



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكرو فيلم

جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
على هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %



شبكة المعلومات الجامعية



بعض الوثائق الأصلية تالفة



شبكة المعلومات الجامعية



بالرسالة صفحات
لم ترد بالأصل

**Dosimetric Planning Consideration of
Different High Energy Radiation Including
Stereotaxy in Patients Receiving
Radiotherapy**

Thesis

*Submitted to the Medical Research Institute
In partial fulfilment of the requirements for the
Philosophy Doctor Degree of Medical Biophysics*

By

Ola Mohamed El-Basueny Zouell

MBBCh. , MSc.

Assistant Lecturer of Medical Physics

DEPARTMENT OF RADIOLOGY

FACULTY OF MEDICINE

UNIVERSITY OF ALEXANDRIA

2004

B

1 - C V I

SUPERVISORS

Prof. Dr. Mohamed Farid Noaman
Professor of Medical Physics and Radiation Protection
Faculty of Medicine
University of Alexandria

Prof. Dr. Michael Moussa Mossaad
Professor of Biophysics
Medical Research Institute
University of Alexandria

Prof. Dr. Assem Youssef Rostom
Consultant of Clinical Oncology
The Royal Marsden Hospital
England

Dr. Thanaa Ibrahim Shalaby
Assistant Professor of Biophysics
Medical Research Institute
University of Alexandria

بسم الله الرحمن الرحيم

(قالوا سبحانك لا علم لنا إلا ما علمتنا إنك
انت العليم الحكيم)

صدق الله العظيم

سورة البقرة آية ٣٢

To My Lovely Mother

Acknowledgment

Acknowledgment must be made to a number of people who without their assistance and encouragement this work would not have been completed. So I shall feel grateful to

- My incredible wonderful Professor Dr. Mohamed Farid Moaman who had been there for me always, infinitely giving his precious knowledge and time, thorough effort and warm support. I shall ever feel grateful to him. Thank you for being a reason that I can stand strong.
- My amazing extraordinary Professor Dr. Assem Youssef Rostom who offered me the opportunity to observe the new innovations and gave me his support at the time I needed. I can hardly express my heartfelt thanks for an unusual person like him.
- My supportive Professor Dr. Michael Moussa Mossaad for his lengthy assistance and sincere guidance. I owe special thanks and appreciation for him directing me through this work.

●

- My thoughtful supervisor Dr. Thanaa Ibrahim Shalaby for her warm assistance and meticulous care. Her supervision was a great pleasure to me.
- Outstanding thanks to Dr. Essam Welaya for his kind help and decent cooperation.
- Thank you for the staff members of the Alexandria Armed Forces Hospital, the Royal Marsden Hospital of Sutton, the Royal Marsden Hospital of London, the Alexandria University Hospital and the Medical Research Institute.

LIST OF ABBREVIATIONS

AFHA	:	Armed Forces Hospital of Alexandria
Ant	:	anterior
BEV	:	Beam eye view.
CFRT	:	Conformal radiotherapy.
CTV	:	Clinical target volume.
d_{max}	:	Depth of maximum absorbed dose.
DMLC	:	Dynamic MLC
DRR	:	Digitally reconstructed radiograph.
DVH	:	Dose-volume histogram
EPI	:	Electronic portal imaging.
GTV	:	Gross tumour volume.
ICRU	:	International Commission on Radiation Units
IG-IM-RT	:	Image guided-IM-radiotherapy
IMBs	:	Intensity modulated beams.
IMRT	:	Intensity modulated radiotherapy.
IMSRT	:	Intensity modulate stereotactic radiotherapy.
ISL	:	Inverse square law.

LAO	: left anterior oblique.
Linac	: Linear accelerator.
LLat	: left lateral
LPO	: left posterior oblique
MLC	: Multileaf collimator.
MSF/MLC	: Multiple static MLC-shaped fields.
MUs	: Monitor units
OARs	: Organs at risk.
PDD	: Percentage depth dose.
Pos	: posterior.
PTV	: Planning target volume.
RAO	: right anterior oblique
RLat	: right lateral.
RMHL	: Royal Marsden Hospital of London.
RMHS	: Royal Marsden Hospital of Sutton.
RPO	: right posterior oblique.
RT	: Radiotherapy

SAR	:	Scatter air ratio.
SRS	:	Stereotactic radiosurgery.
SRT	:	Stereotactic radiotherapy.
SSD	:	Source surface distance
STT	:	Segmented treatment table.
TAR	:	Tissue-air ratio.
3D	:	Three-dimensional.
TLD	:	thermoluminescence dosimetry.
TMR	:	Tissue maximum ratio
TPS	:	Treatment planning system.
TSET	:	total skin electron therapy.
2D	:	Two-dimensional.
WOF	:	Wedge output factor

List of Contents

	Pages
I. Introduction	1
II. Aim of the Work	7
III. Review of Literature	8
Dose Point Definitions	8
Manual Treatment Planning	19
Computer Treatment Planning	39
Three Dimensional Treatment Planning	49
Stereotactic Radiosurgery and Radiotherapy	78
IV. Materials and Methods	81
V. Results	90
VI. Discussion	187
VII. Summary	194
VIII. Conclusions	196
IX. References	198