

**RADIATION DOSIMETRY AND ACCURACY OF LINEAR ACCELERATOR
(LINAC) USING THERMOLUMINESCENT DOSIMETER (TLD)**

By

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

RADIATION DOSIMETRY AND ACCURACY OF LINEAR ACCELERATOR (LINAC) USING THERMOLUMINESCENT DOSIMETER (TLD)

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Linear accelerator (LINAC) is a device that accelerates charged particles to produce ionizing radiation to eliminate tumors. However, the surrounding healthy cells may also be irradiated. This study aimed to determine the radiation dose and accuracy of ionizing radiation produced by LINAC, and determine its distribution inside and outside of the targeted area. In this study, Varian Clinac iX D-2300 at MRCCC SHS was assessed. To measure the radiation dose, thermoluminescent dosimeter (TLD) chips were used. The TLD chips were fixed on several locations on the surface of a water equivalent solid phantom, placed at isocenter of the machine and exposed to 6MV, 200MU photon beam, 15MV, 200MU photon beam and 6MeV, 200MU electron beam. In two examinations, the radiation dose was highest at isocenter. In all examinations, radiation dose was fairly distributed across the targeted area with some variations, and rapidly reduced at the edge. The outside of the targeted area received a significant amount of radiation dose ranging from 0.983 ± 0.092 Gy to 8.433 ± 0.448 Gy for all examinations. This study concluded that the LINAC at MRCCC delivers a well-distributed radiation dose to the targeted area, but surrounding healthy cells are still prone to radiation risks.

Keywords: linear accelerator, thermoluminescent dosimeter, water equivalent solid phantom, radiation dose distribution

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DEDICATION

This thesis is especially dedicated to my family.

I hope I make you proud.

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TABLE OF CONTENTS

	Page
STATEMENT BY THE AUTHOR.....	2
ABSTRACT.....	3
DEDICATION.....	5
ACKNOWLEDGEMENTS.....	6
TABLE OF CONTENTS.....	7
LIST OF FIGURES.....	9
LIST OF TABLES.....	11
CHAPTER 1 – INTRODUCTION.....	12
1.1 Background.....	12
1.2 Research Problems.....	13
1.3 Research Objectives.....	14
1.4 Significance of Study.....	14
1.5 Research Questions.....	14
1.6 Hypothesis.....	15
CHAPTER 2 - LITERATURE REVIEW.....	16
2.1 Radiation Therapy.....	16
2.2 Medical Linear Accelerator.....	17
2.3 Radiation Dosimetry, Limit and Safety.....	22
2.3.1 Dose Limit and Safety.....	22
2.3.2 Thermoluminescent Dosimeter.....	23
2.3.3 Solid Water Phantom.....	25
CHAPTER 3 – RESEARCH METHODS.....	27
3.1 Venue and Time.....	27
3.2 Materials and Equipment.....	27
3.3 Design of Experiments.....	27
3.4 Experimental Procedure.....	31
3.4.1 Measurement Using TLD Chips.....	31
3.4.2 Calibration Factor.....	35

3.5 Analytical Procedure	39
CHAPTER 4 – RESULTS AND DISCUSSION	40
4.1 Analysis on 6 MV, 200 MU Photon Beam	40
4.2 Analysis on 15 MV, 200 MU Photon Beam	43
4.3 Analysis on 6 MeV, 200 MU Electron Beam	45
4.4 Comparison of Different Ionizing Radiation Beams.....	47
CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS	52
5.1 Conclusions	52
5.2 Recommendations	53
GLOSSARY.....	54
REFERENCES.....	57
APPENDICES	60
Appendix 1 – IAEA Safety Standard Series No. RS-G-1.5 2002 Chapter 5	60
Appendix 2 – Data Results and Tables	61
Appendix 3 – Equations and Formulas	68
CURRICULUM VITAE	69

LIST OF FIGURES

Figure	Page
1	Schematic diagram of a linear accelerator (Khan, 2003)..... 18
2	Schematic diagram of a linear accelerator showing all parts of the unit (Podgorsak, 2005). 18
3	Treatment head forming photon beams (A) and electron beams (B) (Khan, 2003). 20
4	Photon beam production by means of bremsstrahlung effect, shown by incident electrons number 1 - 3 (Seibert, 2004)..... 21
5	Working principle of a TLD: (A) trapping event of electrons and holes in the crystal lattice, (B) luminescing event due to electron release by heating. (Attix, 1986). 23
6	Schematic diagram depicting the process of TLD reading (Johns and Cunningham, 1983)..... 24
7	LiF : Mg, Ti TLD chips used in this study..... 25
8	Several slabs of solid water phantom put together, with dimension of 30 x 30 x 11 cm ³ 26
9	A set up diagram from the side, showing the placement of the solid phantom and the TLD chips being irradiated with ionizing radiation beam (photon beam or electron beam) produced by the LINAC. 28
10	Diagram showing the set up of the SSD of 100 cm. 29
11	The arrangement of points of measurements on the surface of the solid phantom (marked by alphabets O to E). The points of measurements were placed both on the inside of the targeted area (marked by stripe patterns) and on the outside of the targeted area. 29
12	Varian Clinac iX D-2300 at MRCCC Siloam Hospitals Semanggi used in this study..... 32
13	Placement of LiF : Mg, Ti chips on the surface of the solid phantom..... 32

14	Placement of the solid phantom with TLD chips at the isocenter of the machine for photon beam examination (left) and electron beam examination with electron applicator (right).	33
15	Set up of SSD of 100 cm.....	33
16	TLD reading at PTKMRN-BATAN using Thermo Scientific HARSHAW TLD Model 3500 Manual Reader.....	35
17	Set up of reference condition to obtain calibration factors.....	36
18	Additional phantom slabs were added on top of the 30 x 30 x 11 cm ² solid phantom to create the reference depth (left) and placed at the isocenter of the machine (right).....	38
19	Average radiation dose for first examination using 6 MV, 200 MU photon beam.....	41
20	Average radiation dose for second examination using 15 MV, 200 MU photon beam.....	43
21	Average radiation dose for third examination using 6 MeV, 200 MU electron beam.....	45
22	Average radiation dose inside of the targeted area for all three examinations.....	47
23	Dose profile showing a similar trend line with all examinations in this study, where the x-axis is the distance from the isocenter and the y-axis is the relative dose (Khan, 2003).....	48
24	Average radiation dose inside of the targeted area (points of measurement O and A) for all three examinations.....	50

LIST OF TABLES

Table		Page
1	Arrangement of points of measurements	30
2	Specification of measurements using TLD chips	34
3	Reference conditions to determine absorbed dose to water	37
4	Average radiation dose for first examination using 6 MV, 200 MU photon beam	40
5	Average radiation dose for second examination using 15 MV, 200 MU photon beam	43
6	Average radiation dose for third examination using 6 MeV, 200 MU electron beam	45
7	Average radiation dose detected on the inside of the targeted area (points of measurement O and A) for all ionizing radiation beams	49