



## CFAO GRADUATE STUDENT POSTERBOARD ABSTRACTS

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### Colorimetric and spectrophotometric measurements of orthodontic thermoplastic aligners exposed to various staining sources and cleaning methods

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#### Background

Manufacturers of orthodontic aligners suggest that users take off removable appliances every time they consume solid foods or any drink (except water). This is to avoid a color change within the clear thermoplastic material of which they are made. Prior studies have focused on a limited set of aligners, excluding some popular American brands of aligners.

The main objective of this study was to evaluate the stain resistance of the polymer forming three different American aligner brands. A secondary aim was to evaluate the stain-removal potential of two cleaning techniques for these devices.

#### Methods

The removable appliances were exposed to different staining agents common in a regular diet (coffee, red wine, black tea and cola) or to a control solution made of a saliva replacement gel. The three brands evaluated were Invisalign®, ClearCorrect® and Minor Tooth Movement®. Following exposure, the same aligners were cleaned with either the Invisalign® crystals or the Cordless Sonic Cleaner combined with a Retainer Brite® tablet. Colorimetry data was acquired via a calibrated scanner, using a CIELAB color space approach to compare changes in aligners exposed to various media.

#### Results

This study suggests that an exposure of 12 hours to instant coffee affects the intrinsic color of the Invisalign® aligners. After 7 days of exposure, a more conspicuous intrinsic color change is observed in the Invisalign® aligners exposed to instant coffee and red wine. The black tea created an extrinsic color change in the three brands after 7 days. While normal exposure conditions would not typically consist of 12 h to 7 days of continuous exposure, these data indicate that repeated, cumulative exposure may be problematic.

The two cleaning methods tend to show a better efficacy in removing extrinsic stains from black tea compared to intrinsic stains of other substrates.