RADIATION ONCOLOGY & MEDICAL PHYSICS IN TUNISIA

Mounir Besbes, PhD

International day of medical physics

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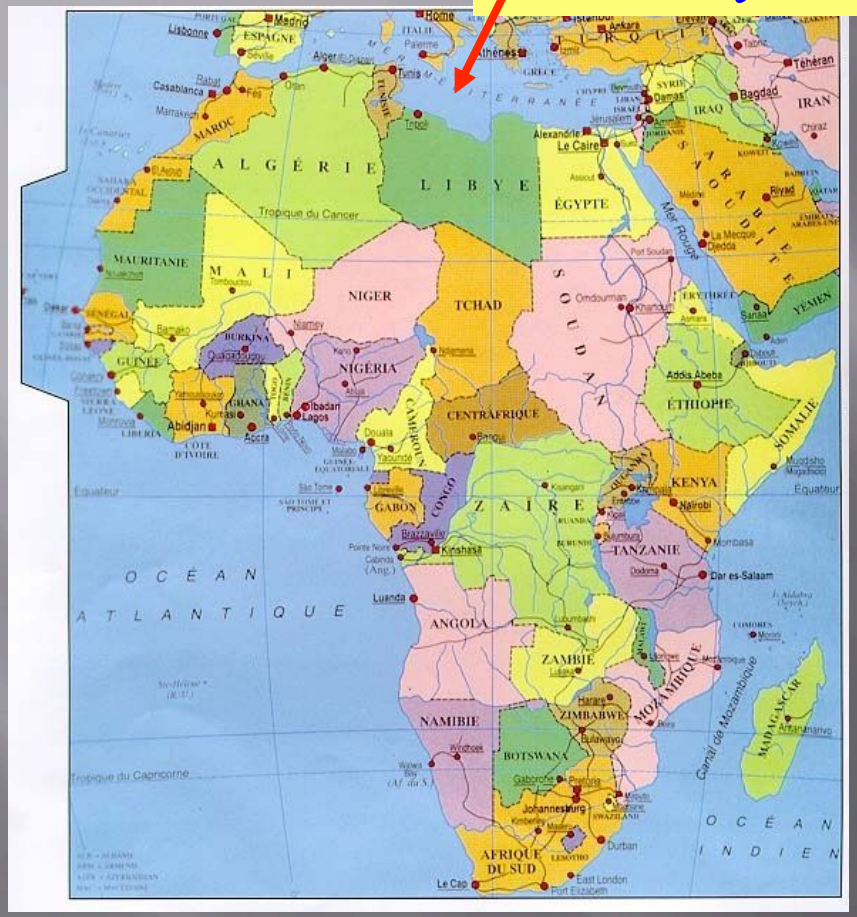
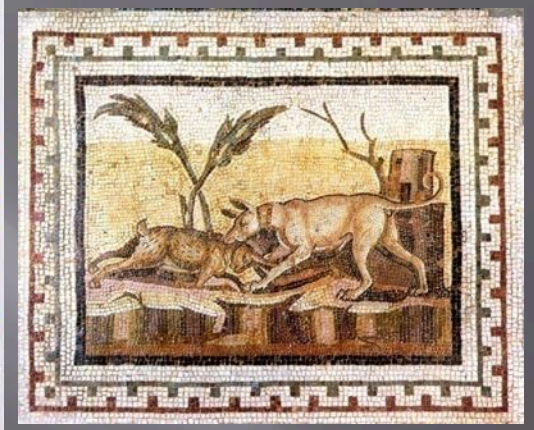
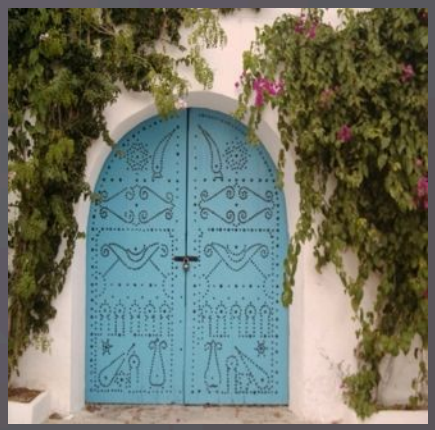
Paris- France

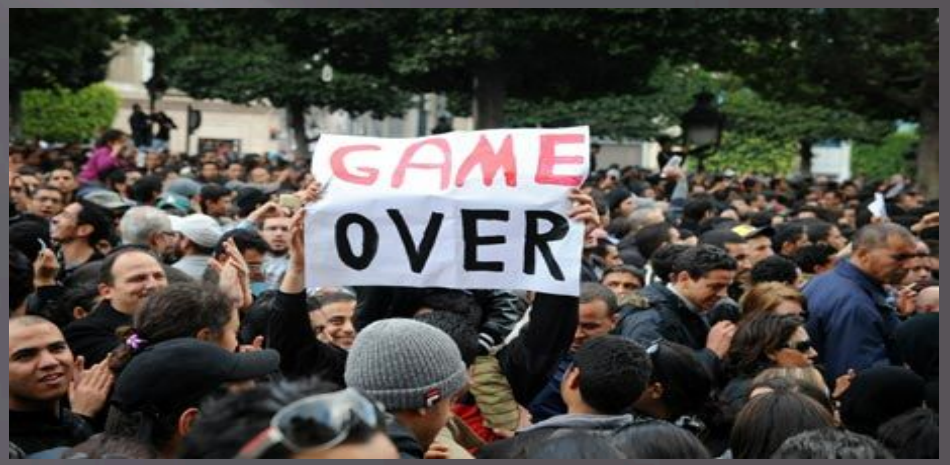
TUNISIA

A small country with a big history
And the symbol of Arabic Spring



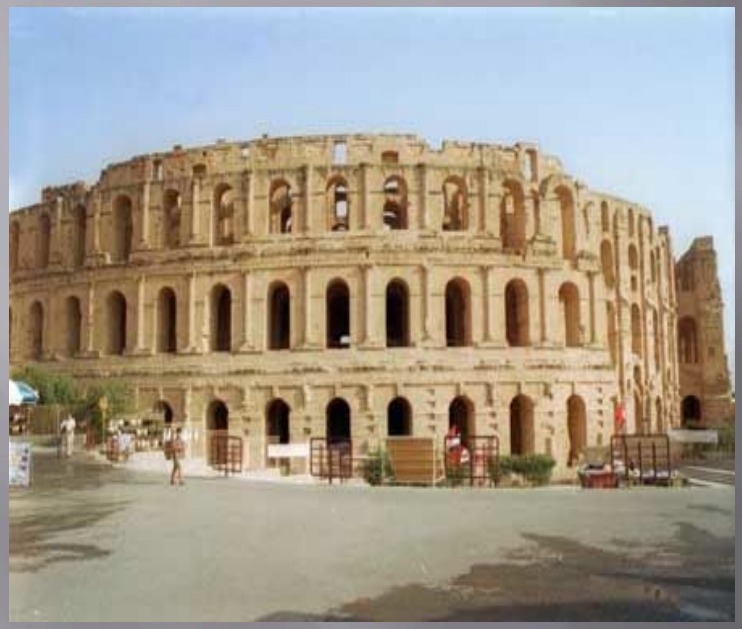






10 millions
164000 Km^2

A Small country with a big history



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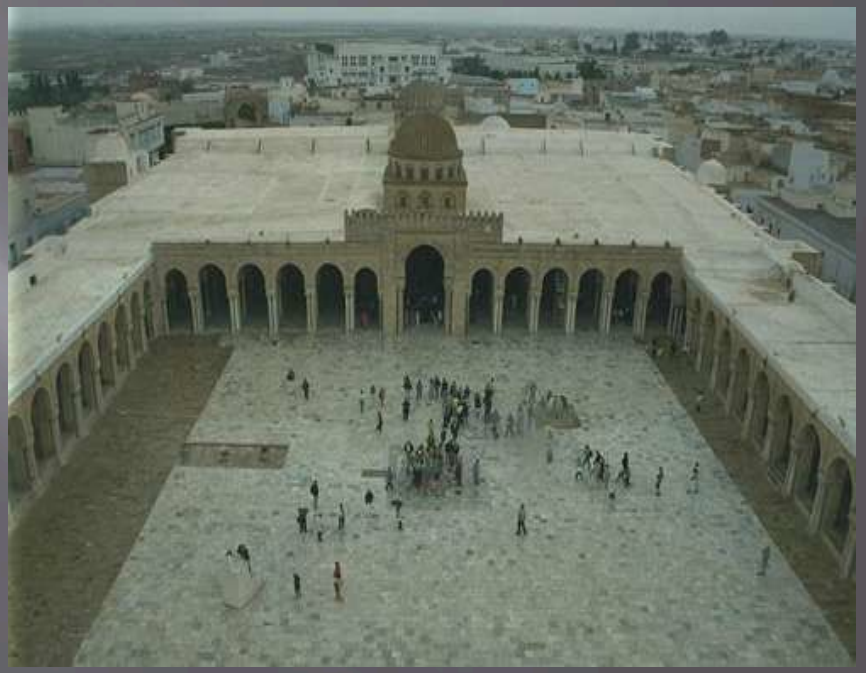
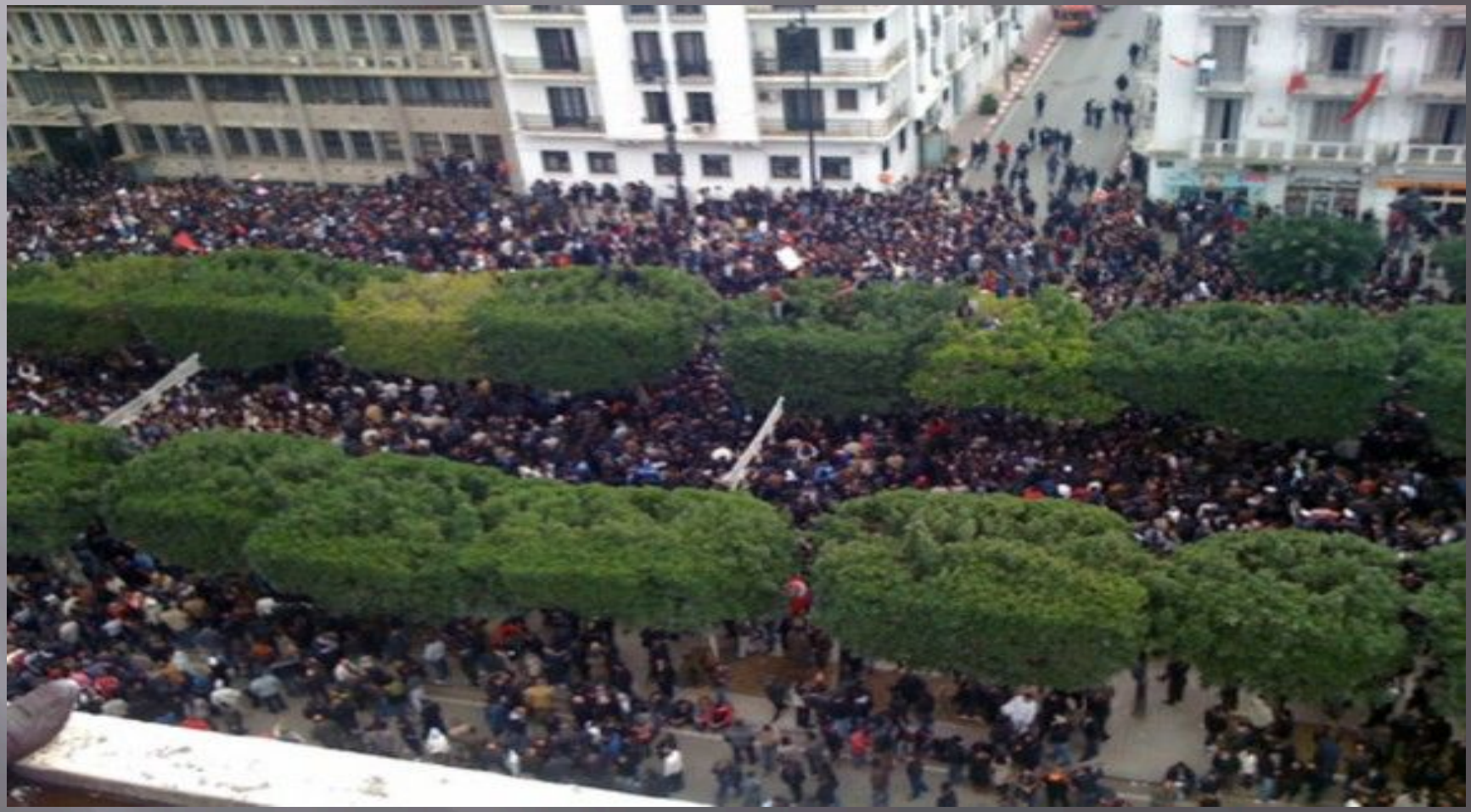


KAIROUAN

And the symbol of Arabic Spring



RADIOTHERAPY IN TUNISIA

Creation in 1969 of the first Tunisian Anti-Cancer Centre :

"**Salah Azaiz Institute**"

(ISA) with a department of Radiotherapy .

RADIOTHERAPY IN TUNISIA

- The number of treated patients is currently multiplied by 12 since the opening of ISA : more than 7000 patients in 2012.

FACILITIES
1992

- First radiotherapy treatment with photons X of clinac . (with the assistance of the experts of the IAEA)- **1992-**

  The first treatment with electrons **-1994-**
- Installation of the treatment planning system (TPS) and development of estimated dosimetry of the external radiotherapy and the gynaecological brachytherapy procedures.
- Renewal of the simulator and two cobalt units
- Renewal of two curiethrons (LDR)
- Acquisition of contactherapy (50 → 150 kV)

NEW TECHNIQUES

- Starting of the ocular brachytherapy, with radioactive discs of Ruthénium106 in collaboration with the Institute of Ophthalmology (**1996)**
- Introduction of the thermoplastic masks for head and neck tumours (**1997)**
- Introduction of TBI (2000)
- Development of brachytherapy of NPC and HDR (2005)
- 3D Conformal Radiotherapy (2010)
- IMRT irradiation (2013)

Facilities of radiotherapy in Tunisia
Public Sector

Tunis- Salah Azaiz Institute-

- 1 accelerator (Varian iX)
- 1 TPS
- 2 cobalt units
- 1 contactherapy RT 150 kV
- 1 simulator scan
- 2 curiethron LDR
- 1 HDR (24 Channels) Ir192

Sfax- Habib Bourguiba Hospital

- 1 cobalt unit
- 1 accelerator (Varian iX)
- 1 contactherapy unit RT 150 kV
- 1 simulator-scanner
- 1 curiethron LDR(AIEA)
- 1 TPS

Sousse- Farhat Hached Hospital-

- 1 cobalt unit
- 1 accelerator (Varian iX)
- 1 contactherapy unit RT 150 kV
- 1 curiethron LDR
- 1 TPS

Facilities of radiotherapy in Tunisia

Private Sector

Tunis

- Taoufik: 1 cobalt (1982)
- Centre Gamma : 1 cobalt (1992)
- Clinique Hannibal: Accelerator (Varian iX) (2011)
- Clinique ENNASR: Accelerator (Varian iX) (2009)

Sfax

- Chifa : 1 cobalt (1992) and 1 simulator

Sousse

- Ibn Khaldoun: 1 cobalt unit (2005)
  1 simulator (2005)

One machine per 750.000 habitants wish is one of the highest rates of radiotherapy equipment per habitant in Africa.

PROJECTS AND PERSPECTIVE 20013-2014

- Acquisition of a second accelerator for the ISA
- Acquisition of 2 accelerator and 2 TPS for Sfax and Sousse in private.
- Acquisition of an accelerator and a scan simulator and TPS for new public centre in Ariana

Summary of facilities

- 5 LINAC
- 9 Cobalt 60
- 3 LDR afterloaders
- 1 HDR (24 channels)
- Acquisition for 2014
  - 2 LINAC in Public
  - 2 LINAC in Private

1.4 machine/million

1.8 machine/million

RADIATION STAFF

- 32 Radiation oncologists
- 10 Medical Physicists (2PhD and 8 professional master)
- 8 training physicists (bachelors)
- 3 dosimetrists…
- 40 radiation technologists

Contribution of IAEA

- Since 1990, IAEA project have contributed to improve radiotherapy and medical physics in Tunisia with five cooperation projects :

  - **TUN/06-04: Improvement of radiotherapy in Tunisia (1990-1996)**
  - **TUN/06-08: Improvement of radiotherapy in Tunisia (1997-2002)**
  - **TUN/06-10: Introduction of HDR techniques in Tunisia (2003-2005)**
  - **TUN/06/-13: Improvement of radiotherapy and medical physics in Tunisia: Phase II (2009-2011)**
  - **TUN/06/-14:Intruduction of stereotactic radiotherapy in Tunisia (2012-2013)**

Contribution of IAEA/AFRA

- Since 1995, Tunisia took part in program AFRA XII. This program has contributed also to improve radiotherapy and medical physics in Tunisia by two cooperation projects :

  - **AFRA/06-014-15: (1995-2000)**
  - **AFRA/06-027_28: (2000-2005)**
  - **AFRA/06-031-35: (2005-2010)**
  - **AFRA/06-044-45: (2010-2015)**

ACADIMIC EDUCATION & TRAINING

- Research Master in Medical Physics (2011-20013) : first promotion end 2013
- Training for radiographers (3 schools)
- Training for residents in radiotherapy departments

MEDICAL PHYSICS EDUCATION IN TUNISIA

History of medical physics in Tunisia

Training abroad
1990

Radiotherapy started with a physicist "Mr. Hedi Damak" was protection specialist and who has worked at the Atomic Energy Commission of Tunisia.

In 1986 I joined the team as an academic medical physics.

In order to prepare the ground knowing that we have two university hospitals that will have radiotherapy, we sent students doing master of medical physics in Toulouse, France to Prof. Daniel Blanc who was my boss.

This experiment was a failure:

- One returned
- The others have preferred to stay in France

History of medical physics in Tunisia

Job training
2002

- Recruitment of bachelors in science physics
- job Training by myself
- No accreditation

History of medical physics in Tunisia

Professional master
2007-2008

- Nine candidates were trained one of which now preparing a PhD in France
- 8 were recruited as technicians in medical physics
- This master has been sponsored by INCA within the #plan cancer du Président Chirac#
- financial participation of MP lecturers (A. Bridier, J.C. Rosenwald, D; Lefkopolos,j.Manens, Ricard, R. Garcia , P. Alleti, H. Bouhnik)
- Fellow ship for 6 months training in France for 9 students

History of medical physics in Tunisia

Doctorate school of medical physics

- Academic education
  - Bachelor in physic
  - Master (2011-2013)
  - ± Ph.D.(2013-2016)
- Training

Operators

- University El Manar Tunis
- STOR(Societé Tunisienne d'Oncologie Radiothérapie)
- EDC (Education Doctorate Commission)
  - Proposed the contain of education program
- NCR (National Commission of Recruitment of Med. Phys.)
  - Accredited education program

University Education

- University El manar Tunis
  - Intitut Supérieur de Technologie Médicale de Tunis (ISTMT)
  - Faculté de Médecine de Tunis (FMT)
  - Salah Azaiez Institute Tunis

Education programm of Master

- Three semestriels course a full time
  - First session
    - applied Mathematics
    - quantum mechanics
    - Physical basis of radiation and medical applications
    - medical informatics
    - scientific English
    - biological Sciences
    - Optoelectronics

University Education Master

- Second session
  - Dosimetry and radiation detection
  - Basic physics of medical imaging
  - Absolute and relative dosimetry
  - Fundamentals in Oncology
  - Nuclear analytical techniques
  - Nuclear Medicine Instrumentation
  - Medical English

University Education Master

- Third session
  - Radiation and Radiobiology (common)
  - Dosimetry in radiotherapy
  - In vivo dosimetry in radiotherapy.
  - Brachytherapy
  - Quality Assurance (QA)in radiotherapy
  - Numerical simulation in medical physics
  - Medical Physics in nuclear medicine
  - English and literature search and project management

University Education Master

- forth session
  - Research Project in medical physics
  - Clinical training (Radiotherapy or medical imaging (nuclear medecine and radiodiagnostic)

University Education
Ph.D

- A student who wants to have a research project can go even further to the doctorate.
  - This research project takes an average of 3 to 4 years
  - The PhD student has developed a specialized expertise in the subject studied
  - The PhD student demonstrated that he can complete a major project

Training

- The physicist who wishes to improve his clinical knowledge can do a residency in medical physics
  - In a specific subspecialty
    - diagnostic imaging
    - nuclear medicine
    - radiation oncology

Accreditation

- Diploma and university degree in medical physics are considered as a accreditation

Status of profession

- The medical physicist is considered a teaching profession in university

scientific societies

Member and funder of

- AFROG: African Ratiation Oncology Groupe: sponsrized by IAEA
- FAMPO: Federation of African Medical physics: sponsorized by IOMP
- STOR: Société Tunisienne d'Oncologie Radiothérapie

scientific societies

FAMPO

Federation of African Medical Physicists Organisation

FAMPO is a new Regional Organization of IOMP it is our privilege that the Federation of African Medical Physicists are part of the global community of IOMP.

We are proud of FAMPO as the youngest Regional Organization of IOMP.

- http://www.federation-fampo.org/

PROJECTS AND PERSPECTIVES 20013-20014

Objective1
Enhance capacity and accessibility

Staff

- Medical Physicists (Master)
- Training of radiation oncologists
- Training of radiation technologists

Objective2
Improve quality of treatment

Equipment

- Innovative accessories for Conformal radiotherapy, IMRT, and stereotactic radiotherapy (with the new 3 LINACS)

Technique

- Introduce HDR brachy for prostate

Staff

- Training on these new techniques

Reference

- Pr. BESBES Mounir
  - E-mail: mounir.besbes@rns.tn