

## Non-invasive measurement of pulpal blood flow

*P. Wilder-Smith, Heidelberg University, Heidelberg, West Germany.*

Laser Doppler flowmetry (LDF) is used to measure blood flow non-invasively in microvascular systems. This study investigated LDF as a technique for measuring pulpal blood flow (PBF) in human teeth, and monitored the effects of active enamel, superficial and deep dentine caries and its treatment.

In 30 patients the PBF of 183 virgin healthy teeth was measured mesially, mid-buccally and distally four times over a period of 4 weeks. Fifty-four vital carious teeth in 30 patients matched with the control group being split into three groups as follows: (i) asymptomatic enamel caries; (ii) pain from hot and cold, superficial dentine caries; (iii) spontaneous pain, deep dentine caries. PBF was measured before atraumatic caries removal, Dycal<sup>1</sup>, Cavit<sup>2</sup> application and after 3 and 14 days.

Using a LDF meter (Periflux<sup>3</sup>), PBF measurements showed 8.9 per cent variation. The significant difference averaged 7.9 per cent. Mean PBF of healthy teeth measured 16.9 per cent FSD with no significant difference between: individual patients ( $P > 0.05$ ), individual types of teeth ( $P > 0.01$ ), maxillary and mandibular teeth ( $P > 0.01$ ). PBF in teeth with enamel caries was normal before and after treatment. Superficial and deep dentine caries raised PBF significance ( $P > 0.01$ ). After treatment PBF levels returned to normal in all but a third of the deep dentine caries group, where PBF remained unchanged. These findings confirm histological and functional studies on pulpal circulation.

LDF measures PBF with acceptable accuracy and reproducibility, providing information on PBF in healthy and carious teeth. It shows promise for diagnosis and monitoring treatment effectiveness.

<sup>1</sup>L. D. Caulk Co., Dentsply, Milford, Delaware, USA.

<sup>2</sup>ESPE GMBH, D-8031 Seefeld, West Germany.

<sup>3</sup>Perimed KB, Stockholm Sweden.