

DENTOTEMP

TEMPORARY CEMENT

WHITE PAPER



Product description

DENTOTEMP is a non-eugenol elastic self-cured cement for long term temporary application.

Function	Composition
Base monomer	Bis-GMA
	TEGDMA
	HEMA
Filler	Fumed silica
Filler / Radiopacifier	Zirconium oxide
	Others

Main advantages:

- Radiopaque
- Eugenol-free
- High elasticity
- Two-stage cure for an easy excess removal (gel phase)
- Self-cured
- Good marginal seal
- Perfect balance of performances: retention / retrievability
- Easily removed from the restoration without crumbled cement

Indications

DENTOTEMP is intended for:

- Cementation of permanent crowns and bridges on implant abutment
- Long-term temporary restorations
- Implant-retained crowns that may require future removal

Properties

The “ideal” implant cement would provide secure retention to prevent loosening during normal service and retrievability when needed without damaging the tissue interface, abutment or restoration. It would also provide high marginal seal and high elasticity to compensate the loss of the periodontal ligament. This can reduce the phenomenon of implant abutment screws loosening up under the repeated occlusal stresses. [1]

In normal denture, the teeth are connected to the bone by an elastic periodontal ligament whereas implants are locked into the bone by osseous integration.

The rigid connection between the implant and the bone does not enable the absorption of occlusal forces, which leads to loosening of the screw connecting the abutment to the implant. With natural denture, those force are absorbed by the periodontal ligament.

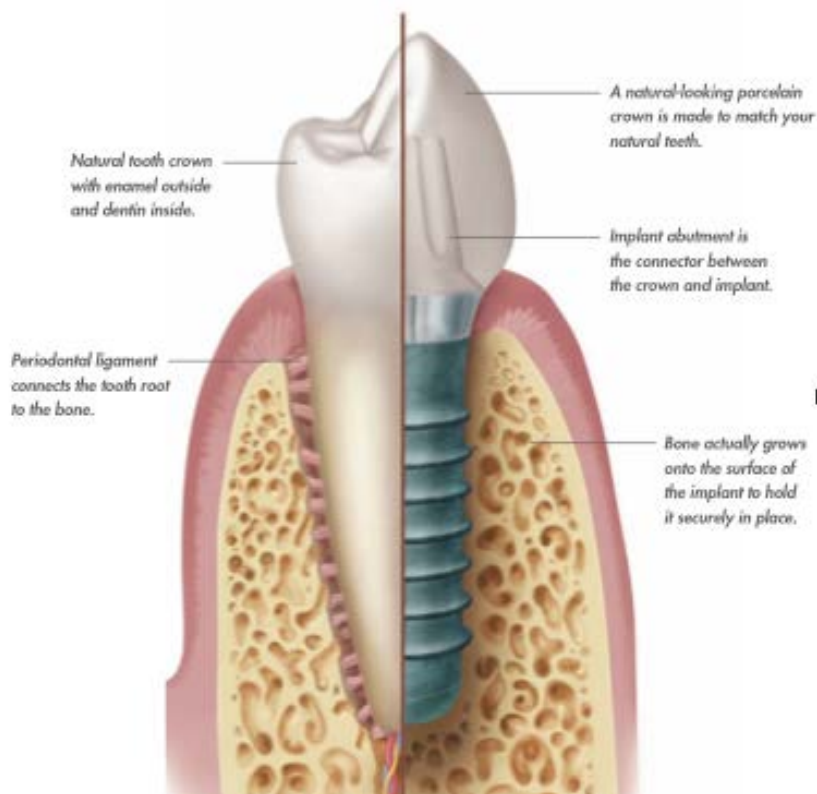


Figure 1 - Periodontal structure for a natural tooth (presence of periodontal ligament) and in case of implant [2]

DENTOTEMP was designed especially with a high elasticity to address this matter, absorbing shock and flexing under daily occlusal stresses to resist breaking down. As a result, the abutment screws have a much lower tendency to become loose. DENTOTEMP mechanical retention provides secure retention when required and retrievability when needed for retreatment or adjustments.

Clinical Evaluation Study [1]:

- Dentists panel: 9 (worldwide)
- Clinical cases: 344

Evaluation criteria:

- Easy removal of implant retained restoration
- Secure retention
- Viscosity
- Setting time

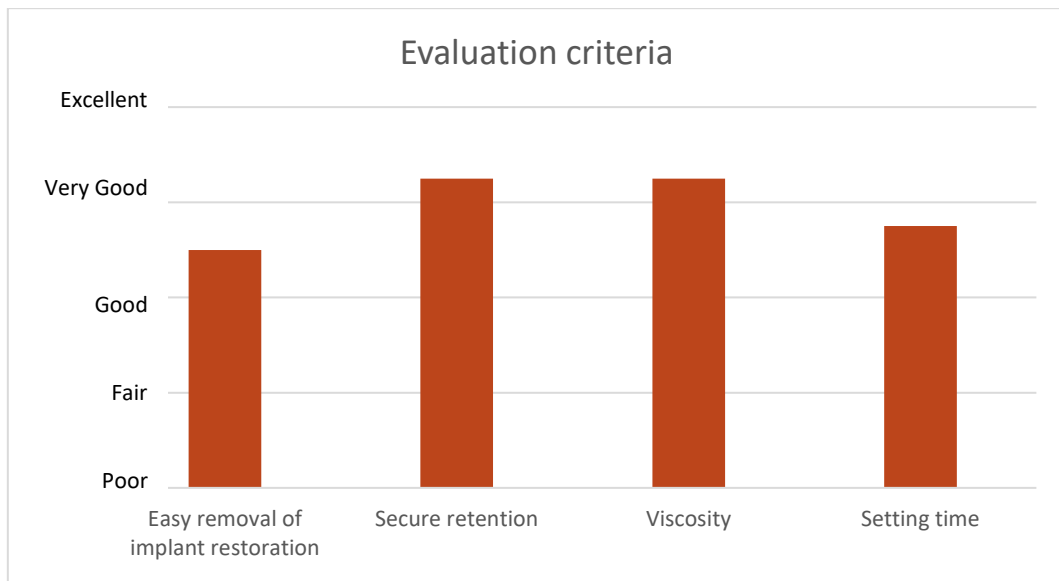


Figure 2 - DENTOTEMP key features evaluation [1]

DENTOTEMP is considered as good or very good for all expected clinical criteria regarding the implant-retained restoration.

Solubility:

DENTOTEMP offers a high tightness due to its low water sorption and low water solubility properties.

Water sorption	35.4 $\mu\text{g}/\text{mm}^3$
Water solubility	5.1 $\mu\text{g}/\text{mm}^3$

Table 1 - Properties in water [1]

Curing:

DENTOTEMP is a self-cured cement.

Initial setting time at 37°C	2.0 – 2.5 min (gel phase)
Final setting time at 37°C	4.0 – 5.0 min

Table 2 - DENTOTEMP setting times [1]

It features an initial gel phase in 2.5 minutes for an easy removal of excess cement and a rigid final-set in four to five minutes.

Other technical data:

Data	Value [1]
Flexural strength	60 MPa
Radiopacity	150 %Al (ISO 4049:2009)
Shrinkage	2.5 %
Film thickness	10 µm (ISO 4049:2000)
Working time at 23°C	1.5 – 3.5 min

The high radiopacity of Dentotemp facilitates the detection of possible cement residues at subgingival area.

Product Performances / MARKET

Other properties:

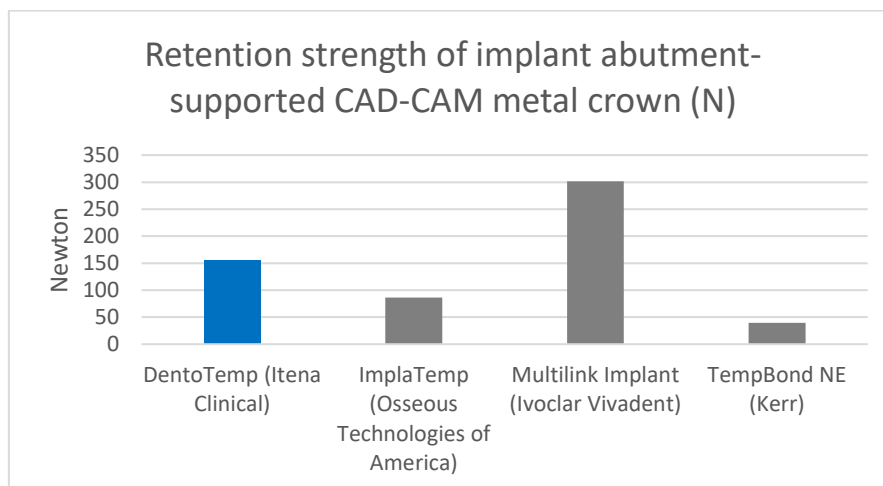


Figure 3 - Retention strength of implant abutment-supported CAD-CAM metal crown (N). [3]

DENTOTEMP offers the advantages of retrievability and adequate retention at the same time. The product is recommended as a semi-permanent cement.

On the other hand, Multilink Implant shows a very high retention value and hence, can be recommended when permanent cementation of implant-supported restoration is mandatory without retrievability.

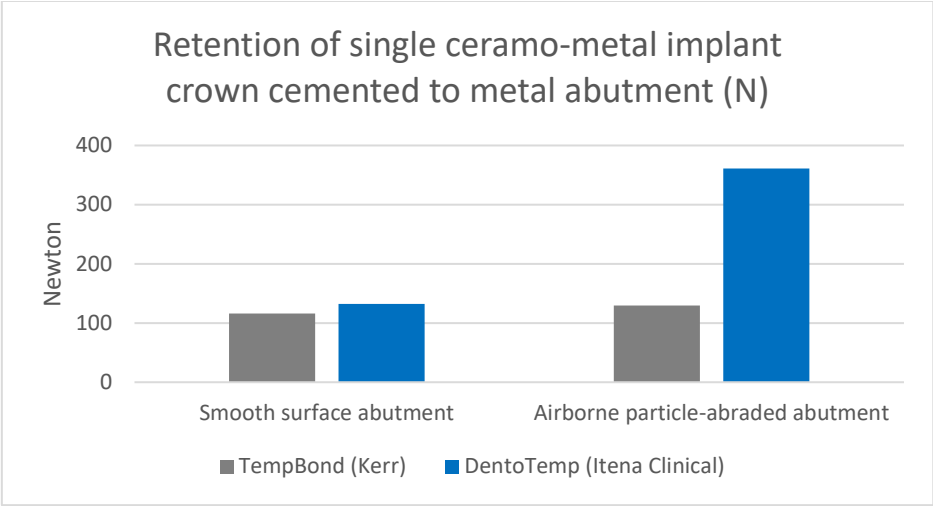


Figure 4 - Tensile bond strength of single ceramo-metal implant crown cemented to metal abutment with or without air abrasion of the surface (N). [4]

DENTOTEMP provides higher retentive value than TempBond. This trend is true on smooth surface abutment and is more important after air abrasion of the abutment metal surface.

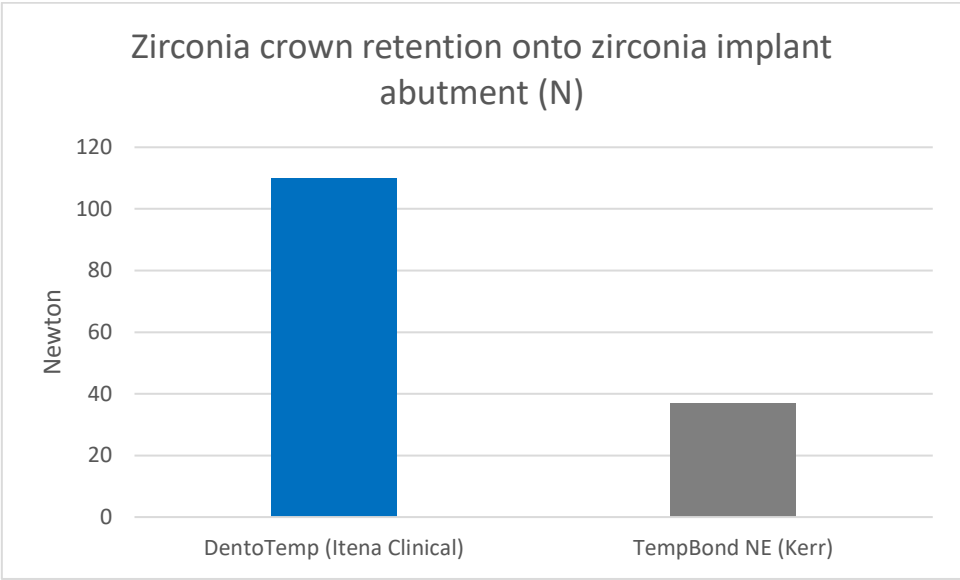


Figure 5 - Comparison of zirconia crown retention onto zirconia implant abutment (N). [5]

DENTOTEMP has higher retention on zirconia/zirconia interface than TempBond NE and is recommended for zirconia crowns.

In cement retention, the risk of leaving excess cement in the peri-implant sulcus is a possible cause for peri-implantitis. Excess cement may act as a mechanical irritant or as a proliferation growth area for bacteria.

Peri-implantitis is an inflammatory condition that leads to the destruction of osteo-integrated implant supported tissues such as alveolar bone. Peri-implantitis is associated with a polymicrobial biofilm that is similar with the microflora in tooth sites. *Prevotella intermedia* and *Fusobacterium nucleatum* are two of the periodontopathogenic bacteria responsible for the progressive destruction and inflammatory disease.

Below, the concentration of bacteria within the broth was estimated by measuring optical density (OD) at 600 nm in a spectrophotometer. OD₆₀₀ measurement directly correlates with the concentration of bacteria in a liquid culture.

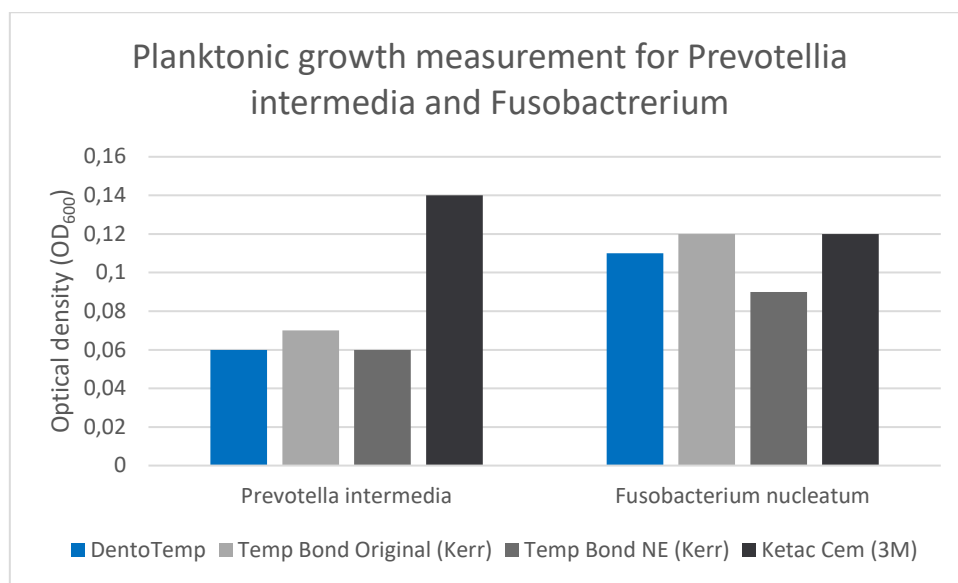


Figure 6 - Bacteria growth measurement for *Prevotella intermedia* and *Fusobacterium* [6]

DENTOTEMP and Temp Bond NE display the same level of *Prevotella intermedia* growth and are less favorable to its development than Temp Bond Original and Ketac Cem.

DENTOTEMP promotes lower *Fusobacterium nucleatum* growth than Temp Bond Original and Keta Cem.

Scientific Literature data:

[1] Itena's R&D internal test report.

[2] Jason J. Hales. Why is it better to save a natural tooth?. Theendoblog.com. December 2012

[3] Pinar Gultekin, et al. Cement selection for implant-supported crowns fabricated with different luting space settings. May 2012

[4] Jasvinder Jugdev, et al. The effect of air abrasion of metal implant abutments on the tensile bond strength of three luting agents used to cement implant superstructures: an in vitro study. 2014

[5] Pinar Gultekin, Umut Cakan. Effect of methacrylate-based resin cements on tensile bond strength of zirconia copings on zirconia abutments. January 2018

[6] Nur Balci, et al. In vitro evaluation of planktonic growth on experimental cement-retained titanium surfaces. 2016

[7] Sorin Mihali, et al. Nano-ceramic particle reinforced composite-Lava Ultimate CAD/CAM Restorative. 2013