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College of Dentistry**



Discoloration of Stretched Clear Elastomeric Chains by Different Dietary Medias (An in vitro study)

**A Thesis Submitted
to the Council of the College of Dentistry,
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Requirements for the Degree of Master of
Science in Orthodontics**

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ABSTRACT

With the increasing demand on esthetic orthodontic appliances, discoloration of clear elastomeric chains and modules remained an issue which concerned both orthodontists and patients.

This an in vitro study was conducted to evaluate the effect of exposing stretched clear elastomeric chains to three types of dietary media (tea, coffee and turmeric) from six different companies (Ortho Technology, American Orthodontics, Opal Orthodontics, Ortho Organizer, Ormco and G&H).

A total of 960 lengths of six modules were cut from short type elastomeric chain; 160 pieces from each brand. The specimens were stretched 50%, placed on plastic boards, and incubated in water at 37°C for 1 day, 7 days, 14 days and 28 days. Once a day, the specimens were immersed for ten minutes in the testing dietary media, washed and then returned back to the water container.

Color measurements were made before and after incubation of the specimens. Digital image were taken by an SLR digital camera and the color changes were calculated according to CIE L*a*b* color space system by Adobe Photoshop program. The resulting data were statistically analyzed using ANOVA and LSD tests.

Elastomeric chains from AO, Opal and G&H companies were the most brands prone to discoloration, and Ortho Organizers and Ortho Technology chains were the least prone to discoloration.

Tea, coffee and turmeric solutions discolored elastomeric chains from all companies in a variable degree, however turmeric caused significantly more discoloration, followed by tea and least by coffee. The amount of discoloration caused by tea and coffee increases gradually to peak at 28 days, while most of the discoloration caused by turmeric is in the first day and reaches a plateau at a week.

تسبب الكركم في التغيير تغييرا واضحا على السلاسل المرنة الواضحة وهي أعلى من تأثير الشاي والقهوة وكمية أكبر من عدم الاستقرار اللوني تم العثور عليها لسلاسل مرنة واضحة من الشركة AO بعد الغمر في الكركم الذي يتحول تماما إلى اللون الأصفر بينما كان أقل قدر من التغيير للسلاسل واضحة المرنة من الشركة AO بعد الغمر في القهوة وكان هذا بسبب الاختلاف في التركيب الكيميائي للأوساط الغذائية والتفاصيل الدقيقة في عملية تركيب وتصنيع تلك السلاسل المرنة .