



THE FINE STRUCTURE AND DISTRIBUTION OF
VESSELS IN A SMALL SEGMENT OF HUMAN
PERIODONTAL LIGAMENT AND ALVEOLAR BONE.

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SUMMARY.

From each of six teenage orthodontic patients one healthy, functional maxillary first premolar was surgically extracted, leaving biopsied buccal bone and periodontal ligament attached to each root.

The intact specimens were processed for viewing in the transmission electron microscope (TEM). Horizontal serial sections 1 μ m thick, for viewing in the light microscope (LM), were taken from the apical through to the cervical end of each specimen. Where vessels of any type were seen in either periodontal ligament or alveolar bone, silver sections of the same area and orientation were mounted on grids and photographed in the TEM.

Medullary tissue of alveolar trabecular spaces was found to communicate with the overlying gum tissues, and with the periodontal ligament, via foramina. Medullary interstitial tissue was identified as vestigial haematopoietic tissue, adipose and sinusoidal.

The most prominent feature of each specimen was the presence of large vessels which almost filled each trabecular space, and which ramified through the buccal cortex and the alveolar socket wall. The ligamentous

extensions of these vessels were the most obvious feature of the periodontal membrane, raising question that they have not been previously investigated. Long extensions of the large vessels linked ligamentous pericytic venules, which ran longitudinally in loose connective tissue columns within a stroma of principal fibres. The impression given was that ligamentous fluids were 'funnelled', via the foramina, into the large vessels of the trabecular spaces.

Some of the ligamentous pericytic venules passed through the foramina into the trabecular tissue, where they appeared to act as 'vasa vasorum' to the large medullary vessels.

The large vessels were tortuous and convoluted, being of the order of millimetres long, and tens of microns in diameter. They were greater than $2 \cdot 10^3 \times$ the luminal size of the pericytic venules.

No periodontal vessel was seen characteristic of the arterial side of the circulation.

Published ultrastructural criteria tentatively identified the large vessels as initial lymphatics. However, the presence of lymphatics in bone being without a

published precedent, suggestions are made how definitively to class these vessels.

It is strongly suggested that ligament and bone are one unit, and that a proper periodontal functional analysis must await stereologic morphometric data for the combined tissues. However, based upon the reported findings is conjectured a simple microcirculation for the periodontium and, proposed, are the components of a system which probably controls alveolar responses both to changes in masticatory patterns and to orthodontic treatment.

Suggestions have been detailed to further investigate the reported findings.