

## **DETECTION OF CARIES BENEATH A DENTAL SEALANT WITH THE CANARY SYSTEM**

An *in vitro* study was conducted to compare the effectiveness between The Canary System™ and laser fluorescence (DIAGNOdent™) to detect decay under intact sealants and to correlate the Canary Number to caries lesion depth.

### **METHODS:**

Twenty eight extracted human teeth composed of 103 potential healthy and carious pits/fissures on their occlusal surfaces were used. Pits and fissures were scanned with The Canary System™ and DIAGNOdent before and after sealant placement with 3M™ ESPE™ Clinpro™ Sealant™. Polarized Light Microscopy (PLM) was performed at the University of Texas as the ‘gold standard’ to score examined sites as ‘carious’ or ‘non-carious’ in a blinded fashion.

### **RESULTS:**

A representative carious tooth sample is shown in Figure 1. The sensitivity and specificity results after sealant placement are summarized in Table 1 below.

**Table 1.** Sensitivities and specificities of The Canary System and DIAGNOdent for pit and fissure caries detection after sealant application.

Caries detection method	The Canary System	DIAGNOdent
<b>Sensitivity</b>	<b>83%</b>	<b>64%</b>
<b>Specificity</b>	<b>79%</b>	<b>46%</b>

### **CONCLUSIONS:**

In this study, when scanning the 3M™ ESPE™ Clinpro™ Sealant™ placed over pit and fissure caries, Canary Numbers of greater than 20 were consistently obtained for 93% of caries of greater than 1000 microns (1 mm) in size. Canary Numbers equal to or less than 20 were consistently obtained for 95% of sealed healthy pits and fissures. **Therefore, a Canary Number reading > 20 when scanning a tooth surface with the dental sealant used in this study indicates the presence of caries beneath the sealant. This study concludes that The Canary System has the potential to aid dental professionals in the detection of caries beneath sealants more accurately than DIAGNOdent.**

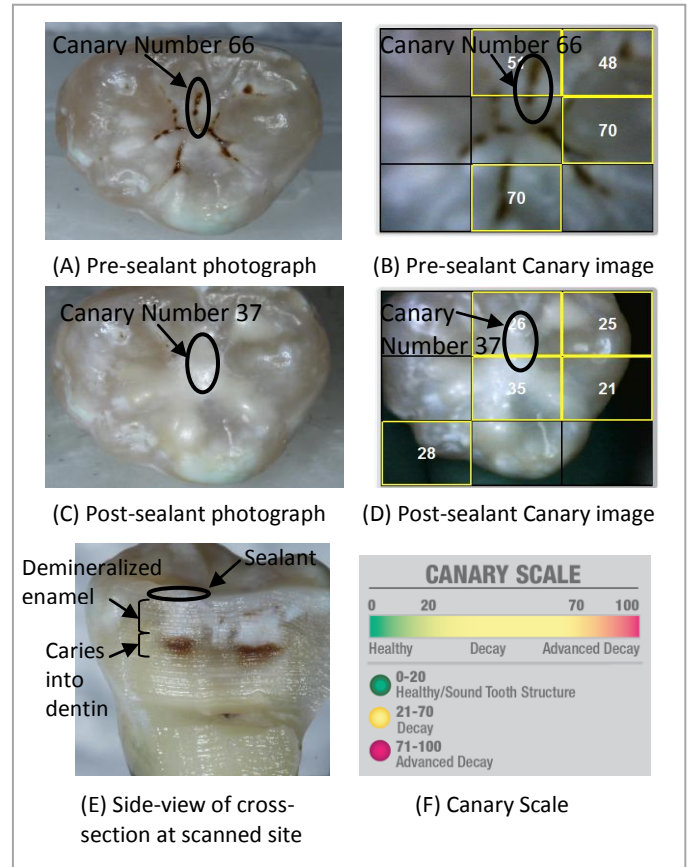


Figure 1. Photographic and Canary images of a representative carious tooth sample prior to sealant placement (A and B) and after sealing with 3M™ ESPE™ Clinpro™ Sealant™ (C and D). A site of interest on the occlusal surface (marked by a circle) was scanned with The Canary System before and after sealant placement, resulting in mean ± sd Canary Number readings (shown in black) of 66±3 and 37±2, respectively. (E) Side view of the sealed tooth cross-sectioned at the examined site of interest show demineralised (early caries) enamel and caries in dentin beneath the sealant. (F) The Canary Scale is a relative scale of 0-100 that reflects the state of tooth mineralization and crystallization. This is a graduated scale where lower numbers indicate healthy enamel and higher numbers indicate more advanced tooth decay.

*“...Canary Number reading of greater than 20 indicates the presence of caries beneath the sealant.”*