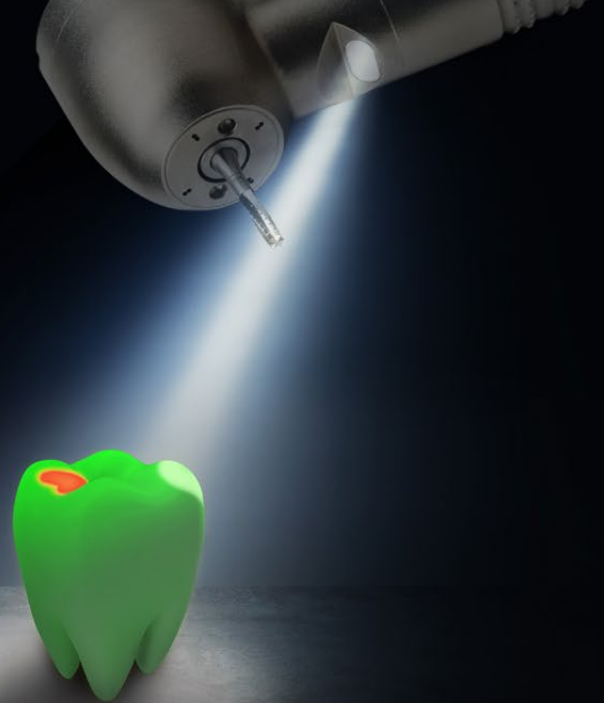


Clinical Guidelines for Dental Handpiece use with **FLUORESCENCE™ HD**



Introduction

Using UV (405 nm) fluorescence mode handpiece light output during restorative dental treatment allows the clinician to directly visualize both composite restorative materials and bacterially-infected dental hard tissue.

Modern composite materials are designed to look as much like natural dental tissue as possible. This property makes the detection and differentiation of previously placed composite restorations from natural tooth substance very difficult. When using a handpiece with fluorescence mode, the area being treated is excited by the UV light. The resulting fluorescence emitted by the tooth and the composite is different, allowing the dentist to easily differentiate between the two for most composites.

A dental handpiece in fluorescence mode can also aid in the clinical visualization of bacterially-infected dental hard tissue. Traditional tools (probing the hardness of the tissue or staining) indicate only indirectly whether hard tissue is infected. Using a handpiece with fluorescence mode along with the appropriate filter (goggles, loupe insert or paddle) can allow direct visualization of the remaining bacterially-infected dentin during the restoration procedure.

Both these capabilities increase the efficiency and precision of restoration and caries removal in practice, saving time and tooth structure.

Factors Affecting Fluorescence in the Dental Practice

When using Fluoresce HD in dental practice, the fluorescence light (UV) should be as intense as possible. The handpiece/turbine should use solid rod optics with high transmission efficiency.

External sources of light can diminish the visible fluorescence contrast. White light from the operatory light, a head lamp, room lighting or even daylight can interfere with the ability to see the fluorescence contrast. Therefore, these white light sources should be shut off or minimized while using Fluoresce HD.

Red fluorescence in carious dentin is caused by red-fluorescing porphyrin compounds in bacteria. These are known to bleach out over time when exposed to light. The cavity should not be continuously UV illuminated for long periods as this may reduce red fluorescence and distort the fluorescence visible contrast.

Fluoresce HD 405nm (UV) is to be used for cavity preparation only. The tooth surface should first be thoroughly cleaned of mature plaque on the enamel surface and in the fissures prior to Fluoresce HD use. The bacteria in the plaque may also fluoresce red and should not be mistaken for carious enamel.

Caries indicating dyes and stains marketed for residual caries diagnosis generally also fluoresce strongly. These staining solutions should not be used in combination with Fluoresce HD.

*Clinical directions and suggested restoration actions are the opinions of Aine M Lennon PhD, Doctor of Medical Dentistry
** In exceptional cases, demineralized enamel can be left at the margin if the lesion is arrested and excellent oral hygiene can be expected

Equipment

1. Fiber optic air turbine with Fluoresce HD dual wavelength coupler or electric motor with Fluoresce HD dual wavelength light output and fiber optic contra angle.
2. One of the following yellow filter options (for contrast, not safety):
 - A. Goggles
 - B. Universal loupe insert
 - C. Paddle filter

Caries and Composite Excavation Step-by-Step

1. *Access Cavity Preparation

In order to provide access to carious dentin, an access cavity should be prepared. This allows the full extent of the carious dentin to be assessed. Highspeed handpieces with water-cooled rotary diamond burs are recommended for this stage of cavity preparation. Carious enamel should be removed whether bacterially-infected or demineralized.^{**} Bacterially-infected enamel appears red in fluorescence mode while sound enamel fluoresces green. Enamel, which is merely demineralized, will not fluoresce as brightly as sound enamel or dentin.

2. *Composite Removal

If a composite restoration is to be removed, using a handpiece with fluorescence mode makes it much easier to differentiate composite from tooth substance. Using fluorescence mode, sound dental hard tissue fluoresces green. Dental composites generally have a different appearance (often white) in fluorescent light compared to natural dentin or enamel (Figure 1). Because of this differentiation, the time needed for careful composite removal is reduced and the chance of inadvertent removal of dentin or enamel (Figure 1) is minimized.

3. *Detection and Removal of Residual Caries

Following access cavity preparation, the extent of caries in dentin should be assessed. Carious areas in dentin are easily identified as they appear red in fluorescence mode as opposed to sound dentin, which is green (Figure 2). Red-fluorescing areas have a high degree of bacterial infection and should be removed. Residual caries can be removed at slow speed with round burs. Red-fluorescing areas are removed layer-by-layer until green-fluorescing dentin is exposed. Traditionally dentin hardness needs to be checked using a probe at intervals during excavation. This is not necessary when using Fluoresce HD. But it is still advisable to check dentin hardness at the margins of the cavity (see below).

4. *End Point of Caries Excavation

Generally, red-fluorescing bacterially-infected dentin should be completely removed. However, when excavating close to the pulp, it is advisable to be more conservative, leaving infected dentin rather than risk a pulp exposure.

4.1 *General Recommendations for Dentin Excavation

In areas where there is no danger of causing a pulp exposure, complete removal of red-fluorescing dentin is recommended. This aims firstly, to eliminate bacterially-infected tissue, and secondly, to have the margins of the cavity remain in sound tissue, which is important for the marginal seal of adhesive restorations or for anchorage of mechanically retentive restorations.

4.2 *Excavation of Dentin near the Pulp Chamber

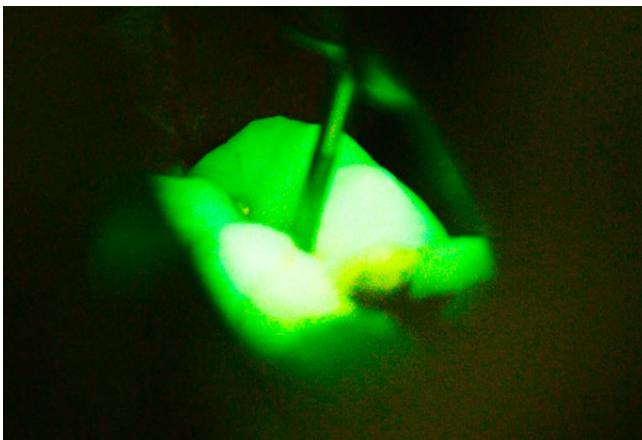
When excavating close to the pulp in a vital tooth, the aim should be to remove as much red-fluorescing dentin (infected) as possible without inadvertently opening the pulp chamber. Allowing bacterially-infected dentin close to the pulp to remain (i.e. selective caries removal) is recommended in cases where complete excavation of caries might cause a pulp exposure, loss of vitality and lead to a root canal treatment. Dentin areas close to the pulp should be covered with calcium hydroxide or hydraulic silicate cement before placement of the restoration.

4.3 *Green-fluorescing Soft Dentin

In some cases, dentin at the advancing front of a carious lesion may be softened but not red fluorescing (affected dentin). This happens when acids produced by bacteria in the dentin penetrate further along the dentinal tubules than bacteria. This dentin fluoresces green using Fluoresce HD indicating that it is not bacterially infected. This non-infected, softened dentin needs to be removed if it is at the margin of the cavity to allow placement of the restoration in sound tissue. If it is adjacent to the pulp, it should be allowed to remain as described above.

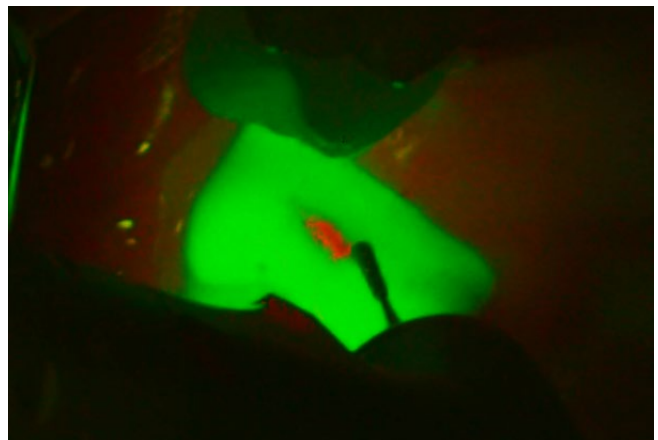
Fluoresce HD provides the dental practitioner with a tool that can aid in the detection of residual caries and identify the presence of bacteria in dentin in vivo with an accuracy similar to laboratory methods. This allows precise and efficient differentiation between infected and non-infected dentin, allowing maximum preservation of tissue.

Figure 1



Composite is clearly visualized vs. healthy tooth

Figure 2



Caries appear orange/red with Fluoresce HD

Fluoresce HD Accessories

Enhance your Fluoresce experience with high-quality accessories from Lares.



**Fluoresce HD Yellow Tint
Reg Glasses**

Item# 11595



**Universal Loupe Insert
for All Models**

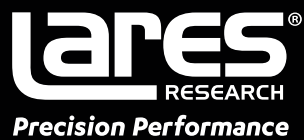
Item# 11551



**Fluoresce HD Yellow Tint
Handheld Paddle**

Item# 11597

*Clinical directions and suggested restoration actions are the opinions of Aine M Lennon PhD, Doctor of Medical Dentistry
** In exceptional cases, demineralized enamel can be left at the margin if the lesion is arrested and excellent oral hygiene can be expected



FLUORESCENCE™ HD

For studies and articles
related to Fluoresce HD, visit
laresdental.com/fluoresce-hd

INTERNATIONAL/OEM AND SPECIAL MARKETS

Christian Godoy

+1 530.717.3145

cgodoy@laresdental.com

295 Lockheed Ave

Chico, CA 95973 USA

USA: +1 888.333.8440

Worldwide: +1 530.345.1767

Fax: +1 530.345.1870

world-sales@laresdental.com

www.laresdental.com

70450 04/19