



## CFAO GRADUATE STUDENT POSTERBOARD ABSTRACTS

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### Can exposure to fluoride solutions change the surface of orthodontic brackets?

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**Abstract:** A concern in the orthodontic clinic is the high prevalence of active caries lesions in orthodontic patients. Treatment of tooth enamel with fluoride not just reduces the solubility of enamel to acids, but also modulates the acquired enamel pellicle (AEP) formation, with consequent influence over the biofilm composition. Little information is known about the impact of fluoride solutions on the surface of orthodontic brackets, and the consequent pellicle formation. Here, we investigated the changes on the bracket surface after exposure to fluoride solutions. X-ray Photoelectron Spectroscopy (XPS) was used to atomically analyze the composition of orthodontic stainless steel and ceramic brackets before and after their incubation in fluoride and non-fluoride solutions for 2 hours at 37°C. Hydroxyapatite discs were used as control. Interestingly, fluoride was not identified on the surface of neither metallic nor ceramic brackets, suggesting that fluoride does not bind strongly to the tested brackets. Contrarily, fluoride was identified in the control group confirming that fluoride strongly binds to the hydroxyapatite discs. The binding of fluoride to the hydroxyapatite is often attributed to the positive charge of calcium sites on the enamel. Therefore, absence of fluoride on bracket surfaces may be related to a predominant negative charge on the surfaces of alloys and ceramics brackets. This suggestion is reinforced by the XPS identification of positive-charged elements on the brackets. Differences were noted among the tested groups suggesting that modulation of the bracket pellicle via surface changes with mouthwashes is a possibility. This study opens avenues on the not yet characterized changes on the bracket surface and the possible ways to modulate the acquired bracket pellicle.