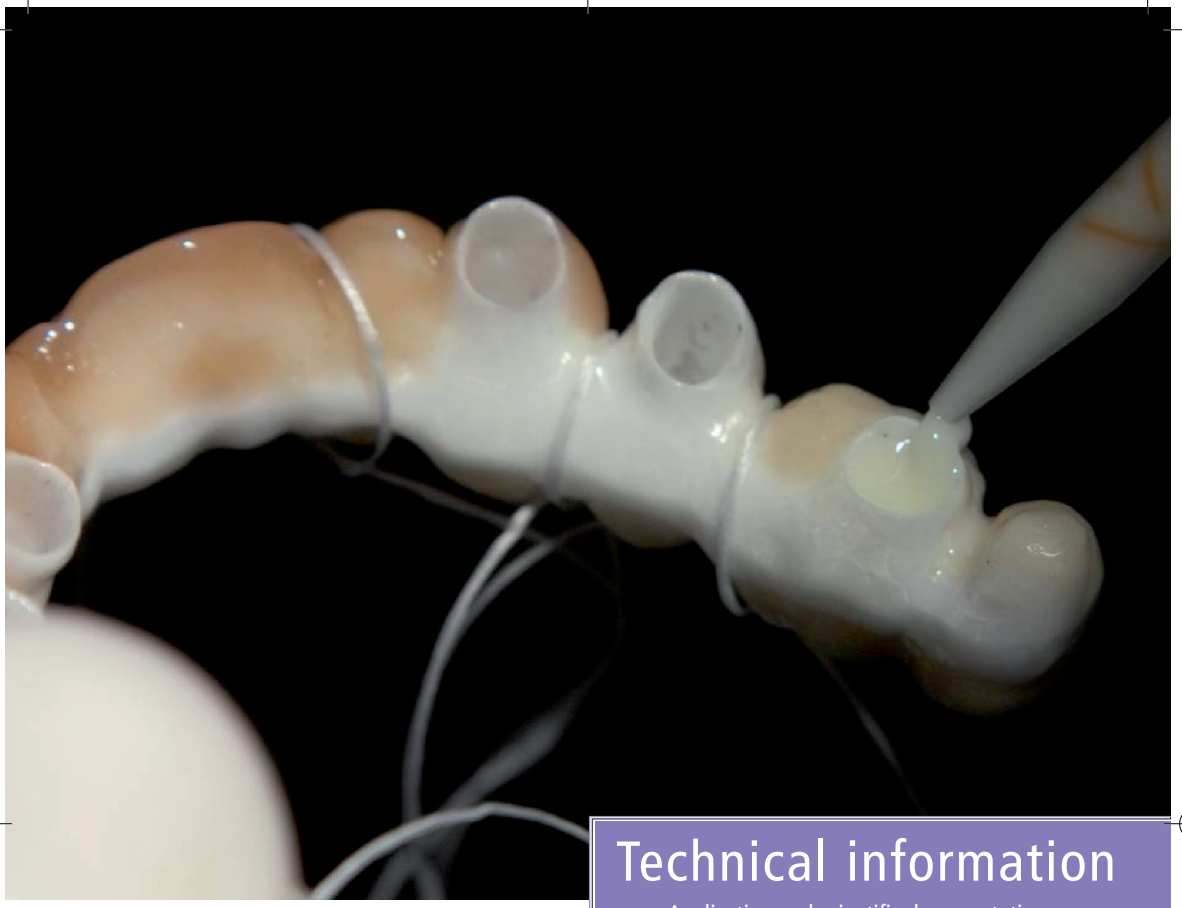


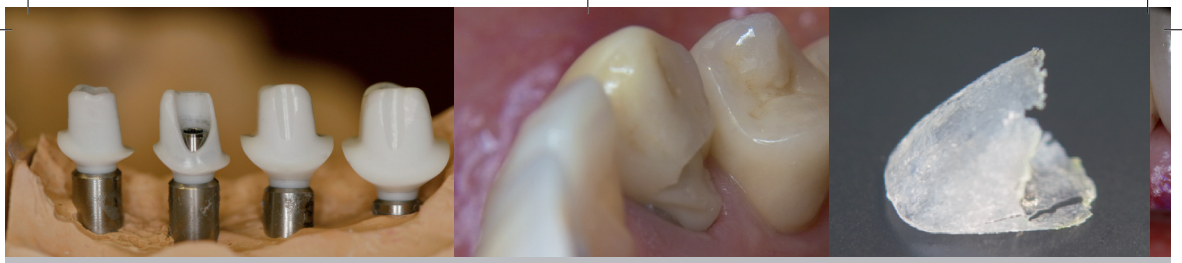
Technical information

Application and scientific documentation
for implantlink® semi Classic and Forte

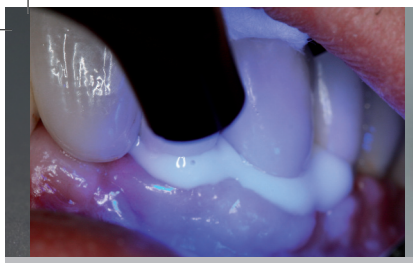
implantlink® *semi* Classic & Forte

Dual-curing, Semipermanent Implant Cements for Superstructures

DETAX



Contents



1. Introduction

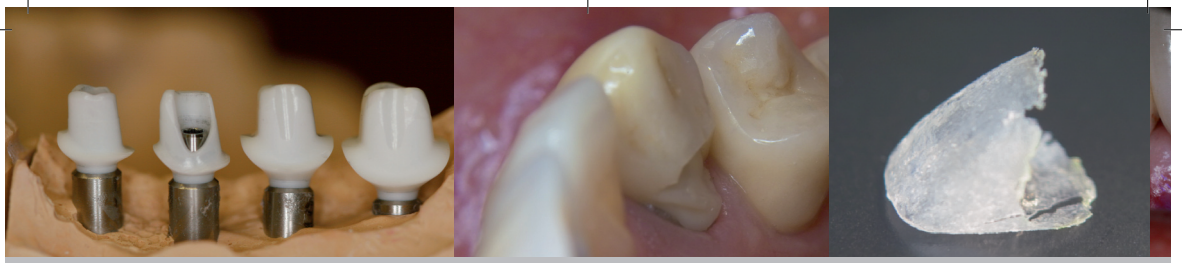
The permanent fixation of implant superstructure onto the most varied abutments and inserts has changed significantly in recent years. Ten to fifteen years ago, the definitive attachment of implant crowns and bridges by means of vertical and horizontal screw connections was absolutely at the forefront. As time went on, there was debate over whether it would not be more advantageous to bond the superstructures with the abutment (Felton, 1999; Behr 2008).

In the meantime, experienced implantologists have abandoned screw retention in most cases and are "cementing" the implant-prosthetic fixtures onto the abutments. Where highly adhesive, permanent fixative cements are used for this, however, the advantage of screw retention is lost, namely that the superstructures are able to be removed without being damaged. In order to allow the removal of the cemented superstructures without damage nevertheless, many users employ the temporary cements in familiar use in tooth conservation.

The disadvantages of conventional temporary cements are well-known, e.g. insufficient adhesive force and compressive strength, erosion of the cement gap, bacterial colonization, unsafe removal of excess (residuals), etc.

implantlink® semi has been specially developed for use as a temporary cement for superstructures.

Now, for the first time, implantlink® semi provides a secure adhesion of the superstructure thanks to a low resistance to displacement, a reduced film thickness, a marginal gap tightness and a balanced adhesion, enabling damage-free removal. In the process, the use of additional release compounds to reduce the adhesion can, indeed must, be dispensed with. Now, it is the case that the most varied situations arise in the practice, in which implant-supported fixtures must be attached provisionally. There is a large number of implant systems on the market that differ in the size of the abutments, the angle, the type of surface, the material, the form of the surface, etc.



All these parameters affect the adhesion of the superstructures. If this is too low, the fixture can become loose. If this is too high, then problems occur in removing it (Behr 2008).

As well, there are single crowns, bridges that are fixed on two implants and larger fixtures that are anchored on more than two implants. With the increasing number of anchorage points, the force that must be applied to be able to remove the superstructure again when required also increases. On the other hand, however, above all on position and esthetic grounds in the anterior region, customized abutments are placed, for which the adhesive force of the cement (retention) must be higher in order to accommodate the smaller size. For this reason, implantlink® semi Forte, with a higher adhesive force, was especially developed for applications with a smaller or customized abutments, in addition to implantlink® semi.

The proofed and well tested implantlink® semi now became implantlink® semi Classic.

2. Characterization

implantlink® semi Classic and Forte are two-component, dual-hardening cements based on urethane methacrylates. In areas inaccessible to light, the cements set solidly within 5 - 6 minutes due to the chemically initiated solidification mechanism. To accelerate the curing, the cements can be irradiated using the light from customary polymerization lamps. This is particularly advantageous for removing the excess, which has been pressed out in the region of the gap edge. After a brief period, the so-called gel phase is attained and, a little later, the excess can be removed particularly easily and in large pieces. The flowability is very high and the distinctive thixotropy prevents dripping. implantlink® semi Classic and Forte are suitable for all material combinations, are eugenol free and are antibacterially formulated. Due to their particular compositions, implantlink® semi Classic and Forte are as odorless and tasteless as possible.

3. Controlled Bonding

The adhesion that the cement forms between the abutment and the superstructure is the central point that determines the quality and service life of the temporary attachment. This adhesive force, however, is determined by several factors and it is helpful to be aware of these factors.

One important point is the size of the surface available as the "adhesive surface" between the abutment and the superstructure (Covey 2000; Lee 2008). The larger this surface is, the higher the adhesion is. The surface is primarily determined by the type / height of the abutment system (small and large). Particularly where customized abutments are used, the surface, and hence the adhesive force, is markedly reduced (Fig. 1).

Another important influencing measurement is the conicity of the abutment. The larger the angle becomes, the smaller the adhesion with the same "cemented surface" becomes.

Moreover, the type of material (titanium, gold, ceramic) and its surface finish are relevant for the bond. Here, the retention can be particularly affected by the surface roughness, which can lead to a sharp increase in the adhesion (Rist 2010).

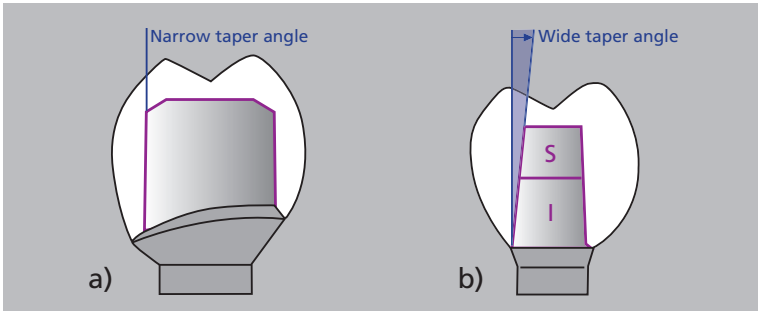
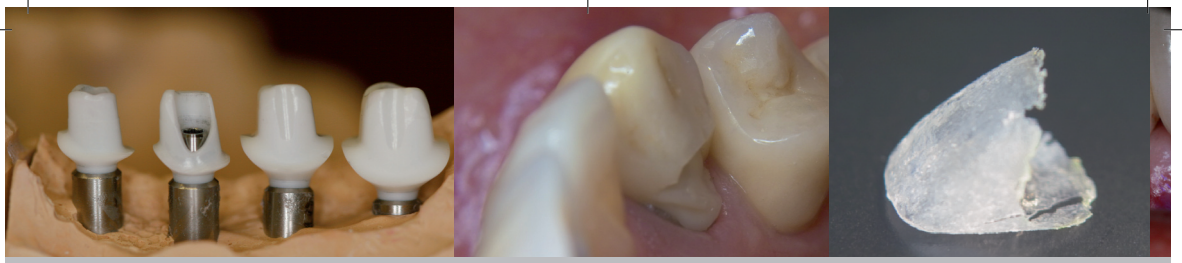


Fig. 1: Various abutment configurations and their effect on the retention:
a) Large abutment with large retention surface, narrow taper angle and high adhesion;
b) Small standard abutment (S) with small retention surface, wide taper angle and reduced adhesion; small, customized abutment (I) with very small retention surface, wide taper angle and limited adhesion.



Generally, the adhesion must be high enough to generate an adequate counterforce to the chewing forces occurring, so that the superstructure remains solidly fixed to the abutment. A lower limit of 5 - 7 N is given in the literature for the adhesive force (Botega 2004, Strub 1999). An upper limit of 100 N for the adhesive force is discussed, with which the removal of the superstructure should still be possible without damage or destruction (Froehlicher 2010).

3.1 Adhesion on standard abutments

To determine the adhesive forces of implantlink® semi Classic and Forte, gold and zircon oxide superstructures were cemented onto titanium abutments, conditioned and the tractive forces were measured by means of a universal testing machine (Quooss 2009; Quooss 2011). Details of the sample preparation and measurement are described at Point 11.1. The mean adhesive FH forces [N] of the various temporary Implant cements with Au superstructures and the respective standard deviations from the mean values are shown in Table 1. It transpires that TempBond NE exhibits the lowest adhesive force (53.77 N). The mean adhesive force for implantlink® semi Classic is 75.13 N and 110.2 N for implantlink® semi Forte. The highest adhesive force, at 142.6 N, is achieved by Premier Implant Cement (Fig. 2).

In order for solid cementing to become possible, even under reduced adhesive conditions, the adhesion for implantlink® semi Forte was increased markedly from 75.2 N to 110.2 N, and hence by approx. 47%, in comparison with implantlink® semi Classic.

	implantlink® semi Classic*	implantlink® semi Forte**	TempBond NE*	Premier Implant Cement**
Mean value	75,13 N	110,2 N	53,77 N	142,60 N
Standard deviation	2,55 N	27,45 N	7,16 N	27,95 N

Table 1: Mean adhesive forces and standard deviations of various temporary implant cements; Au superstructures; Ti abutment; * (Quooss 2009); ** (Quooss 2011)

An adhesive force of 110 N corresponds with a weight of approx. 24 lb (11 kg) and corresponds approximately with the upper limit discussed in the literature (Froehlicher 2010). Damage-free removal is still possible under these conditions (Söhnel 2011).

Thus, implantlink® semi Forte should only be used when a high adhesion is required, for example for customized abutments.

At 53.7 N, TempBond NE attains a significantly poorer adhesion. The adhesion values of more than 140 N for Premier Implant Cement, by contrast, are very high. This can lead to problems on removing the superstructures.

Table 2 shows the mean adhesive FH forces [N] of the various temporary implant cements with ZrO_2 superstructures and the respective standard deviations from the mean value. It transpires that TempBond NE again exhibits the lowest adhesive force (68.15 N).

The average adhesive force for implantlink® semi Classic is 80.57 N and 131.68 N for

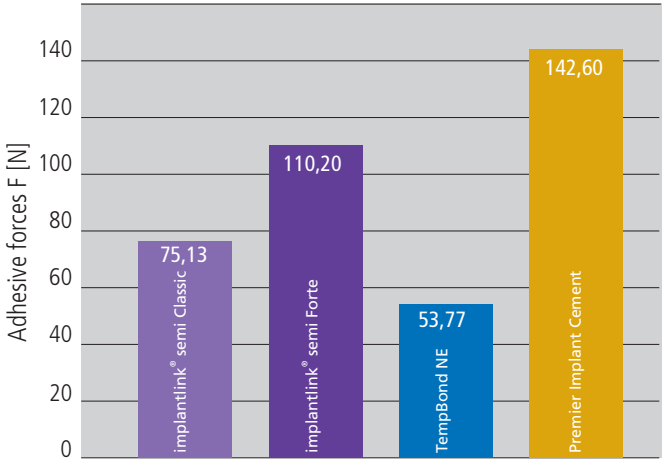
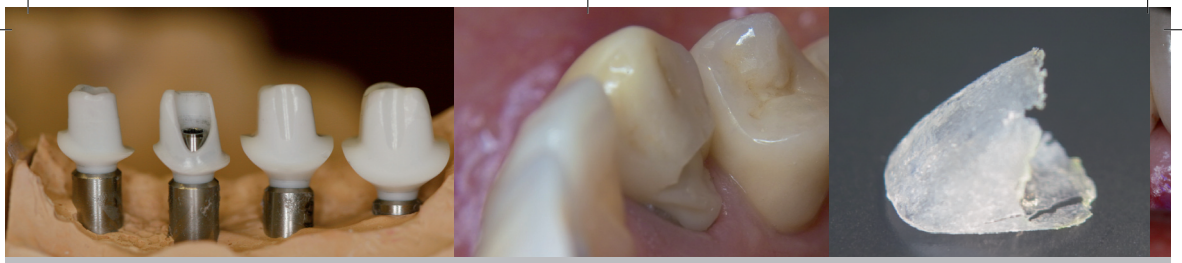


Fig. 2: Mean FH adhesive forces of various temporary implant cements with Au superstructures; * (Quooss 2009); ** (Quooss 2011)



Premier Implant Cement (Fig. 3). The adhesive forces determined show Premier Implant Cement to be a very strong adhesive for both material combinations. Removal of the superstructure without damage is made considerably more difficult. In order to make a delayed removal possible, the manufacturer recommends the use of release agents (e.g.: Vaseline, lubricant gel), in order to reduce the adhesive force. In using a release agent, however, the tightness of the gap edge comes into question. TempBond NE exhibits a markedly lower adhesive force. The adhesive forces for implantlink® semi Classic and Forte are balanced out such that the adhesion is suf-

	implantlink® semi Classic*	TempBond NE*	Premier Implant Cement*
Mean value	80,57 N	68,15 N	131,68 N
Standard deviation	5,49 N	5,57 N	15,71 N

Table 2: Mean FH adhesive forces and standard deviations of various temporary implant cements; ZrO2 superstructures; Ti abutment; * (Quooss 2009)

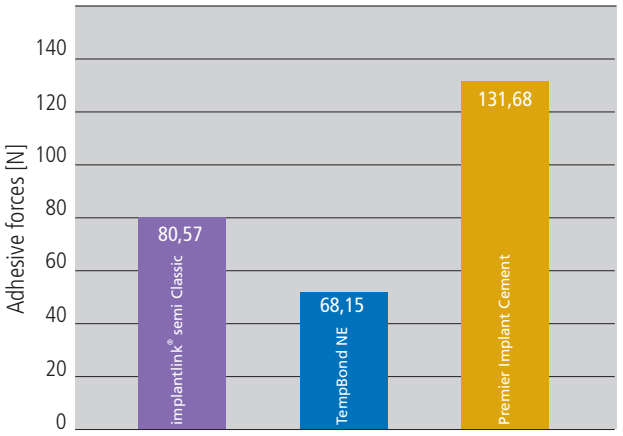
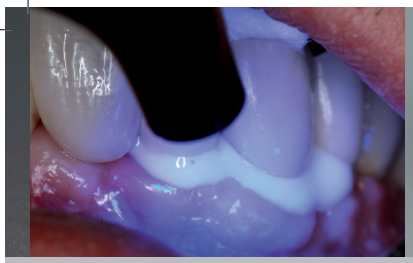


Fig. 3: Mean adhesive forces of various temporary implant cements with ZrO2 superstructures; Ti abutment; *(Quooss 2009)



ficiently high to remain permanently in place, but, on the other hand, not too high, in order to enable the abutments to be removed using normal force. By way of comparison: Permanent cements attain adhesive forces of over 300 N (Clayton 1997, Squier 2001, Wolfart 2006).

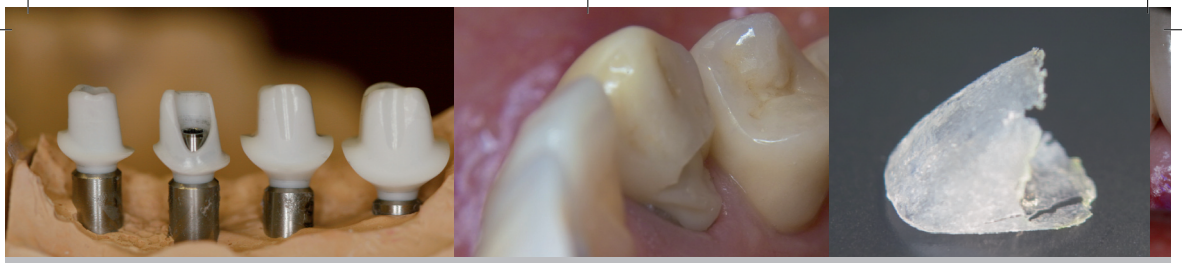
3.2 Adhesion on customized standard abutments with reduced surfaces

In order to test the usage case of subsequently customized abutments, the size of the standard abutments used was reduced by shortening these by 1.5 mm (original length approx. 6 mm). This corresponds with a reduction in the length of approx. 30% and of the surface contributing to the adhesion by approx. 40%. In Table 3 the adhesive forces of both cements for the customized abutment are compared.

Under these conditions, a mean adhesive force of approx. 63 N is achieved for implantlink® semi Forte, while in the case of implantlink® semi Classic, only approximately one third of the force is required to remove the superstructure. Although the adhesive force for implantlink® semi Classic is still significantly over the minimal force of 5 - 7 N discussed in the literature (Botega 2004/ Strub 1999), this may not be optimal for the high load to which, for example, anterior dental implants are exposed. With a 3-fold higher adhesion, implantlink® semi Forte is more suitable in this case. The result confirms emphatically how important choosing the right cement is, depending on the abutment situation.

	implantlink® semi Classic***	implantlink® semi Forte***
Mean value	21,5 N	62,6 N
Standard deviation	9,3 N	24,2 N

Table 3: Adhesive forces of gold superstructures on titanium abutments with abutments shortened by 1.5 mm; *** (Detax 2011)



4. Determination and Comparison of the Compressive Strength under EN ISO 9917

For optimal cementing, the compressive strength, as a measure of the chewing stability, is also of particularly great significance. Because the chewing pressure is distributed over the cemented surface, a high compressive strength is important, even for reduced surfaces. The compressive strengths were measured in accordance with DIN EN ISO 9917 and the details are to be found under Point 11.2.

Table 4 shows the mean compressive strengths, C [MPa], of the various temporary implant cements and the respective standard deviations from the mean value. It appears that TempBond NE exhibits the lowest compressive strength (6.76 MPa). Next in line are implantlink® semi Classic, with 85.34 MPa, implantlink® semi Forte, with 103.8 MPa and Premier Implant Cement, with 257.8 MPa, mean compressive strengths (Fig. 4).

A similar performance as that for the adhesive forces is apparent in the compressive strengths. Premier Implant Cement has a very high compressive strength, which cor-

	implantlink® semi Classic*	implantlink® semi Forte**	TempBond NE*	Premier Implant Cement**
Mean value	85,34 MPa	103,8 MPa	6,76 MPa	257,8 MPa
Standard deviation	5,88 MPa	6,2 MPa	2,07 MPa	29,02 MPa

Table 4: Mean compression strengths and standard deviations of various temporary implant cements;
* (Quooss 2009); ** (Quooss 2011)

responds with permanent cements, while TempBond NE exhibits an exceptionally low strength. In comparison with other temporary cements, implantlink® semi Classic attains very high values. The compressive strength of implantlink® semi Forte has been markedly increased in comparison with this (85.3 MPa to 103.8 MPa, approx. 21.7 %), in order to facilitate the stability of the bonds during chewing, even under difficult conditions. The characteristics of implantlink® semi Classic and Forte are balanced such that a high stability is achieved and removal without damage is still possible.

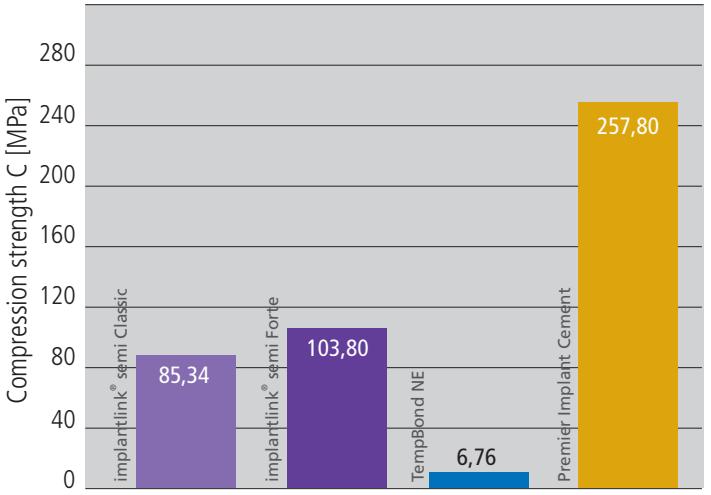
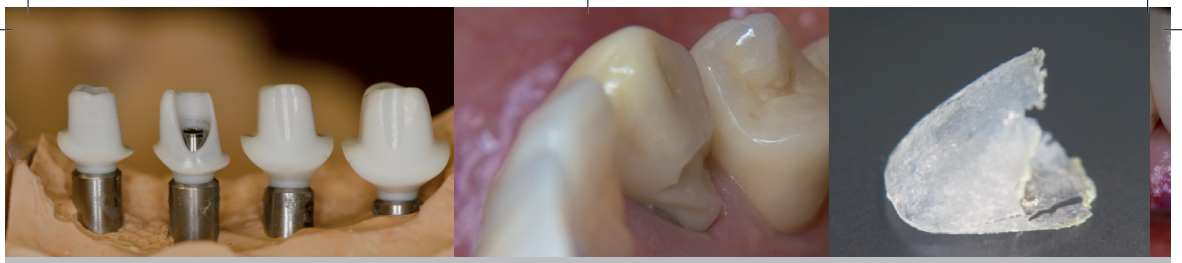


Fig. 4: Mean compression strength C [MPa] of various temporary implant cements, * (Quooss 2009); ** (Quooss 2011)



5. Determination and Comparison of the Film Thickness under EN ISO 9917

The fitting or the clearance of the cement gap have a great influence on the adhesion between the abutment and the superstructure. The larger the gap clearance, the poorer the adhesion.

In combination with large gap clearances, cementing can partially loosen due to chewing loads; bacteria can colonize the gap and this may even result in the complete loss of the superstructure (Behr 2008).

The film thickness was measured in accordance with EN ISO 9917 and details can be found under Point 11.3.

	implantlink® semi Classic*	implantlink® semi Forte**	TempBond NE*	Premier Implant Cement**
Film thickness	0,008 mm	0,007 mm	0,009 mm	0,010 mm
Standard deviation	0,0007 mm	0,0007 mm	0,0008 mm	0,0007 mm

Table 5: Film thicknesses of the cements in accordance with EN ISO 9917; * (Quooss 2009); ** (Quooss 2011)

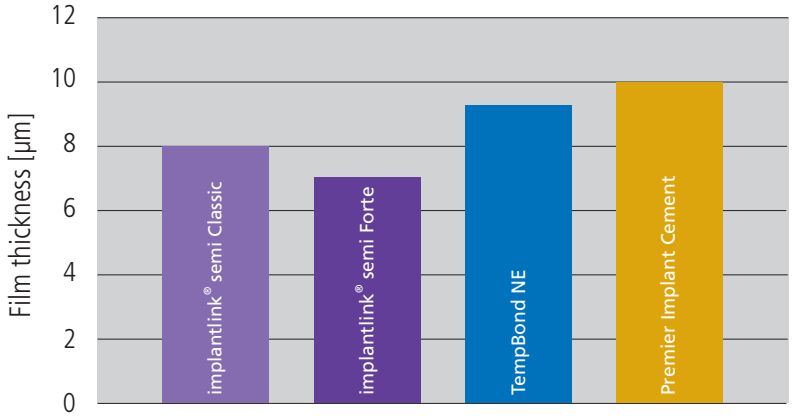


Fig. 5: Mean film thicknesses of various temporary implant cements; * (Quooss 2009); ** (Quooss 2011)

The film thicknesses of the cements are shown in Table 5. It is apparent that implantlink® semi Classic and Forte, with a mean film thickness of 8 µm and 7 µm, exhibit the narrowest film thicknesses. Then follows TempBond NE, with 9 µm, and Premier Implant Cement, with a 10 µm mean film thickness (Fig. 5). The very narrow film thicknesses that were determined for implantlink® semi Classic and Forte enable minimal cement gap clearances and provide an optimal fit and a secure bond.

6. Gingival Management

The high crosslink density of the cement material prevents the infiltration of bacteria and bulging or loosening of the cement, whereby irritations and odor formation, even over longer wearing periods, can be prevented. How bacteria-proof the cement is can be seen on the internal mucosa in Fig. 6, which has begun to adhere directly to the edge of the removed zirconium dioxide crown within the first four months of wearing. The small blood vessels opened on removal clearly show this. The adhesion of the vessels to the internal mucosa exhibit a bacteria-proof cement film after this period (Blesch 2010).

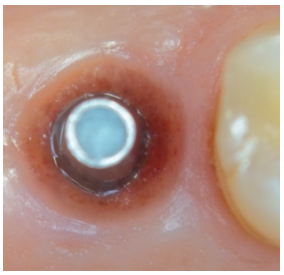
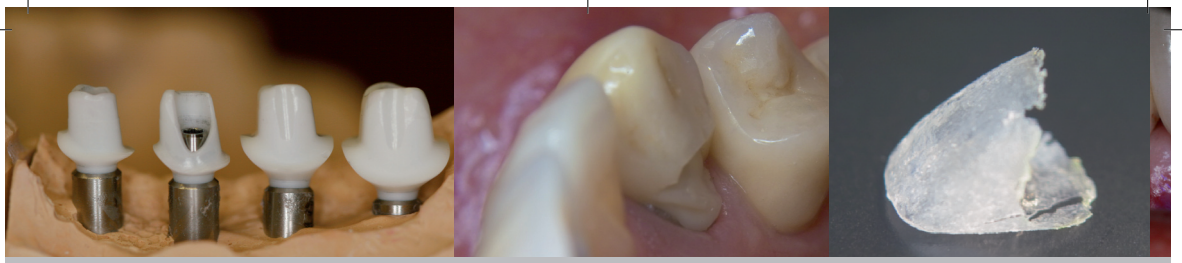


Fig. 6: Internal mucosa after the first four months' wear

7. Removal

The customary aids (e.g. crown remover), instruments (e.g. crown buttler) and appliances (Corona Flex – KaVo) available in any practice may be used to remove the superstructures again. One to two uses of the crown buttler is adequate, as a rule, to be able to remove crowns. Even "crown removal forceps" with interchangeable silicone jaws can be used. In particular cases, the crown can be "embedded" in an acrylate matrix.



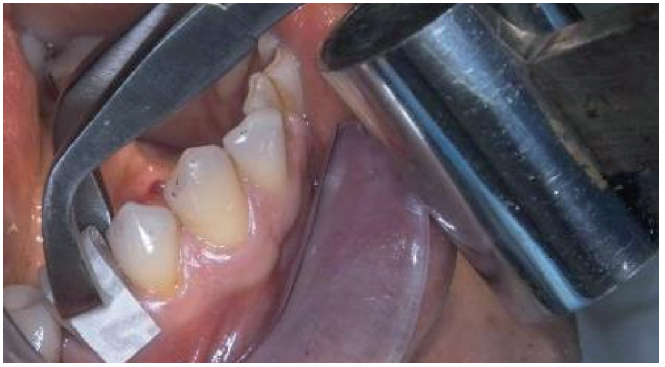
The superstructure can then be loosened from the abutment in this protective mold using forceps, etc. Using loops slid between the abutments is recommended for bridges.

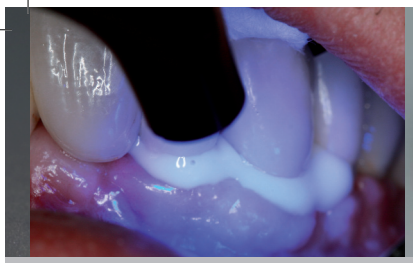
A very thin, hard layer of adhesive will remain behind on the various abutments and in the lumina of the crowns. The remains of the adhesive material can be removed easily, quickly, residue-free and extensively as a thin film.

This is not only the case for implantlink® semi Classic (Hoelzer 2010) but was also confirmed for implantlink® semi Forte, using the example of crowns and bridges (Söhnel 2011).

8. Toxicology

implantlink® semi contains components that, in terms of their toxicology, are classified as acritical. This is also confirmed in the toxicology tests carried out in accordance with ISO standards. The cytotoxicity test (L929 MEM Elution Test, ISO 10993-5) was passed without biological reactivity, likewise the systemic toxicity test (ISO 10993-11). The tests for sensitization (according to Kligman, ISO 10993-10) and irritation (ISO 10993-10) also showed no evidence of a sensitizing or irritant effect.



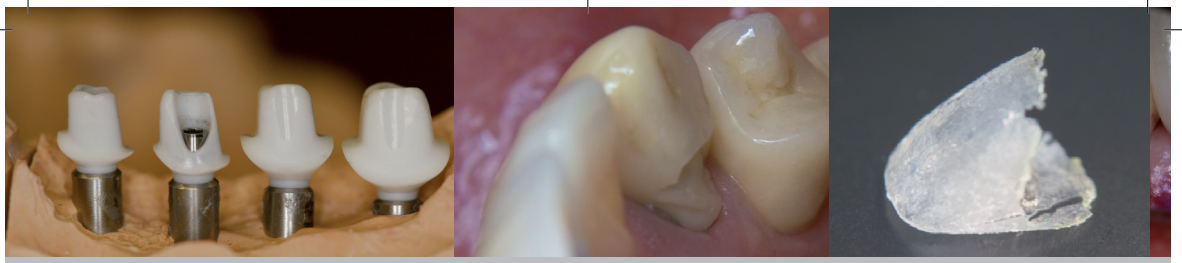


9. Technical Data for implantlink® semi Classic and Forte

Characteristics	implantlink® semi Classic	implantlink® semi Forte
Mixing volume	5 ml (mini-mix)	5 ml (mini-mix)
Mixing ratio	4:1	4:1
Colour code	base: white-opaque catalyst: semi-transparent	base: white-opaque catalyst: semi-transparent
Resistance to displacement	low	low
Working time	80 sec.	80 sec.
Gel phase (removal of residues)	2 - 3 min.	2 - 3 min.
Setting time in the mouth	5 - 6 Min.	5 - 6 Min.
Setting time with light curing	approx. 20 sec. per surface	approx. 20 sec. per surface
Compressive strength	**approx. 85 MPa**	**approx. 100 MPa**
Film thickness	< 10 µm	< 10 µm

implantlink® semi Classic: For all regular cases, where a normal adhesion should be expected;

implantlink® semi Forte: For all cases, where a low adhesion should be expected (e.g. small or customized abutments).



10. What Users Say

"The low-viscosity cement can be introduced and distributed quickly with the tip of the tapered mixing cannula. The cement does not drip and sets slowly enough so that one can also insert several crowns in one jaw with appropriate drying, which relieves the operator considerably!

Should the reconstruction be removed for control or other purposes, the cement residues can be removed very easily, almost in one piece. After short disinfection, the reconstruction can be fastened again with very little effort."

Dentist Andreas Blesch, Karlsruhe

"With implantlink® semi, a new luting cement that takes account of this circumstance is at last available. The crown is cemented firmly, but can be removed relatively easily. To this extent implantlink® semi is a valuable addition to the range of dental aids and a successful innovative cementing material. It clearly makes implant treatment safer."

Dr. med. Dietrich Münchgesang, Karlsruhe

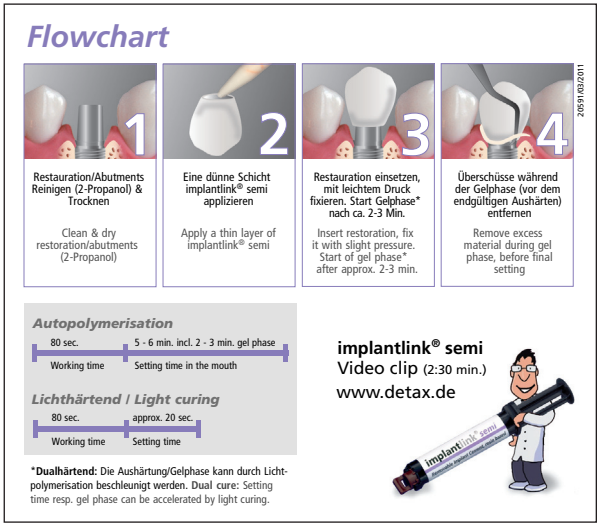
Video Clip!
"the basics
in 2:30 min."
www.detax.de/en/implantlink/clip

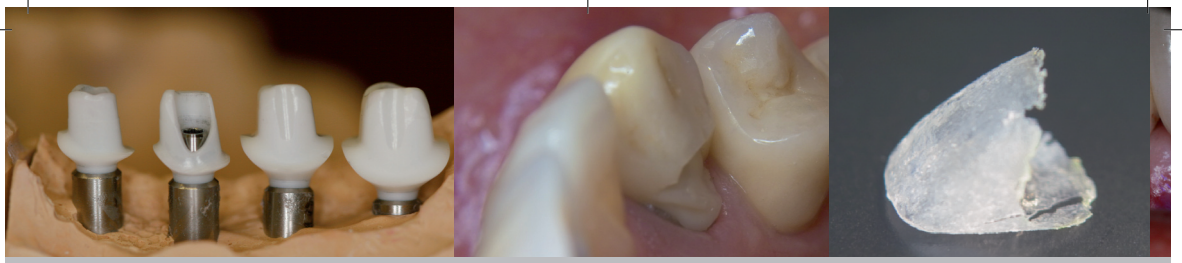
"The consistency (flowability) of the mixed material guarantees a fine restoration or joint gap even at low insertion pressure. However the possibility of controlled initiation of the gel phase of the surpluses by means of light (in each case 20 seconds vestibular and oral) and the directly resulting possibility of fast and easy cleaning must be emphasized especially. Since the pre-cured surpluses can be peeled off practically completely, there is scarcely any risk of overlooking residues of the cement in the critical subgingival region.

The comparatively easy ability to remove implant crowns cemented with implantlink® semi is also especially convincing. Crowns could be removed with one or two applications of the Crown Butler. A very thin and hard cement layer on the different abutments and in the lumina of the crowns was very impressive.

Altogether, implantlink® semi has convinced us that we don't want to be without it in the future."

Dr. med. Beyer, Mannheim





implantlink® semi Forte

"From the practitioner's point of view, the consistency of the material is felt to be just right and the processing time is entirely sufficient to fill the bridges and to place these on the abutments.

The extrusion during use was not disagreeable; the material flowed out to all edges of the crown as desired, without hardening or collecting subgingivally in a thin film.

With the usual, customary force for removing a bridge from the abutments you can feel the resistance of the material and the construction was able to be easily removed after a second try. Removal was found not to be too difficult and is, in terms of the pressure, comparable with that used for TempBond NE.

Cleaning the bridge and the crown proved quick and simple, since pieces of the same size were able to be removed without leaving little bits, and so it was found to be very pleasing."

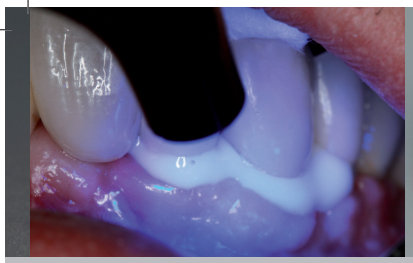
Dentist Söhnel, University of Greifswald
(Söhnel 2011)

Dental Advisor

"implantlink semi was evaluated by 23 consultants in 185 uses. This product received a 91% clinical rating.

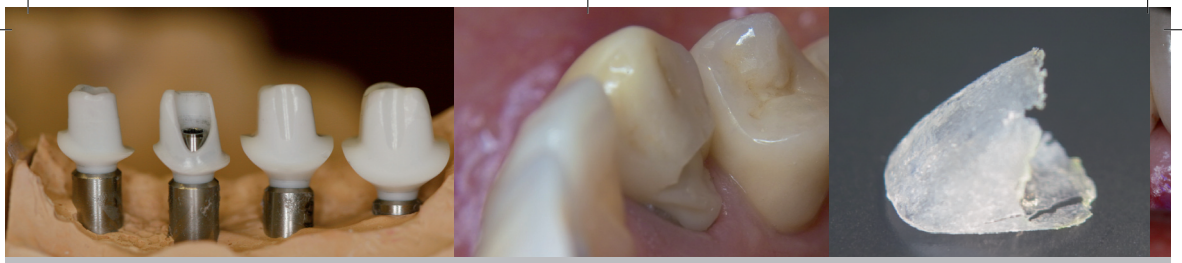
Forty-four percent of consultants reported that implantlink semi was better than their current temporary cement and 35% reported that it was equivalent. Seventy percent would switch to implantlink semi and 78% would recommend it."

The Dental Advisor



03092 **Classic Standard packing**
5 ml cartridge mini-mix
10 mixing cannulas, brown, 4:1
1 flowchart

03371 **Forte Standard packing**
5 ml Kartusche mini-mix
10 mixing cannulas, brown, 4:1
1 flowchart



11. Description of the Measurement Methods

* Extract from "Materials scientific analysis of temporary cements" (Department of Dental Medical Propedeutics/Community Dentistry, Dental Clinical Centre, Ernst-Moritz-Arndt University, Greifswald) 1/2009 and 2011

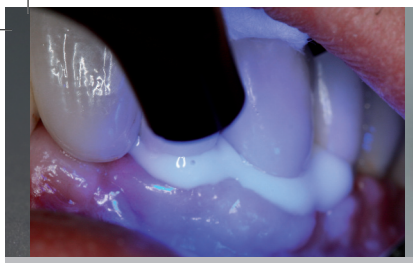
11.1. Adhesive force*

The implant analogs with screw-fastened abutments and superstructures were cleaned with isopropanol, rinsed with deionized water and lightly blown dry. Within 60 seconds after the end of mixing, the superstructures were filled completely with the temporary implant cement and brought onto the abutments. The superstructures were pressed with a continuous pressure of 20 N onto the abutments with the aid of a loading device, excess cement surpluses swelling out were removed. After 60 minutes the specimens were stored for a period of 23 h ± 0.5 h in 37°C ± 1°C warm deionized water.

The implant analogs with the screw-fastened abutments and the cemented superstructures were clamped individually in the spe-cially fabricated specimen holder and transferred to the universal test machine. The superstructure is locked with an eye on the upper force transducer (1 kN force sensor). After clamping of the individual specimens, the superstructures were pulled off from the abutment slowly with a speed of 1 mm/min. After the adhesive force examinations the superstructures were cleaned and newly cemented. All tests were performed without the use of additional separating agents.

11.2. Compression strength *

The mold, the object carriers as well as the screw clamps were conditioned to 23°C ± 1°C and cleaned with isopropanol. Within 60 seconds after the end of mixing, the mixed cement was filled with a slight surplus into the mold. A cellulose acetate foil as well as an object carrier were placed on the top and bottom of the filled mold and all was clamped in a screw clamp. The spe-

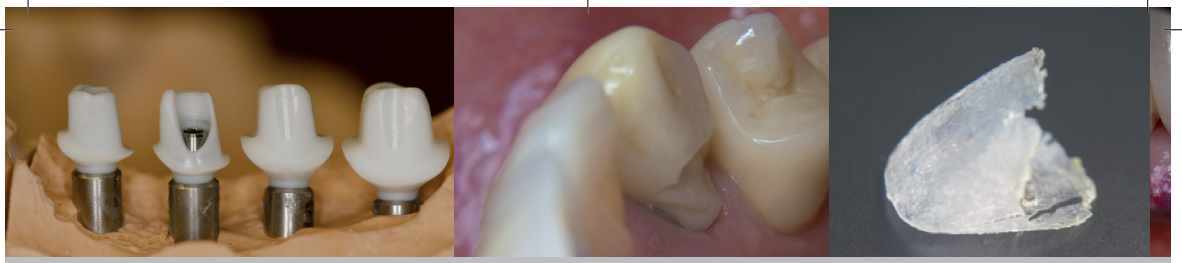


cimens were then stored for 60 minutes in a warming box at 37°C ± 1°C at a relative humidity of at least 30%. The screw clamp, the object carriers as well as the foils were then removed and the ends of the specimens were sanded with wet sandpaper (grain size 400). The specimens were removed from the mold directly after surface preparation, examined for air bubbles or chipped edges by a visual test and stored for 23 h ± 0.5 h in 37°C ± 1°C warm, deionized water. Defective specimens were rejected.

The mean diameter of the specimens was determined and noted from two measurements accurate to 0.01 mm at a right angles to one another by means of digital micrometer screw. Moistened filter paper was placed between the two rams of the universal test machine. A new filter paper was used for each measurement. A continuous force was applied on the longitudinal axis of each individual specimen with a speed of 0.75 mm/min., until this burst under the load at a maximum force (F_{max}). The tests and the relevant test reports were saved. The compression strength can be calculated from the individual mean specimen diameters and the relevant maximum force with the following formula:

$$C = \frac{4 F_{max}}{\pi d^2}$$

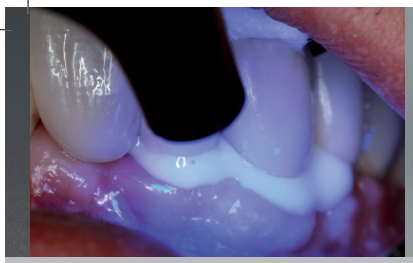
C	compression strength
F_{max}	the greatest applied force in Newton (maximum force [N]
D	diameter of the specimen, in millimeters



11.3. Film thickness*

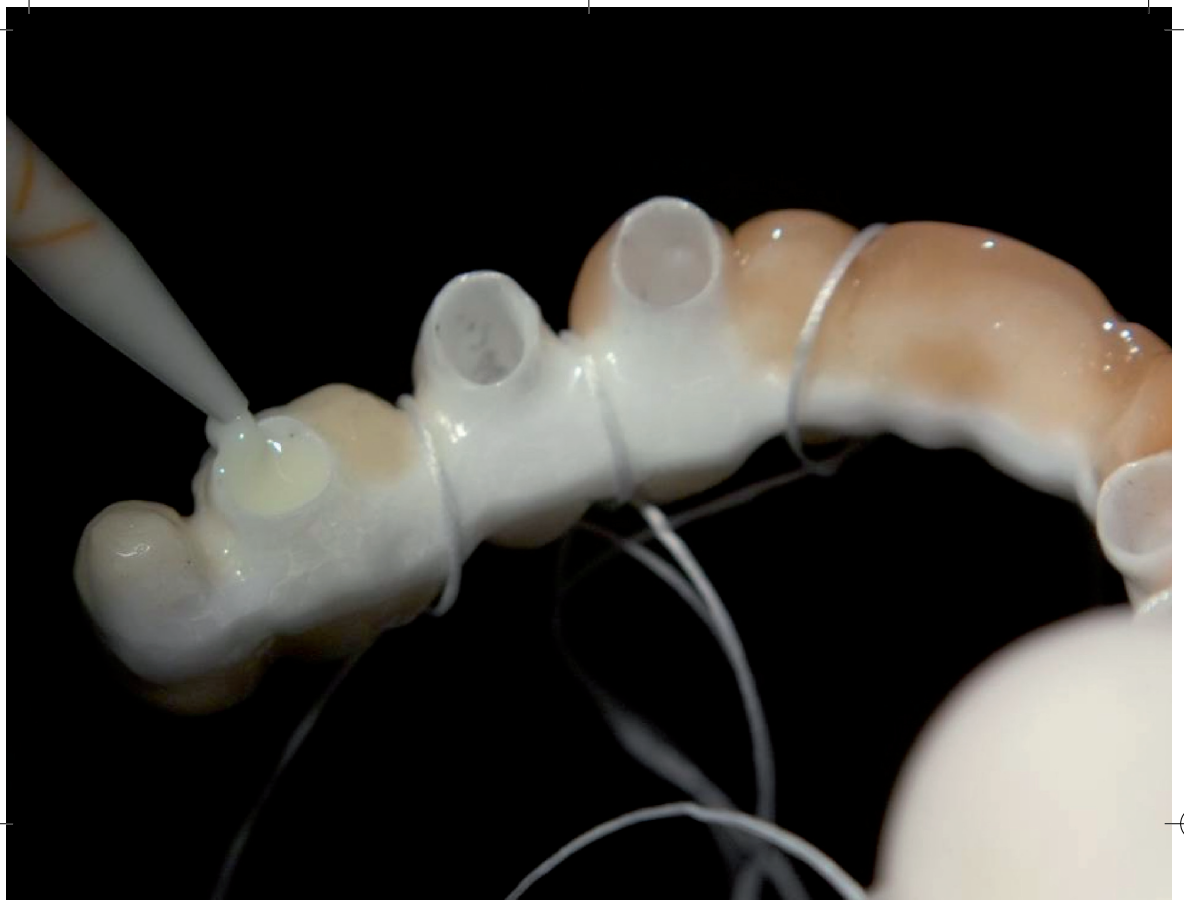
The glass plates were cleaned with isopropanol, then rinsed with deionized water and lightly blown dry. Two glass plates were placed above one another and their thickness measured accurately to 1 µm with the aid of the digital micrometer screw. The determined value is designated as measurement A. The upper glass plate was removed and the mixed implant cement applied by means of cannula to the lower plate. The upper glass plate was placed back on the lower plate with the cement in the same alignment as in the determination of measurement A. The specimen was then placed centrally between the ram of the universal test machine (Zwick Z050/THA3).

Ten seconds before the end of the working time stated by the manufacturer, a force of 150 ± 2 N was applied with 20 N/s, vertically and centrally above the upper glass plate and the cement located below. Here it had to be ensured that the cement fills the intermediate space between the glass plates completely and the upper plate does not move. After 10 minutes application of a controlled force of 150 ± 2 N, the plates were removed from the universal test machine and the combined thickness of the two glass plates and the cement film located between them was measured with the aid of the digital micrometer screw.



12. Sources

1. Behr, M.; Deutsche Zahnaerztliche Zeitschrift 63, 160 (2008)2.
2. Blesch A.; Dental Barometer 2/2010, 29 (2010)
3. Botega D.M.; Mesquita M.F.; Herniques G.E.P.; Vaz L.G.; J. Oral Rehabilitation 32, 884 (2004)
4. Clayton G.H.; Driscoll C.F.; Hondrum S.O.; Int. J. Oral & Maxillofac. Impl. 12, 660 (1997)
5. Covey A.D.; Kent D.K. St. Germain Jr. D.K.; Koka S.; J. Prosth. Dent 83, 344 (2000)
6. Felton D.A.; Int. J. Maxillofac. Impl. 14, 138, (1999)
7. Fröhlicher R.R. and Mueller P.S.H.; Dissertation for the University of Berne (2010)
8. Hoelzer S,; BDIZ EDI konkret 122 (2010)
9. Lee D.-H.; Suh K.-W.; Ryu J.-J.; J. Kor. Prosthodont 43, 280 (2008)
10. Quooss A.; Kordaß B. ; "Werkstoffkundliche Untersuchungen an temporaeren Zementen" (Dept. of Dental Propaedeutics / Community Dentistry, Center for Stomatology, Ernst-Moritz-Arndt University of Greifswald) 2009
11. Quooss A.; Kordaß B.; "Werkstoffkundliche Untersuchungen an temporaeren Implantatzementen im Vergleich" (Dept. of Dental Propaedeutics / Community Dentistry, Center for Stomatology, Ernst-Moritz-Arndt University of Greifswald) 2011
12. Rist K.; Schnurr T.; Salz U.; Abstract IADR Conference, Barcelona (2010)
13. Strub J.R.; Türp J.C.; Witkowski S.; Huerzeler M.B.; Kern M.; Curriculum Prothetik, vol. 3: Kombinierte and abnehmbare Prothetik, Implantologie, Nachsorge, Psychologie. 2nd ed. Berlin, Chicago, London, Paris, Barcelona, Sao Paulo, Tokyo, Moscow, Prague, Warsaw: Quintessenz (1999)
14. Squier R.S.; Agar J.R.; Duncan J.P.; Taylor T.D.; Int. J. Oral & Maxillofac. Impl.16, 793 (2001)
15. Söhnel S.; "In vitro Materialtestung implantlink® semi forte" Center for Stomatology, Ernst-Moritz-Arndt University of Greifswald) 2011
16. Wolfart M.; Wolfart S.; Kern M.; Int. J. Oral & Maxillofac. Impl. 21, 519 (2006)



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