

COMPETITIVE COMPARISON

TheraCal LC[®]

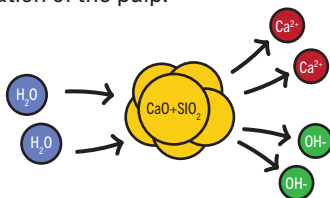
Resin-Modified Calcium Silicate Pulp Protectant/Liner

VS

Glass Ionomers/ Resin-Modified Glass Ionomers

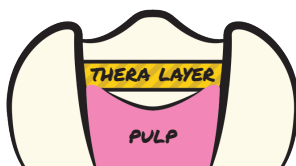
1 Calcium Release

TheraCal LC's calcium release^{1*} stimulates hydroxyapatite and secondary dentin bridge formation that leads to a protective seal and insulation of the pulp.^{2,3}



2 Direct Pulp Capping

TheraCal LC is indicated as a direct pulp capping material and as a liner. TheraCal LC generates an alkaline pH that promotes healing and apatite formation.^{2,4}



3 Easy Syringe Delivery

TheraCal LC's easy and fast syringe delivery offers controlled and precise placement in all deep cavity preparations on moist dentin. TheraCal LC is easy to manipulate without running or slumping and its light-cured ability permits immediate placement of a restorative material.

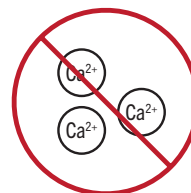


4 Save a Step! Save \$! Save Time!

With TheraCal LC, there is NO need for two separate products. TheraCal LC can be directly applied to the pulp exposure and be used as a liner in the same prep. Save a step! Save \$! Save Time!

No Calcium Release

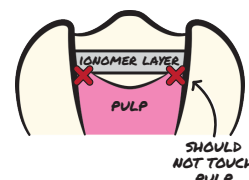
Glass ionomers and resin-modified glass ionomers have fluoride release but do not contain or release calcium.



Not For Direct Pulp Capping

There are several studies that suggest resin-modified glass ionomers should not be used directly on the pulp, as it can be cytotoxic which is frequently attributed to HEMA (unpolymerized monomers).^{5,7,8,9,10}

Studies also show that glass ionomers should not be used directly on the pulp, as the material's initial acidity may generate damage and its fluoride release has cytotoxic effects on the pulp.^{6,9}



Manual Mixing

Glass ionomers or resin-modified glass ionomers typically require manual mixing, trituration or a special dispenser.



More Steps. More \$. More Time.

When performing a sandwich technique, calcium hydroxide or MTA would be placed directly to a pulp exposure prior to placing the liner or base with a glass ionomer or resin-modified glass ionomer material.

* Bisco has, on file, the calcium release data for TheraCal LC.

1. Gandolfi MG, Siboni F, Prati C. Chemical-physical properties of TheraCal, a novel light-curable MTA-like material for pulp capping. International Endodontic Journal. 2012 Jun;45(6):571-9.

2. ADA definitions for direct and indirect pulp capping at: www.ada.org/en/publications/cdt/glossary-of-dental-clinical-and-administrative-terms

3. Apatite-forming Ability of TheraCal Pulp-Capping Material. M.G. GANDOLFI, F. SIBONI, P. TADDEI, E. MODENA, and C. PRATI J Dent Res 90 (Spec Iss A):abstract number 2520, 2011 (www.dentalresearch.org)

4. Okabe T, Sakamoto M, Takeuchi H, Matsushima K (2006) Effects of pH on mineralization ability of human dental pulp cells. Journal of Endodontics 32, 198-201.

5. Sidhu, SK, Nicholson, JW. A Review of Glass-Ionomer Cements for Clinical Dentistry. J Funct Biomater. 2016 June 28; 7(3).

6. Kranjevac T, Milovanovic M, Volarevic V, Lukic ML, Arsenijevic N, Markovic D, et al. Cytotoxic effects of glass ionomer cements on human dental pulp stem cells correlate with fluoride release. Med Chem. 2012;8(1):40-45.

7. Modena, KC, Casas-Apayco, LC, Atta, MT, Costa, CA, Hebling, J, Sipert, CR, Navarro, MF, Santos, CF. 2009. Cytotoxicity and biocompatibility of direct and indirect pulp capping materials. J Appl Oral Sci. 17(6):544-554.

8. Stanislawski L, Daniau X, Lauti A, Goldberg M (1999) Factors responsible for pulp cell cytotoxicity induced by resin-modified glass ionomer cements. J Biomed Mater Res 48:277-288.

9. Selimovic-Dragas M, Huseinbegovic A, Kobaslija S, Hatibovic-Kofman S. A comparison of the in vitro cytotoxicity of conventional and resin modified glass ionomer cements. Bosn J Basic Med Sci. 2012, 12: 273-278.

10. Huang FM, Chang YC. Cytotoxicity of resin-based restorative materials on human pulp cell cultures. Oral Surg Oral Med Oral Radiol Endod. (3):361-365.

COMPETITIVE COMPARISON

TheraCal LC[®]

Resin-Modified Calcium Silicate Pulp Protectant/Liner

vs Calcium Hydroxide

1 Any Etch/Bond System

After TheraCal LC has been light-cured, the material **can be used with all etch techniques** (self-, selective- and total-etch) for optimal bonding and finishing of the restoration.

After light-curing TheraCal LC you can:



Self-Etch



Selective-Etch



Total-Etch

Incompatible With Etch

Calcium hydroxide liners **should not be acid etched** as it might soften and smear over the walls of the cavity, which may contaminate acid-etched enamel and produce an inferior bond.¹



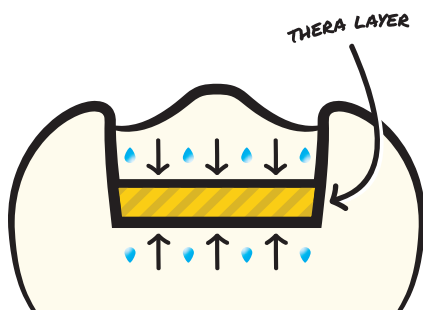
Do not
Selective-Etch



Do not
Total-Etch

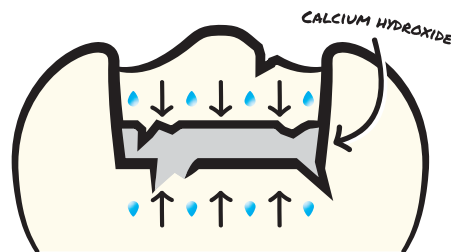
2 Low Solubility

TheraCal LC's proprietary formula allows its resin matrix to allow for ion exchange and release calcium, but is not water soluble.



High Solubility

Calcium hydroxide “has high solubility and water sorption,² which may result in softening of the liner and in material loss under poorly sealed tooth–restoration interface where the oral fluids can penetrate through and partially or totally dissolve this pulp-protecting material.”³



^{*}Bisco has, on file, calcium release and solubility data for TheraCal LC.

1. Gandolfi MG, Siboni F, Prati C. Chemical-physical properties of TheraCal, a novel light-curable MTA-like material for pulp capping. International Endodontic Journal. 2012 Jun;45(6):571-9.

2. Francisconi LF, de Freitas AP, Scaffa PMC, Mondelli RFL, Francisconi PAS. Water sorption and solubility of different calcium hydroxide cements. J Appl Oral Sci. 17(5):427-431.

3. Arandi NZ. Calcium hydroxide liners: a literature review. Clin Cosmet Investig Dent. 2017;9:67-72.