

History and Current State of Global Neurosurgery in Sub-Saharan Africa

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1 | BIRTH OF NEUROSURGERY IN SUB-SAHAN AFRICA

Archaeological sources reported traces of trepanation in ancient Egypt 3000 years ago, and Papyri of that time already described techniques for the treatment of head trauma (1). The history of modern neurosurgery in Sub-Saharan Africa (SSA) is recent, and there are two significant periods to be considered. The first period can be called the pre-independence period. This period corresponded to the 1950s, when most African nations were still colonized. During this period, neurosurgical care was delivered by surgeons originally from European countries. For instance, in West Africa, the first neurosurgical operations were carried out in 1957 by a French military medical officer at the Hôpital Principal de Dakar. Later, in 1972, the first neurosurgical care delivery was organized in "Côte d'Ivoire" under Drs. B. Courson and C. Cournil. During the same period, neurosurgery service delivery developed in English-speaking West African countries. In Ghana and Nigeria, the discipline was introduced by local neurosurgeons who had trained in Europe, namely Dr. JTO. Mustaffa in 1962 (Ghana) and Dr. JL Odeku 1969 (Nigeria) (2,3,5). In Southern and Eastern Africa, the specialty was initiated by Dr. P. Clifford in Kenya and Dr. I. Bailey in Uganda. In Zimbabwe, Dr. Lawrence Levy was the first neurosurgeon to practice the discipline (2, 3).

The second period of Sub-saharan African neurosurgery started after the independence and showed greater involvement of African neurosurgeons. This period began in the 1970s, and among the local neurosurgeons, Drs. Mélaïne Kouamé Kangah, Vincent Ba Zézé, and G. Dechambenoit contributed significantly to the growth of neurosurgery in Ivory Coast. Similarly, Drs. Mamadou Guèye, Seydou B. Badiane, and Y. Sakho were pioneers in Senegal. Dr. Kazadi Kalangu did the same in Zimbabwe, while Dr. S. Sanoussi and Dr. Wandja pioneered neurosurgery in Niger and Cameroon (2,3). In Burkina Faso, Dr. Abel Kabre, after his training in Dakar in the 80s, has successfully developed its specialty. Unfortunately, we have lost some of these pioneers: Dr. Vincent Bazeze (Côte d'Ivoire, 2020), Dr. Ulric Jones (The Gambia, 2020), and Dr. Samuel N. Wandja (Cameroon, 2020). Dr. Mamadou Gueye (Senegal) died 18 years earlier. The contributions of these pioneers will never be forgotten. They have mainly been involved in training the current generation of neurosurgeons and have set the ground for future endeavors.

2 | CURRENT STATUS OF THE SPECIALTY

Today SSA countries have about 450 neurosurgeons (excluding South Africa), and they are unevenly distributed. With few exceptions, all countries have at least one neurosurgeon. However, despite the significant increase in the number of specialists from 20 neurosurgeons in 1970 and 450 neurosurgeons in 2018, the SSA regions' workforce density remains low at 0.04 neurosurgeons per 100,000 people. This number is well under the target recommended by the World Federation of Neurosurgical Societies' Global Neurosurgery Committee – 0.5 neurosurgeons per 100,000 people. In comparison, the USA has 1.19 neurosurgeons per 100,000 people, France has 0.88, and Japan has 5.5 (6). This gap justifies the training of young African neurosurgeons.

3 | TRAINING IN NEUROSURGERY

Sixteen SSA countries (excluding South Africa) have neurosurgery training programs: seven in Western Africa (Burkina Faso, Côte d'Ivoire, Ghana, Mauritania, Niger, Nigeria, and Senegal), one in Central Africa (Cameroon), six in Eastern Africa (Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda), and three in Southern Africa (Malawi, Zambia, and Zimbabwe). These programs recruit 1 to 10 residents each year, and the length of training varies between 4 and 6 years. Access to training remains difficult for many young physicians who wish to enter the specialty. One barrier they often face is the lack of remuneration or scholarships to cover tuition fees and living expenses. Next, programs often lack resources such as dissection laboratories, which may impact training quality.

4 | ACCESS TO NEUROSURGICAL CARE IN SUB-SAHARAN AFRICA

There is a significant need for pediatric neurosurgeons in the region owing to the burden of neural tube defects and hydrocephalus. Pediatric neurosurgery centers across the continent have contributed to developing new equipment, techniques, and improved patient outcomes. For instance, the University of Zimbabwe team developed the Harare shunt, and the Nigerien team developed the Niamey slit catheter (10). Both devices have changed hydrocephalus's management. The Ugandan team contributed to developing endoscopic third ventriculostomy with choroid plexus cauterization – an alternative to shunt treatment of hydrocephalus. Like Uganda, Niger has established itself as regional reference centers for the neuroendoscopic management of hydrocephalus (10). Neurotraumatology, despite the accessibility of surgical management, remains an orphan of resuscitation means, which are not always available in many countries like pediatric neurosurgery; neuro-oncology practice is booming in several SSA centers. These include Abidjan, Ouagadougou, and Dakar, where the skull base surgery and endonasal endoscopic approach for pituitary tumors are now widely used (7). Vascular neurosurgery is taking a new lease of life in Kenya, Mali, and Senegal (8,9,11). Although these advances are encouraging, they cannot meet the current neurosurgical need, so most patients do not have access to care. Health systems strengthening efforts will be needed to improve access for these underserved populations, and SSA neurosurgeons can help develop surgical systems policies.

5 | CONCLUSIONS

SSA Neurosurgery has made significant progress over the last five decades, and the specialty has become established in most countries. However, the neurosurgical workforce remains low and unevenly distributed. Access to and quality of neurosurgical education remains a significant barrier to the training of neurosurgeons. Finally, investments in the other components of the surgical system (infrastructure, funding, governance, and information management) will be crucial to expanding neurosurgical care delivery in SSA.

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