



**In vitro STUDIES OF THE PHARMACODYNAMICS OF THE
ACTIVE COMPONENTS OF LEDERMIX PASTE, A
CORTICOSTEROID-ANTIBIOTIC ROOT CANAL DRESSING MATERIAL**

VOLUME I

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ABSTRACT

Ledermix is a compound therapeutic agent employed as a primary endodontic dressing. It contains, among other components, an antibiotic (demethylchlortetracycline) and a corticosteroid (triamcinolone). This study was undertaken to determine the in vitro release characteristics and dentine diffusion of the two active components in order to provide an indication of their availability to the periapical and periodontal tissues with time.

A new method has been devised using plastic root canal models and freshly-extracted human teeth filled with Ledermix paste containing 0.01 percent ^3H -triamcinolone and bathed in phosphate buffered saline (pH 7.4). The release and diffusion of demethylchlortetracycline and ^3H -triamcinolone were determined by using spectrophotometry and liquid scintillation spectrometry respectively at various time intervals up to 14 weeks. The concentrations of the two components within the coronal, mid-root and apical dentine were determined. Diffusion rates through coronal dentine to the pulp were also determined up to 8 days.

The plastic canal models showed that apical release is mainly dependent on foramen diameter size and only slightly dependent on paste volume. Peak release occurred in the first minute and then declined exponentially with time. There was little difference in the release from human teeth with an open apex compared with those with

an apical foramen which had been sealed, indicating that the main supply route to the periodontal tissues was via the dentinal tubules.

Removal of the canal smear layer by using E.D.T.A.C. as an irrigant significantly increased the rates of diffusion. Removal of the cementum had a similar effect, indicating that both the smear layer and cementum act as barriers to diffusion. Combining Ledermix paste with Pulpdent paste significantly slowed the release of the Ledermix components.

The mean concentrations of demeclocycline found within dentine indicate that its efficacy as an antibacterial agent within the dentinal tubules is questionable. Further research is indicated to determine whether other antibiotics may be more useful in these situations.

Data is not currently available on the concentration of triamcinolone required to achieve a local therapeutic effect, however clinical evidence exists which shows that the concentrations achieved by the use of Ledermix in endodontics are effective.

DECLARATION

This research report is submitted as a partial requirement for the Degree of Master of Dental Surgery in Endodontics at the University of Adelaide. Further requirements for the Degree were completed during 1984 and 1985.

This research 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, this report contains no material previously published or written by another person, except where due reference is made in the text of this report.

I consent to this research report being made available for photocopying and loan if it is accepted for the award of the degree.

PAUL V. ABBOTT

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