# 25th Euro Dentistry Congress

September 20-21, 2017 Dublin, Ireland

## The effect of resin infiltration application on early proximal caries lesions (in vitro study)

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**Background**: Resin infiltration material (ICON), used in treating early proximal caries lesions, as it depends on a micro-invasive infiltration technology.

**Aim**: To evaluate the effectiveness of resin infiltration, fluoride varnish and combination of fluoride and resin infiltration after induction of caries like lesion on extracted human young premolar teeth in vitro.

**Material & Methods**: Thirty extracted human premolar teeth for orthodontic treatment were sectioned in a buccolingual direction into two halves using isomet low speed saw, thereby creating 60 specimens in total. Each specimen was immersed for 2 weeks in demineralizing solution to induce caries-like lesion. Only teeth with International Caries Detection and Assessment System (ICDAS) codes 1 and 2 were selected. The specimens were divided into three equal groups. Group A (n=20) (ICON), group B (n=20) (ICON+ Fluoride) and group C (n=20) (Fluoride) served as control group. Then, thermo-cycled in artificial saliva and examined with Scanning Electronic Microscope and Energy-Dispersive X-ray analysis. The collected data were submitted to statistical analysis using Kruskal Wallis and Mann Whitney with level of significance among the groups at (p values<0.05).

**Result**: The demineralized enamel surface showed an irregular pitted rough surface with the presence of widely distributed craters of variable depths. In group A, there was a partial blockage of the enamel rods with resin infiltration, while in group B the surface was highly smooth and homogeneous with the presence of a hyper-mineralized layer and complete obliteration of the craters and enamel rod ends. In group C, the enamel rods were partially blocked with fluorapatite crystals with rough irregular surface. EDX analysis showed high Ca and P levels in group A in comparison to the other groups, there is no statistical significant difference, while group B and C had higher level of Fluoride.

**Conclusion**: Combination of resin infiltration and fluoride were seen to be an efficacious method for the treatment of interproximal lesions by improving the surface texture and remineralization of the tooth surface. Application of resin infiltration and fluoride will reduce caries progression.

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