

## **Master of Engineering Project (MIE8888Y)**

Deadline: Sept. 17, 2021

**Project ID:** UT-Dentistry

**Supervisor(s):** Prof. Kamran Behdinin (MIE)

**Disciplines involved:** 2 ME-MEng students with Mechatronics background

**NDA:** no

**Project Title:** Design of A New Root Canal Cleaning Instrument

(1) Background:

Tooth root canal infection is caused by microorganisms (mainly bacteria) populating the root canal system. These Bacteria are in a form of a biofilm that adhere to the walls of the root canal. Currently, the conventional way of root canal cleaning and shaping often do not completely eradicate these bacteria. Persistent infection often remains, especially in cases where the anatomy and the configuration of root canal system is complex.

(2) Project description:

Design and develop a new root canal cleaning instrument (Endo Brush) that can engage the whole root canal system for effective debridement and detachment of bacterial biofilm from the canal walls.

(3) In this multidisciplinary capstone design project, the client expects the team to design the following:

Design and test a bottle brush-like instrument with bristles made from Nickel titanium or stainless steel that expand depending on the size of the lumen of the root canal space to allow maximum friction between the bristles of the brush and the canal wall for effective mechanical detachment of the bacterial biofilm.

The brush should work in rotational movement on a slow speed dental handpiece. Once developed, the prototype should be tested for effectiveness and fatigue resistance to prevent instrument breakage inside the canal.

Root canal treatment of infected teeth is an important procedure in dental care, with millions of teeth that require this form of treatment as a last resource before extraction. Yet there is a need to improve the tools available for this procedure. The proposed design of Endo-Brush provides a unique opportunity to detach and subsequently remove all biofilm from difficult-to-reach areas of the root canal system. Such an instrument could be marketed commercially and become an important tool for any dentist or endodontist.

### **Application Instruction:**

Interested ME-MEng students should email the following documents to: [mcp@mie.utoronto.ca](mailto:mcp@mie.utoronto.ca) by Sept. 17, 2021.

1. Brief statement of interest on the top 1 preference of the projects.
2. CV.
3. Recent unofficial transcript even if there is no grade on it.