



MANAGING THE PULPAL RESPONSE

with High Performance Materials

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PROTECTING THE PULP



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General dentists spend an estimated 80% of their time performing restorative procedures, and in every case, the pulpal health of the tooth is a concern. Whether the procedure is simple or complex, protection of the pulp is essential for long-term success and patient satisfaction.

Materials that have been available to clinicians for pulpal protection are zinc phosphate, CaOH, glass ionomer, and Mineral Trioxide Aggregate (MTA). Although they have had various levels of clinical success, each has certain drawbacks, such as long set times. Designed to provide a

more comprehensive solution, a new class of material—a resin-modified calcium silicate cement—offers unique features for full pulpal protection.

CLINICAL VERSATILITY

A light-curable hydrophilic resin combined with MTA technology, TheraCal LC is indicated for direct and indirect pulp capping, and as a liner. It performs as an insulator barrier and protectant of the dental pulpal complex¹ and may aid in the healing process.^{2,3}

In addition, its handling and light-curing features make it an optimal choice over conventional calcium hydroxide-based materials, as it facilitates precise, immediate placement, and subsequent condensation of restorative material.

CLINICAL USES

- Protective liner: for use under restorative materials, cements, or other base materials.
- Pulp capping agent: may be placed directly on pulpal exposures after hemostasis is obtained. It is indicated for any pulpal exposures, including carious exposures, mechanical exposures, or exposures due to trauma.

View a step-by-step technique for a Class I direct composite restoration using TheraCal LC as a liner



INDIRECT PULP CAP

According to Paul Child, Jr, DMD, CDT, an indirect pulp cap is the procedure by which incomplete excavation is provided, leaving a thin layer of affected or sound dentin when near the pulp. This procedure, he explains, may provide the tooth the opportunity to repair itself and maintain vitality. However, factors such as self-etching adhesives, additional material costs, and lack of insurance reimbursement have discouraged the use of

the indirect pulp cap—even though adhesives are acidic, do not disinfect the dentin, and do not provide the necessary chemicals for tooth remineralization.

An indirect pulp cap and/or liner with TheraCal LC offers many clinical benefits. Along with a well-sealed restoration, this procedure offers protection and may comfortably delay endodontic treatment for years.⁴



FIG 1. Patient presented with a large failing amalgam.



FIG 2. Amalgam removal and excavation of decay.



FIG 3. Placement of TheraCal LC before build up.



FIG 4. Build up placed over TheraCal LC and final prep.

DIRECT PULP CAP

Much has been written about the preferred features of an optimal pulp capping material for today's practices. The list includes a material that will:

- Support remineralization of the dentin and formation of new hard tissue
- Maintain an alkaline environment
- Promote healing
- Reduce postoperative sensitivity
- Be efficient, easy to apply

The ultimate goal in pulp capping is to give the patient's tooth a chance to heal.

TheraCal LC is designed to meet these goals: its sustained high calcium release stimulates hydroxyapatite and secondary bridge formation,^{2,3,5} creates a bond to dentinal tissue, and can be placed directly on the pulp. Easy and efficient to use in a clinical setting, this material is a strong, hard, fast-setting pulp protectant.



FIG 1. Patient presented with a failing DO amalgam.



FIG 2. Upon removal of the amalgam and decay, there was a small exposure of the pulp horn.



FIG 3. TheraCal LC is an excellent choice for direct pulp capping because of its ability to release calcium ions and form hydroxyapatite.⁵



FIG 4. Final restoration of the pulp capped tooth.

PROTECTIVE LINER

Prevention of postoperative sensitivity is one of the main reasons for the use of protective liners. Sensitivity can greatly impact a patient's satisfaction and evaluation of treatment. Over time, larger, deeper restorations can exhibit microleakage and stress fractures, resulting in sensitivity. Liners offer added protection and can be used to manage subsequent polymerization shrinkage stress.



FIG 1. Patient presented with occlusal decay.



FIG 2. Upon excavation a small pulpal exposure was noticed.



FIG 3. TheraCal LC is placed over pulp exposure and used for pulpal protection.



FIG 4. Final restoration.

HIGH-PERFORMANCE CHEMISTRY

WHAT MAKES THERACAL LC UNIQUE?

- It is a liner and pulp-capping material with the ability to induce apatite crystal formation,⁵ similar to commercially available self-curing MTA products.
- Its proprietary resin formula consists of tri- and di-calcium silicate particles in a unique, patented hydrophilic monomer that provides significant calcium and hydroxide ion release.
- Stable and durable as a liner, base, or pulp-capping material, it is permeable to dentinal fluid but resists dissolution.^{6,7}

A SCAFFOLD FOR REPARATIVE DENTIN FORMATION

Dentinal fluids are absorbed within TheraCal LC, resulting in the release of calcium and hydroxide ions.⁸ The tooth responds to form apatite and a bond, supporting the natural sealing ability of the product. This ability to assist in the formation of apatite plays a critical role in pulpal protection.⁹

5 MILLION RESTORATIONS

In the past three years, over five million restorations have been placed using **TheraCal LC** as a direct or indirect pulp capping material

SEAL AND PROTECT WITH THERACAL LC

TheraCal LC is a new step toward taking what research understands and creating improved materials that address the needs of healing and pulpal protecting:

KEY FEATURES

- Sustained high calcium release stimulates hydroxyapatite and secondary dentin bridge formation, and forms to a protective seal.^{2,3,5}
- The alkaline pH (hydroxide ions) promotes healing.¹⁰
- Forms a protective barrier that insulates the pulp (which may lead to less tooth sensitivity).⁹
- Moisture tolerant with very low solubility.⁶
- High radiopacity making it easily identifiable on radiographs.
- Light-curable with immediate set and easy to use.
- Strong physical properties to withstand the forces of mastication under composites, amalgams, cements, and other base materials.⁷
- Flowable yet stays where it is placed.

TheraCal LC[®] CLINICAL TIPS

APPLY TO
VISIBLY MOIST
DENTIN



APPLY
IN 1MM
INCREMENTS



LIGHT CURE
FOR 20
SECONDS



ABOUT THE COMPANY

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At BISCO “adhesion is our passion” and we are dedicated to understanding and improving restorative dentistry. BISCO offers all the products you need, from start to finish, for each restorative procedure including bonding agents, etchants, resin composites, core materials and fiber posts. BISCO products are proudly made in the U.S.A.

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EBOOKS

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TheraCal LC[®]

Resin-Modified Calcium Silicate Liner/Pulp Protectant

● EASE OF USE

- Light curable, flowable-like handling

● RADIOPAQUE

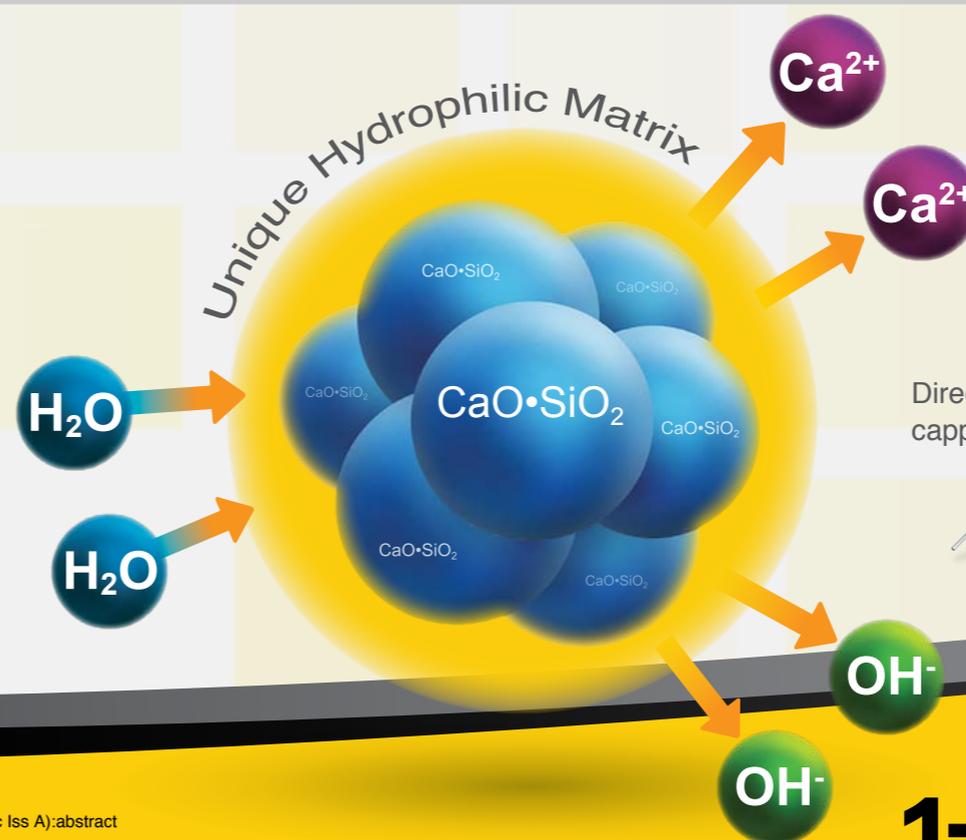
- Radiopaque properties allow for easy detection on x-rays

● CALCIUM RELEASE

- Hydroxyapatite formation^{1,2}

● HEALING & INSULATION

- Liner insulates the pulp³, providing virtually no post-operative sensitivity
- Promotes healing¹



Direct and indirect pulp capping material and liner.



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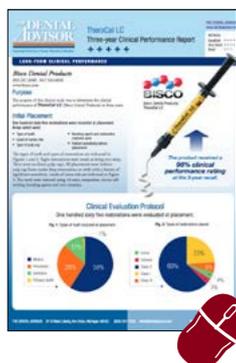
¹ ADA definitions for direct and indirect pulp capping at <http://www.ada.org/en/publications/cdt/glossary-of-dental-clinical-and-administrative-ter>

² 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)

³ Selcuk SAVAS, Murat S. BOTSALI, Ebru KUCUKYILMAZ, Tugrul SARI. Evaluation of temperature changes in the pulp chamber during polymerization of light-cured pulp-capping materials by using a VALO LED light curing unit at different curing distances. Dent Mater J. 2014;33(6):764-9.

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DENTAL ADVISOR Three-year Clinical Performance Report



THERACAL LC - Over 5 million restorations later: Are you getting the most of it?



DIRECT COMPOSITE Placement Using TheraCal LC and All-Bond Universal