

Final Report for AAOF.  
Award Category: Biomedical Research Award  
Period: 2001-2002.

Peri-implant bone response to continuous Horizontal loading: A comparison between porous-surfaced and threaded osseointegrated implants used as orthodontic anchorage units.

**Rodrigo Oyonarte<sup>1</sup>, Douglas A Deporter<sup>1,2</sup>, Robert M Pilliar<sup>1,2</sup>, Donald G Woodside<sup>1</sup>.**

<sup>1</sup>Faculty of Dentistry and <sup>2</sup>Institute of Biomaterials and Biomedical Engineering, University of Toronto, Canada.

#### **Abstract**

Bone remodeling adjacent to orthodontically-loaded osseointegrated implants of two different designs (porous-surfaced, and machined threaded) was compared in order to determine the suitability of porous-surfaced implants as orthodontic anchorage units. Five beagle dogs received 3 implants of each design in contralateral mandibular locations. One week following a 6-week initial healing period, the two mesial-most implants on either side were orthodontically-loaded for 22 weeks. All implants remained osseointegrated throughout orthodontic loading, except for one threaded implant that loosened. Porous-surfaced implants had higher marginal bone levels ( $p < 0.025$ ) and significantly higher percent bone area than threaded implants at coronal endosseous zones. Greater mineral appositional rates were found next to threaded implants. The results indicate that different implant surfaces can lead to differences in peri-implant bone remodeling. Given the observed bone remodeling patterns, the possibility exists that porous-surfaced implants of shorter lengths may be used successfully as orthodontic anchorage units.

#### **Master of Science Thesis, 2002**

**Rodrigo Oyonarte, DDS**  
**Graduate Department of Dentistry**  
**University of Toronto**