

1998 Research Award

Principal Investigator: Professor Robert P. Kusy

Other Investigators: Mr. John Whitley

Title of the Project: Influence of Archwire Alloy, Interbracket Distance, and Bracket Engagement on the Resistance to Sliding Under Dry and Wet Conditions

Institution: University of North Carolina at Chapel Hill

Brief Summary: This project sought to understand the relationship between appliance geometry and appliance material properties. To this end, various archwire alloys were first drawn through 0.018" stainless steel brackets when the interbracket distance was very large (18mm). Then just stainless steel archwires were drawn through the same 0.018" stainless steel brackets whilst varying the interbracket distances from 18 to 8 mm in four steps. Next, the previous experiment was repeated using a 0.022" slot instead of a 0.018" slot. Finally, saliva was added to what were all previously dry brackets, the slot size increased to 0.022", and various archwire alloys investigated over interbracket distances that varied from 18 to 8 mm. What was found was that wire stiffnesses have a profound influence on binding, that an inverse relationship exists between resistance to sliding and interbracket distance, that once the clearance no longer exists the resistance to sliding is independent of the slot width, and that saliva acts like an adhesive for stainless steel wires but is neutral for cobalt-chromium wires.