

Moroccan Neurosurgery: Current Situation and Its Contribution to Global Neurosurgery

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1 | MODERN MOROCCAN NEUROSURGERY: THE BEGINNING

The first neurosurgical departments were created in the country in 1960, one in Rabat and one in Casa Blanca. These department were chaired by non-Moroccan neurosurgeons, and between 1960 and 1975, four local neurosurgeons would take over. After The first Medical school in Morocco opened in Rabat in 1962, a training program in neurosurgery was set up in 1968. The first trained Moroccan neurosurgeons were very active and encourage the development of local training in Morocco with additional training in foreign countries to increase the number of neurosurgeons and support the organization and promote neurosurgery in the country. They also convinced health policymakers to include neurosurgery in the Moroccan health care system as a priority with an upgrade of the specialty first in all university hospitals and then in all regional hospitals according to the needs. By supporting local training, Morocco ended up in 1998 with eighty native neurosurgeons while there were none in 1956, and with nine neurosurgical departments, four of these were inside University Hospitals and with a National Society of Neurosurgery, created in 1984 (1). Other medical and surgical specialties also developed in the same time as neurosurgery and ended up with a training program. Since then, the evolution of Moroccan Neurosurgery has been continuous, rapid, and outstanding, and many advances have been achieved in the last two decades (1). Two significant events marked the evolution of Moroccan Neurosurgery in these previous two decades:

1. The organization of the 13th world congress in Marrakech in 2005, "Bridging the Gap in Neurosurgery," considered as the first international gathering of Neurosurgeons, draws the Global Neurosurgery concept and take the attention of the international neurosurgical community in the huge gap between HICs and LMICs regarding several neurosurgeons and neurosurgical practice mainly in Africa (2).
2. The decision of the WFNS to leadership the creation of the first WFNS Reference center in Rabat to train young African Neurosurgeons from sub-Saharan Africa, which had a positive impact on the evolution of neurosurgery in Morocco but also in all continents (3).

2 | MOROCCAN NEUROSURGERY: CURRENT SITUATION

Currently, 250 neurosurgeons are in practice in Morocco, either in public, academic, or private sectors. Twenty-five is a woman. The Moroccan population is 36 million inhabitants, and the ratio of neurosurgeon per inhabitant is 1/ 144000. There are 35 neurosurgical facilities and departments spread all over the country in 25 cities. Among these departments, 14 are in University Hospitals, four departments in Rabat, 3 in Casa Blanca, 3 in Marrakesh, 1 in Fes, 1 in Oujda, and recently 1 in Tangiers, and 1 in Agadir. There are Twenty-one neurosurgical facilities in regional hospitals of the country. The number of Medical schools and University Hospital centers has increased from 2 in the 60s to 10 nowadays:

1. Rabat 2
2. Casablanca 2
3. Fes 1
4. Marrakech 2
5. Oujda 1
6. Tangiers 1
7. Agadir 1

Neurosurgical facilities have been strengthened in 1983 by the creation of the "Hospital des specialties" in Rabat, a 400-bed facility dedicated to Neurosurgery, Neurology, Neuroradiology, Neuropathology, Neurophysiology, Ophthalmology, and Otorhino, with modern equipment, technologies, and multidisciplinary teams. This hospital plays a crucial role in developing neurosurgery and

neurosciences specialties in the country. It is a national neurosciences reference center for brain vascular diseases, pituitary adenomas, skull base tumors, functional neurosurgery, pediatric neurosurgery, epilepsy surgery, awake surgery, and Gamma knife Radiosurgery. All Neurosurgical departments in University Hospitals are active and involved in delivering tertiary care, training Residents, and providing continuing medical education by organizing courses, workshops, seminars, and other scientific meetings at regularly basis.

There are ten national Training programs in Neurosurgery in Morocco, which are similar and homogenous regarding their content, teaching method, and the duration of the programs. These programs offer adequate environment for learning and acquisition of skills and knowledge in neurosurgery. Neurosurgical training lasts five years and graduates get National Diploma in Neurosurgery at the end of their training, focuses on basic essential neurosurgery along with learning some subspecialties such as pediatric neurosurgery, vascular neurosurgery, neuro-oncology, spine, functional neurosurgery, neuroendoscopy, and minimally invasive techniques. The programs aim to produce the needed number of practice and academic neurosurgeons and no more. It provides the full spectrum of the neurosurgical procedures to the trainees and offers active participation in all to assure competence.

All university neurosurgical departments are well equipped with an advanced microscope, stereotactic frame, endoscope for neurosurgery, neuronavigation, ultrasonic aspirator, neuromonitoring, Ct, and MRI as well as angiography suits are also available in all departments. Gamma knife unit is also available in Hospital des Spécialités in WFNS Rabat training center. This training program is open not only for Moroccan residents but also for residents from Sahara Africa since 2002 with the creation of the first WFNS Reference center for training young African neurosurgeons in Rabat. Since the start of the WFNS Training center, more than 70 African residents are enrolled in different programs in Morocco from 17 sub-Saharan countries. This program has been extraordinarily successful, and 4 to 5 are expected to join the program each year in addition to 5 to 10 positions available annually in University Medical Centers for Moroccan residents.

This WFNS program of training has contributed to significantly reduce the gap in neurosurgeons-to-population ratio insubaharafrica and had an immulative effect on the development of neurosurgery in the hole continent by encouraging WFNS leadership to establish additional Regional Training Centers (Algiers,Kenya,Senegal) and many sub saharafrican countries to develop local neurosurgical training programs (3,4).

Moroccan neurosurgeons are also highly active in participating in many regional, continental, and international neurosurgical organizations as founders or many organizations like WFNS, CAANS, PANS, MANS, SNCLF, and other neurosurgical societies. Moroccan Society of Neurosurgery, a member of WFNS, is well known worldwide and has regularly hosted important regional, continental and international neurosurgical meetings and congresses since its creation in 1984.

Moroccan Neurosurgery has experienced an exceptional development even though Morocco is a developing country. This was possible thanks to the gigantic efforts of the pioneers assisted by young assistants and residents who in turn have carried the torch of progress and shared the ambition of developing Moroccan Neurosurgery and bringing it to a top international level.

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