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Effect of orthodontic forces on blood flow in human gingiva

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ABSTRACT

The relationship of gingival blood flow to the magnitude and duration of applied force was studied in humans using Laser Doppler flowmetry. The sample consisted of five adult volunteers with interdental space between their maxillary central incisors. The labial surface of each central incisor was bonded with a buccal tube and a spring force was applied to close the space. The forces applied were 50 g, 80 g, 120 g, and 250 g. Each force was applied for 30 seconds, 60 seconds, 90 seconds, 5 minutes, and 10 minutes. The blood flow signals were recorded continuously using a pen recorder. Measurements indicated that blood flow was negatively correlated to the amount of force applied. The duration of reactive hyperemia was positively correlated to the duration of force. Laser Doppler flowmetry measures blood flow in superficial periodontal tissues. Yet, the relationship of blood flow changes to the magnitude and duration of orthodontic force suggests that measurements of gingival blood flow may provide a means of estimating physiologic orthodontic forces.

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KEY WORDS: Gingival blood flow, Orthodontic force, Laser Doppler flowmeter, Reactive hyperemia.