TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
ABSTRACT (THAI)	iv
ABSTRACT (ENGLISH)	vi
LIST OF TABLES	x
LIST OF ILLUSTRATIONS	xi
CHAPTER I INTRODUCTION	5 1
1.1 Introduction	1
1.2 Purpose of the study	3
1.3 Anticipated benefits	3
CHAPTER II REVIEW OF LITERATURE	4
2.1 Treatment of skeletal open bite	4
2.2 Assessment of molar intrusion	5
2.3 Assessment of miniscrew implant stability	5
2.4 Gingival crevicular fluid, peri-implant crevicular fluid	V ₆ e
and peri-miniscrew implant crevicular fluid	
2.5 Biomarkers in gingival crevicular fluid	7
2.6 Alkaline phosphatase	9

	Page
CHAPTER III MATERIALS AND METHODS	17
3.1 Materials	17
3.2 Methods	18
CHAPTER IV RESULTS	23
CHAPTER V DISCUSSION	36
CHAPTER VI CONCLUSIONS	41
BIBLIOGRAPHY	42
APPENDIX	50
CURRICULUM VITAE	62

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright[©] by Chiang Mai University All rights reserved

LIST OF TABLES

Table

1 Age (year) distribution by gender and number of the subjects (n)

23

in each group in this present study

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright[©] by Chiang Mai University All rights reserved

TABLE OF ILLUSTRATIONS

F	igure NULL 1860	Page
1	Orthodontic appliances used in this study	18
2	Sentalloy®closed coil springs attached transpalatal arch and miniscrew implant	20
3	Boxplot graphs show the medians of alkaline phosphatase levels around	26
	experimental molars, control molars and miniscrew implants during	
	the unloaded period (2 weeks) and the loaded periods (12 weeks)	
4	Boxplot graphs show the medians of alkaline phosphatase levels around	27
	experimental molars during the unloaded period (2 weeks) and each	
	one-week interval of the loaded period (12 weeks)	
5	Boxplot graphs show the medians of alkaline phosphatase levels around	28
	right mandibular first molars during unloaded period (2 weeks) and each	
	one-week interval of the loaded period (12 weeks)	
6	Boxplot graphs show the medians of alkaline phosphatase levels around	29
	right maxillary second molars during the unloaded period (2 weeks) and each	
	one-week interval of the loaded period (12 weeks)	
7	Boxplot graphs show the medians of alkaline phosphatase levels around	30
	miniscrew implants during the unloaded period (2 weeks) and each	
	one-week interval of the loaded period (12 weeks)	
8	Boxplot graphs show the medians of alkaline phosphatase levels around	31
	Experimental molars, during the unloaded period (2 weeks) and each	
	two-week interval of the loaded period (12 weeks)	

Figure	Page
9 Boxplot graphs show the medians of alkaline phosphatase levels around	32
right mandibular first molars during the unloaded period (2 weeks) and each	
two-week interval of the loaded period (12 weeks)	
10 Boxplot graphs show the medians of alkaline phosphatase levels around	33
right maxillary second molars during the unloaded period (2 weeks) and each	
two-week interval of the loaded period (12 weeks)	
11 Boxplot graphs show the medians of alkaline phosphatase levels around	34
miniscrew implants during the unloaded period (2 weeks) and each	
two-week interval of the loaded period (12 weeks)	
12 Boxplot graphs show the medians of alkaline phosphatase levels around	50
experimental molars during the unloaded period (2 weeks) and each	
three-week interval of the loaded period (12 weeks)	
13 Boxplot graphs show the medians of alkaline phosphatase levels around	51
right mandibular first molars during the unloaded period (2 weeks) and each	
three-week interval of the loaded period (12 weeks)	
14 Boxplot graphs show the medians of alkaline phosphatase levels around	52
right maxillary second molars during the unloaded period (2 weeks) and each	
three-week interval of the loaded period (12 weeks)	
15 Boxplot graphs show the medians of alkaline phosphatase levels around	53
miniscrew implants during the unloaded period (2 weeks) and each	
three-week interval of the loaded period (12 weeks)	

Figure	Page
16 Boxplot graphs show the medians of alkaline phosphatase levels around	54
experimental molars during the unloaded period (2 weeks) and each	
four-week interval of the loaded period (12 weeks)	
17 Boxplot graphs show the medians of alkaline phosphatase levels around	55
right mandibular first molars during the unloaded period (2 weeks) and each	
four-week interval of the loaded period (12 weeks)	
18 Boxplot graphs show the medians of alkaline phosphatase levels around	56
right maxillary second molars during the unloaded period (2 weeks) and each	
four-week interval of the loaded period (12 weeks)	
19 Boxplot graphs show the medians of alkaline phosphatase levels around	57
miniscrew implants during the unloaded period (2 weeks) and each	
four-week interval of the loaded period (12 weeks)	
20 Boxplot graphs show the medians of alkaline phosphatase levels around	58
experimental molars during the unloaded period (2 weeks) and each	
six-week interval of the loaded period (12 weeks)	
21 Boxplot graphs show the medians of alkaline phosphatase levels around	59
right mandibular first molars during the unloaded period (2 weeks) and each	
six-week interval of the loaded period (12 weeks)	
22 Boxplot graphs show the medians of alkaline phosphatase levels around	60
right maxillary second molars during the unloaded period (2 weeks) and each	
six-week interval of the loaded period (12 weeks)	

Figure

23 Boxplot graphs show the medians of alkaline phosphatase levels around
miniscrew implants during the unloaded period (2 weeks) and each
six-week interval of the loaded period (12 weeks)



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright[©] by Chiang Mai University All rights reserved