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HEALING PATTERNS OF TRANSPLANTED ROOTS COATED WITH AN ALLOGENEIC FIBRIN-FIBRONECTIN CONCENTRATE

A HISTOLOGICAL STUDY ON THE CHACMA BABOON *PAPIO URSINUS*

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A research report submitted to the Faculty of Health Sciences,
University of the Witwatersrand, Johannesburg,
in partial fulfilment of the requirements for the degree
of
Master of Science

Johannesburg, 2012

DECLARATION

I hereby declare that this research report is my own unaided work, except where due acknowledgement for assistance received has been made. It is being submitted for the degree of Master of Science in the University of the Witwatersrand, Johannesburg. It has not been presented before for any degree or examination at this or any other University.

..……..

Simitha Singh-Rambiritch

signed this …… day of …… 2012

The work reported in this thesis was performed at the Bone Research Unit, School of Physiology, Medical Research Council/University of the Witwatersrand, Johannesburg, South Africa.

To my parents

Dewakpersad and Chandini Singh

ABSTRACT

This experiment was designed to evaluate whether an allogeneic fibrin-fibronectin protein concentrate (AFFP) can not only prevent ankylosis and root resorption of autotransplanted roots during healing but contribute to regenerate a periodontal attachment as well. In two adult male baboons (*Papio ursinus*), four horizontal alveoli, 2 to 3 mm deep, were prepared bilaterally in the buccal alveolar and basal bone adjacent to the first and second mandibular molars to receive the roots of the adjacent two molars. Following hemisection, the first and second mandibular molars were extracted, the coronal two-thirds of the roots were planed to remove the remnants of the periodontal ligament and cementum and a notch was placed at the junction between the planed and non-planed surfaces. The planed surfaces were demineralised with citric acid at pH 1 for 3 min. Before transplantation, the crowns were resected and the experimental roots and alveoli were coated with the AFFP prepared from pooled fresh-frozen baboon plasma. The animals were killed 55 days after the transplantations. Histometrical evaluation was performed on serial sections cut in a bucco-lingual direction parallel to the long axis of the transplanted roots. An analysis of variance, in relation to the extent of ankylosis and root resorption, revealed minimal differences between the treatments of experimental and control roots both in the planed and non-planed sections. In this primate autotransplantation model, the treatment with AFFP did not prevent ankylosis and root resorption and did not result in the establishment of a new periodontal attachment.

Key words: non-human primates, autotransplanted roots, fibrin-fibronectin concentrate.

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ABBREVIATIONS

A	ankylosis
A1PUR	animal 1, posterior upper right
A1PLR	animal 1, posterior lower right
A1AUR	animal 1, anterior upper right
A1ALR	animal 1, anterior lower right
A1PUL	animal 1, posterior upper left
A1PLL	animal 1, posterior lower left
A1AUL	animal 1, anterior upper left
A1ALL	animal 1, posterior lower left
A2PUR	animal 2, posterior upper right
A2PLR	animal 2, posterior lower right
A2AUR	animal 2, anterior upper right
A2ALR	animal 2, anterior lower right
A2PUL	animal 2, posterior upper left
A2PLL	animal 2, posterior lower left
A2AUL	animal 2, anterior upper left
A2ALL	animal 2, anterior lower left
AFFP	allogeneic fibrin-fibronectin protein concentrate
BMP(s)	bone morphogenetic protein(s)
B:N-A	bony interface: from notch to apex
B:N-C	bony interface: from notch to crown
° C	degree Celsius/centigrade
CH_3COOH	acetic acid
IM	intramuscular

IV	intravenous
KPa	international unit of pressure
M:N-A	mucosal interface: from notch to apex
M:N-C	mucosal interface: from notch to crown
n°	number
NA	new attachment
NI	non-inserted fibres
PBS	phosphate-buffered saline
rpm	rotation per minute
RR	root resorption

Statistical abbreviations

A	anterior upper and lower alveoli
C or c	control
DV	dependant variable
Ex	experimental
F	F-ratio
ICC	intraclass correlation coefficient
MS	mean square
p	p-value
P	posterior upper and lower alveoli
propn	proportion
RSD	relative standard deviation
SS	sum of squares
Std Dev	standard deviation
Std Err	standard error