

Physical Properties of Temporary Cements Indicated for Cementing Implant-retained Abutments

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INTRODUCTION

- The most desirable parameters of “ideal” Implant cement are: secure retention, retrievability when needed, low solubility, high marginal seal and high elasticity.
- It will also be desirable if the cement will compensate with its high elasticity for the missing periodontal ligament. This can reduce the phenomenon of implant abutment screws loosening up under the high occlusal forces.
- In this study we measured some of the most indicative parameters in order to estimate how close are the tested cements to the so-called “ideal” cement.

OBJECTIVE

The purpose of this study was to compare the physical properties of temporary cements and implant cements, all of which are indicated for cementing fixed restorations on implant-retained abutments.

METHODS

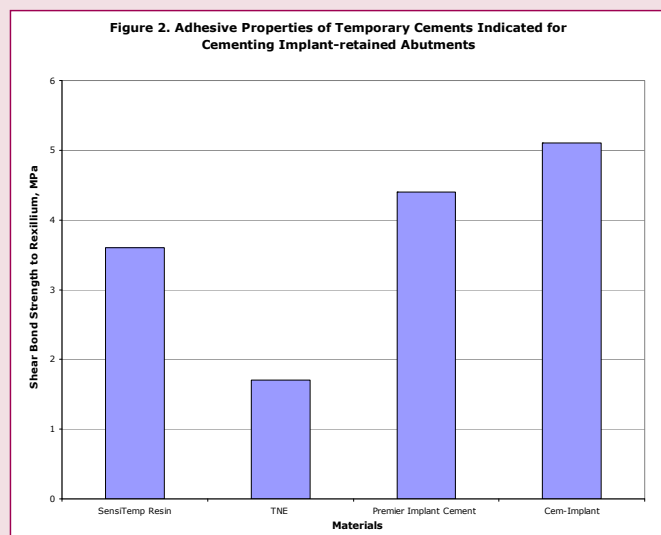
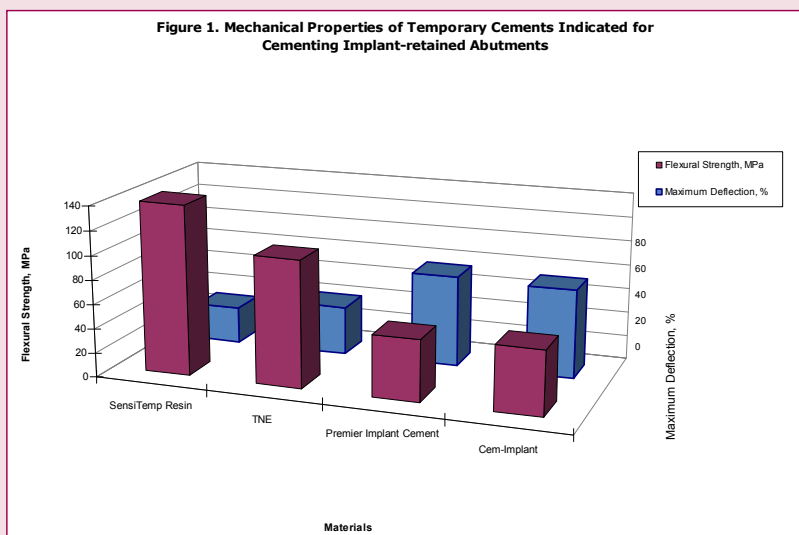
- 2 temporary cements:
 - SensiTemp Resin (Sultan Chemist),
 - TNE (Temrex)
 - and 2 Implant cements:
 - Premier Implant Cement (Premier Dental),
 - Cem-Implant (BJM)
- were tested under the same conditions.
- A variety of tests were used to evaluate the cements properties:
 - flexural strength [FS] (ISO 4049),
 - water sorption [WS] and solubility [SL] (ISO 4049),
 - shear bond strength [SBS] (ISO/TS11405).
 - The experimental results were analyzed statistically (N=10) by ANOVA (p<0.05).

RESULTS

- Test results are presented in the following table and figures.

Table 1. Physical Properties of Temporary Cements Indicated for Cementing Implant-retained Abutments

Material	FS, MPa	Maximum deflection, %	SBS, MPa			Water sorption, µg/mm ³	Solubility, µg/mm ³
			Rexillium	Titanium Nitride	Zirconium		
SensiTemp Resin	140.0±9.5	30±2	3.6±0.8	2.5±0.5	N/A	38.6	≤ 7.0
TNE	104.0±10.7	40±4	1.7±0.5	2.3±0.4	N/A	13.2	≤ 7.0
Premier Implant Cement	50.1±1.2	75±2	4.4±1.2	2.0±0.3	N/A	37.5	≤ 7.0
Cem-Implant	52.4±1.7	73±2	4.0±1.0	1.6±0.5	N/A	36.9	≤ 7.0



DISCUSSION

- Water Sorption and Solubility for all groups were found to be within ISO 4049 specification.
- Higher flexural strength combined with lower deflection was measured for temporary cements group than these demonstrated by two implant cements.
- Shear Bond Strength to Rexillium[®] alloy was higher for two implant cements than for temporary cements, but low enough for all groups to deliver easy retrievability when needed.
- Shear Bond Strength values to Titanium Nitride and Zirconium were extremely low due to high surface finish and lack of defects of the substrates resulted in the lack of mechanical retention.

CONCLUSION

- Premier Implant Cement and Cem-Implant exhibited the lowest flexural strength and higher deflection, which is critical in-order to guarantee their retrievability.
- Adhesion and water sorption results correlated with elasticity results providing possible secure retention of restorations on implant-retained abutments.

FUTURE WORK AND RECOMMENDATIONS

- We will design series of tests to evaluate the retention of crowns to the various types of abutments utilizing different cements.
- The tests will simulate the clinical retention instead of the routinely measuring indirect physical parameters like SBS, flexural strength, etc.