Objective
This ex vivo study evaluated the ability of Resin Infiltration (RI) to resist enamel breakdown by acid demineralization as monitored by The Canary System.

Materials & Methods

- Teeth (with sound and early caries sites) were randomly assigned to two experimental groups:
  1. Treatment Group (examination sites treated with Resin Infiltration (DMG ICON));
  2. Control Group (examination sites were not infiltrated).
- The Canary System scans (triplicates); sound examination sites (n = 60); early carious examination sites (n = 75).
- DMG ICON preparation & application: 1) 35% phosphoric acid gel applied to the demineralized surface for 5 seconds and then washed off with water; 2) The surface was then dried with Dry It for 30 seconds using at least ½ syringe per tooth; 3) DMG ICON preparation & application; 4) Applied infiltrant and left in place for 3 minutes; 5) Light cured for 40 seconds; 6) Wiped the surface.

Results

- Representative Treated Tooth
  - Figure 1:
    - (A) Visually, white spots became less apparent after application of the Resin Infiltration and remained less apparent throughout the duration of the study.
    - (B) Sound site A (green), and carious site B (black)
    - (C) PLM image of site A at Day 50
    - (D) PLM image of site B at Day 50.
    - (E) and (F) Close interproximal contact areas between the surface of interest of the representative control tooth and a sound tooth sample.

- Representative Control Tooth
  - Figure 2:
    - (A) Visually, no change during study.
    - (B) Sound site A (green), and carious site B (black)
    - (C) PLM image of site A at Day 50.
    - (D) PLM image of site B at Day 50.
    - (E) and (F) Close interproximal contact areas between the surface of interest of the representative control tooth and a sound tooth sample.

Findings

- Smooth Surfaces
  - Treatment Group Caries Sites – Significant decrease of Canary Number (∆CN: -20; Related-Samples Wilcoxon Signed Rank Test; p < 0.05) from baseline CN following treatment on Day 0. CN remained significantly lower (p < 0.05) throughout the remainder of the study.
  - Significant increase in CN only on Days 14 and 50 for Treatment Group Sound Sites.
  - Control Groups – CN significantly increased throughout the study (p < 0.05).

- Interproximal Surfaces
  - Treatment Group Caries Sites – Significant decrease of Canary Number (∆CN: -19; Related-Samples Wilcoxon Signed Rank Test; p < 0.05) from baseline CN following treatment on Day 0. CN remained significantly lower (p < 0.05) throughout the remainder of the study.
  - Control Caries Sites – CN significantly increased throughout the study (p < 0.05).

Conclusions
This study demonstrated that lesion infiltration with DMG ICON is able to significantly delay progression of existing caries, and that the status of an infiltrated caries lesion can be monitored using The Canary System.