



## LIST OF CONTENTS

TITLE PAGE .....	i
RESEARCH APPROVAL .....	ii
LEMBAR PENGESAHAN .....	iii
STATEMENT .....	iv
LIST OF CONTENTS .....	v
LIST OF FIGURES .....	vi
LIST OF TABLES .....	vii
LIST OF ATTACHEMENT .....	viii
LIST OF ABBREVIATIONS .....	ix
ABSTRACT .....	x
CHAPTER I .....	1
A. Background .....	1
B. Problem statement .....	7
C. Aim of the study .....	8
D. Benefits of the research .....	8
E. Originality of the study .....	9
CHAPTER II .....	11
A. Literature review .....	11
1. Pulp – Dentine complex .....	11
a. Dentine .....	13
b. Odontoblasts Layer .....	13
c. <i>Cell-free zone</i> .....	14
d. <i>Cell-rich zone</i> .....	15
e. <i>Pulp proper</i> .....	15
2. Process of dental caries .....	16
3. Pulp disease .....	17
a. Etiology of pulp disease .....	18
b. Classification of pulp disease .....	20
i. Reversible Pulpitis .....	20
ii. Irreversible pulpitis .....	21
4. Inflammation .....	22
5. Inflammatory response mechanisms and Inflammatory response of the Dental Pulp .....	23
6. Neutrophils .....	24
7. Cyclooxygenase .....	27
8. Pulpotomy .....	28
9. Gelatin .....	30
10. Chitosan .....	32
11. TEOS .....	33
12. Experimental Animal Pulpotomy Model .....	35
B. Theoretical Basis .....	37
C. Theoretical framework .....	40
D. Conceptual framework .....	41
E. Hypothesis .....	41



CHAPTER III .....	42
A. Type of research .....	42
B. Identification of variables .....	42
1. Depender.....	42
2. Independent variables .....	42
3. Inclusion criteria .....	42
4. Exclusion criteria .....	42
5. Controllable variables .....	42
6. Uncontrollable variables .....	43
C. Operational definition .....	43
D. Sample collection .....	44
E. Apparatus and Materials .....	45
1. Apparatus .....	45
2. Materials .....	46
F. Course of research .....	47
1. Place of research .....	47
2. The procedure of research .....	47
a. Approval from the ethical commission .....	47
b. Research permit at LPPT .....	47
c. Procedure of making Gelatin-chitosan-TEOS-Ca(OH)2 .....	47
d. Preparation of experimental animals .....	48
e. Experimental animal dental treatment .....	48
f. Preparation of histological preparations .....	48
g. Immunohistochemical staining .....	49
h. Hematoxylin Eosin staining .....	51
i. Observation .....	51
G. Data Analysis .....	53
CHAPTER IV .....	54
A. Research Results .....	54
1. Neutrophils Number .....	54
2. COX-2 expression .....	57
B. Discussion .....	62
CHAPTER V .....	68
A. Conclusion .....	68
B. Recommendations .....	68
References .....	68
Attachments .....	80