

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
ABSTRACT (ENGLISH)	v
ABSTRACT (THAI)	vii
LIST OF TABLES	xii
LIST OF FIGURES	xiv
CHAPTER 1 INTRODUCTION	1
Statement of the problems and objectives	1
CHAPTER 2 REVIEW OF THE LITERATURE	4
2.1 Nitrous oxide usage in dentistry	4
2.2 Properties of nitrous oxide	6
2.3 Administrative techniques of nitrous oxide/oxygen	11
inhalation sedation	
2.3.1 Slow titration technique	11
2.3.2 Rapid induction technique	12
2.4 Recovery from nitrous oxide/oxygen	13
inhalation sedation	

2.4.1	Diffusion hypoxia	14
2.4.2	Physiologic parameters	18
2.4.3	Objective signs and subjective symptoms	19
2.4.4	Psychomotor performance	20
2.4.5	Assessing adequate recovery and recovery time	24
2.5	Anxiety and satisfaction assessment	24
CHAPTER 3 MATERIALS AND METHODS		27
3.1	Research design	27
3.2	Research populations and samples	27
3.2.1	Study populations	27
3.2.1.1	Inclusion criteria	27
3.2.1.2	Exclusion criteria	28
3.2.2	Sample size	28
3.2.3	Random sampling	29
3.3	Calibration	30
3.4	Treatment protocol	30
3.4.1	Before nitrous oxide administration	31
3.4.2	Nitrous oxide administration	32
3.4.2.1	Administrative techniques	33
3.4.2.2	Criteria for the state of ideal sedation	34
3.4.2.3	Criteria of oversedation	34
3.4.2.4	Ending techniques	34
3.4.2.5	Criteria of diffusion hypoxia	35
3.4.3	Recovery period	36

3.4.3.1 Criteria for discharge	36
3.5 Data analysis	37
CHAPTER 4 RESULTS	39
4.1 Baseline variables	39
4.2 Physiologic parameters	41
4.2.1 Blood pressure	41
4.2.2 Heart rate	44
4.2.3 Oxygen saturation	45
4.3 Psychomotor performance	47
4.4 Post-sedation complications	48
4.5 Recovery time	49
4.6 Level of satisfaction of sedation method	50
CHAPTER 5 DISCUSSION	51
Conclusion	63
Further research suggestions	64
BIBLIOGRAPHY	65
APPENDICES	75
Appendix A Certificate of ethic clearance	76
Appendix B Patient information sheet and informed consent	77
Appendix C Data collection	82
Appendix D Statistical analysis	95
CURRICULUM VITAE	110

LIST OF TABLES

Table	Page
1 N ₂ O and other inhalation anesthetic agents	7
2 Baseline variables	40
3 Change of systolic blood pressure from the baseline at different stages of sedation	42
4 Change of diastolic blood pressure from the baseline at different stages of sedation	43
5 Change of heart rate from the baseline at different stages of sedation	44
6 Frequency of post-sedation oxygen saturation drop compared to the baseline in each group.	45
7 Post-sedation oxygen saturation at different time point	46
8 Time that psychomotor performance returned to the baseline after N ₂ O termination	47
9 Occurrence of post-sedation complications in each group	48
10 Recovery time in each group	49
11 Level of satisfaction of each sedation method	50
12 Comparison of length of procedure between the SO and SR group	100
13 Comparison of length of procedure between the SO and RO group	100
14 Comparison of length of procedure between the SO and RR group	101

15	Comparison of length of procedure between the SR and RO group	101
16	Comparison of length of procedure between the SR and RR group	102
17	Comparison of length of procedure between the RO and RR group	102
18	The One –Way ANOVA test of the change of blood pressure and heart rate from the baseline at the end of procedure between groups	103
19	The Post Hoc multiple comparison of the change of systolic blood pressure and heart rate from the baseline at the end of procedure between groups	104
20	Comparison of frequency of post-sedation oxygen saturation drop between four groups	105

LIST OF FIGURES

Figure	Page
1 Gases in the atmospheric air	15
2 N ₂ O/O ₂ administration	15
3 N ₂ O/O ₂ is discontinued	16
4 Diffusion hypoxia	16
5 The sample figure of the Bender Motor Gestalt Test	22
6 The Trieger test that is modified from the Bender Motor Gestalt Test	22
7 Sequence of administrative and ending techniques of N ₂ O/O ₂	29
8 The Global-Anxiety Visual Analog Scale (GA-VAS)	31
9 The Trieger test	32
10 The Visual Analog Scale (VAS)	36
11 The graph shows pre-sedation anxiety level of the SO group	95
12 The graph shows pre-sedation anxiety level of the SR group	96
13 The graph shows pre-sedation anxiety level of the RO group	96
14 The graph shows pre-sedation anxiety level of the RR group	97
15 The graph shows length of procedure time of the SO group	98
16 The graph shows length of procedure time of the SR group	98
17 The graph shows length of procedure time of the RO group	99
18 The graph shows length of procedure time of the RR group	99

19	The graph shows time that psychomotor performance returned to the baseline after N ₂ O termination of the SO group	105
20	The graph shows time that psychomotor performance returned to the baseline after N ₂ O termination of the SR group	106
21	The graph shows time that psychomotor performance returned to the baseline after N ₂ O termination of the RO group	106
22	The graph shows time that psychomotor performance returned to the baseline after N ₂ O termination of the RR group	107
23	The graph shows disappearance of subjective symptoms from sedation of the SO group	108
24	The graph shows disappearance of subjective symptoms from sedation of the SR group	108
25	The graph shows disappearance of subjective symptoms from sedation of the RO group	109
26	The graph shows disappearance of subjective symptoms from sedation of the RR group	109