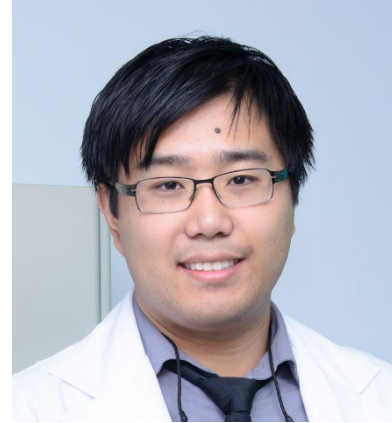


Research Aid Award

Dr. Jia Lin Liu, *University of Toronto*

Dr. Jia Lin Liu is a third-year resident in orthodontics at University of Toronto. He received his Doctor of Dental Medicine from University of Montreal in 2018 and his general practice residency certificate from the Montreal Children's Hospital affiliated with McGill University in 2019. During his general practice residency, he also worked as a dentist in a private dental clinic.



The effect of the oral environment on the debonding process of orthodontic brackets need to be considered. Artificial aging can use thermal and mechanical cycles to degrade the bonding interface. *In vitro* protocols that simulate these processes for the approximate duration of an orthodontic treatment are tested.

The aims of this study are to evaluate the effect of artificial aging on bond strength between metallic bracket and enamel, and to evaluate enamel loss as a function of artificial aging. Sixty upper premolars had metallic brackets bonded and will be divided into 4 groups (n = 15): Control - distilled water storage; Thermocycling - 20,000 thermocycles; Mechanical cycling - 10,000 chewing cycles; Thermo-mechanical cycling - thermocycling followed by mechanical cycling. Shear bond strength will be tested at the bracket-enamel interface. Area percentage of adhesive remnant and adhesive remnant index will be assessed with stereo microscope. Areas with the presence of calcium and phosphorus will be examined with scanning electron microscopy and energy dispersive x-ray spectrometry.

There are several artificial aging protocols available in the literature, but the settings of these methods vary among them and the results from these studies are inconsistent. This project will help researchers to choose an appropriate artificial aging protocol to investigate the bond strength of new brackets and adhesive systems in an *in vitro* setting before using these orthodontics products on patients.

The Research Aid Award from the Foundation allows me to conduct my project without worrying about the financial aspect of the study. The funding from the Foundation will cover the expenses related to the use of equipment in the artificial aging protocols and to the use of scanning electron microscopy.

The funding from the Foundation encourages me to pursue my objective of becoming a teacher in orthodontics eventually in my career.