

Principal Investigator: Tamara Justus, DDS, MSD, Assistant Professor of Orthodontics, Oregon Health and Science University, Portland, OR

CO-Investigator: Arthur C. Brown, PhD, Professor Emeritus, Biological Structure and Function, Oregon Health and Science University, Portland, Oregon

Consultant: Douglas S. Ramsay, D.M.D., PhD., M.S.D., Associate Professor of Orthodontics and Pediatric Dentistry, University of Washington, Seattle, Washington

Title: Pulpal Blood Flow Changes in Maxillary Canines During Retraction with Fixed Appliances

Institution: Oregon Health and Science University

Summary of the findings:

In the four subjects tested so far, there was little change in blood flow upon immediate application of the 50 gm force, except for one subject, who showed a modest increase in flow (see Table 1). Three of the subjects showed a delayed decrease in flow, with a minimum occurring 1 day or 3-5 days following force application; the fourth subject had little change in flow throughout the experiment. Three of the four subjects showed a return to at least baseline flow by the end of the 14 day period; one subject had reduced flow (compared to baseline) at the end of force application, although she returned partway toward baseline values after the force was removed.

Control values were consistent throughout the experimental period for three of the subjects; one subject showed transient decrease in control tooth blood flow.

Table 1

| Subject            | Age  | Sex | Baseline | Immed | 1day | 3-5days | 7days | 14 days | post coil |
|--------------------|------|-----|----------|-------|------|---------|-------|---------|-----------|
| Experimental teeth |      |     |          |       |      |         |       |         |           |
| MO                 | 20-5 | F   | 8.65     | 8.18  | 6.69 | 5.40    | 7.64  | 2.92    | 5.08      |
| SH                 | 13-1 | F   | 6.15     | 5.58  | 6.72 | 1.35    | 3.10  | 7.15    | 7.45      |
| MW                 | 12-7 | M   | 7.21     | 7.78  | 8.60 | 9.33    | 7.02  | 6.13    | 4.12      |
| SW                 | 11-3 | F   | 6.85     | 9.05  | 4.43 | 9.60    | 9.45  | 10.08   | 13.85     |
| Control teeth      |      |     |          |       |      |         |       |         |           |
| MO                 | 20-5 | F   | 7.98     |       | 7.10 | 6.57    | 6.62  | 6.65    |           |
| SH                 | 13-1 | F   | 7.05     |       | 7.30 | 3.80    | 3.73  | 8.29    |           |
| MW                 | 12-7 | M   | 8.00     |       | 7.07 | 6.62    | 7.07  | 5.03    |           |
| SW                 | 11-3 | F   | 7.15     |       | 6.87 | 5.86    | 6.30  | 6.28    |           |

Table 1. Pulp perfusion rates for experimental and control teeth. Age is indicated as year-month. "Baseline" is the flow value before application of force. "Immed" is flow immediately after the force was applied to the experimental tooth. Days of force duration is indicated by "1 day", "3-5 days", etc. "Post coil" is flow just after the coil was removed.