A SCANNING ELECTRON MICROSCOPIC STUDY OF THE MARMOSET PALATE AND PERIODONTIUM MICROVASCULATURE USING CORROSION CASTS

A report submitted in partial fulfillment of
the requirements for the degree of
Master of Dental Surgery

by

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SUMMARY

Previous plastic perfusion studies in mice, rats and dogs have indicated that important species differences exist in the oral microvasculature.

Earlier microvascular studies were hampered by technical limitations of the light microscope. The SEM, with its superior resolution, magnification and depth of focus, has enabled detailed examination of the microvasculature to be undertaken.

The aim of this study was to investigate the microvasculature of the marmoset palate and periodontium using SEM stereopair micrographs of microcorrosion casts for three-dimensional evaluation of species differences.

Eight adult female marmosets (*Callithrix jacchus*) were used. The animals were anaesthetized and perfused with Mercox resin. The tissues were corroded with 10% HCl and 10% KOH solutions and the cleaned casts were coated and examined in the SEM.

Vascular casts were classified according to their endothelial imprint pattern (Hodde, 1981), branching pattern, and vessel diameter (Rhodin, 1967, 1968).

Throughout the entire hard palate, a series of papillary loops extended perpendicularly from a subpapillary plexus to the connective tissue papillae. These loops showed a general sagittal orientation, and were aligned on the crests of the rugae to form a well-delineated spine. The subpapillary plexus formed a canopy over an underlying venous network which lacked a definite orientation.

In the gingivae of upper and lower premolar and molar teeth, a gap was observed between the vasculature on the

sulcular side and on the vestibular and palatal side. Despite the gap, anastomoses occurred between the two sides at a deeper level.

Under the crevicular epithelium, a circular plexus of vessels encircled each tooth. Crevicular loops arose from this circular plexus, also encircling the tooth.

The periodontal ligament vasculature consisted of a network of occluso-apically orientated vessels, comprising mainly postcapillary-sized venules. Capillaries and arterioles were less abundant. Perforating branches from the alveolar bone contributed to the periodontal ligament network.

Vessels of the gingival plexus anastomosed with those of the periodontal ligament and the palate.

Species differences with the mouse, rat and dog were reflected in all sites studied at the microvascular level. These differences may be important in understanding oral microvascular bed function and the vascular response in periodontal disease.

STATEMENT

This report contains no material which has been accepted for the award of any other degree or diploma in any university.

To the best of my knowledge and belief, this report contains no material previously published or written by another person, except where due reference is made in the text of the report.

The author consents to the thesis being made available for photocopying and loan if accepted for the award of the degree.

D. LEE

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