

Departments at Bombay Hospital Institute of Medical Sciences Neurology Department

THE BEGINNING

Bombay Hospital was one of the first few institutes in India to offer neurological services. They were initiated by Dr. R. G. Ginde and Dr. Eddie P. Bharucha, who were colleagues at the King Edward Memorial Hospital as well. Dr. Bharucha completed his early education in Mumbai (then Bombay) and pursued his medicine and neurology at the University College Hospital, London. While there, he was fascinated by the approach of Sir Francis Walsh, who mentored him. He was one of the first few Indian doctors who practiced full time neurology [Figure 1].

Dr. Eddie Bharucha worked in an era when the medical specialties were just beginning to be recognized by the medical fraternity and the community at large. It was due to the efforts of individuals like him that the specialty of neurology took roots in Mumbai and India. Bombay Hospital offered both outpatient and in-patient neurological services even at that time. In his long illustrious career, Dr. E. P. Bharucha received many accolades and held responsible positions. He was a founder member of the Neurological Society of India (NSI), the epilepsy subsection of the NSI and the Indian Epilepsy Society, of which he was the founder secretary general. He served as president of NSI in 1959 and was the Vice President of the World Federation of Neurology (WFN) from 1969 to 1973. The WFN honored Dr. Eddie and his wife Dr. Pilo Bharucha in 2006, by dedicating a lecture in their names, which is delivered at every WFN meeting. With the efforts of Dr. E. P. Bharucha, the neurological services were well-established at the hospital and during this time, many international luminaries visited and interacted with the local neurologists.

CONSOLIDATION AND GROWTH OF NEUROLOGICAL SERVICES

In 1962, another era began when Dr. B. S. Singhal was appointed as a full time consultant at the Bombay Hospital. He received his MD degree from the Grant Medical College, Mumbai and then proceeded to train at the UCH London and the Maida Vale hospital and obtained his MRCP from Edinburgh and London, UK. This was soon, followed by FRCP. At the Bombay Hospital, he has provided uninterrupted services for almost 60 years, working long hours, and helping a very large

Satish Vasant Khadilkar

Dean, BHIMS and Head of the Department of Neurology, Bombay Hospital Institute of Medical Sciences, Mumbai, Maharashtra, India

Corresponding Author:

Satish Vasant Khadilkar, Department of Neurology, Bombay Hospital Institute of Medical Sciences, Mumbai, Maharashtra, India.

Tel.: 912222072489.

E-mail: khadilcarsatish@gmail.com

number of suffering patients. Neurology was now recognized as a separate branch of medicine and specialized neurology outpatient and inpatient services became a regular feature at the hospital. Professor Singhal was head of the Department of Neurology at the Grant Medical College as well. His fabled clinical acumen and management skills attracted colleagues from far and wide, who came to learn from him. During his long and illustrious career, Dr. Singhal has been the recipient of many prestigious awards such as the Karmayogi Puraskar, Rajasthan Ratna, Dr B C Roy national award, Dhanvantari award, and the Rameshwardas Birla National award [Figure 2]. Many of his students occupy important positions in India and abroad.

Professor Nadir Bharucha completed his MD in internal medicine from the KEM hospital in 1976 and joined the St. Thomashospital in London, where he worked with Drs. Reginald Kelly, W. Ian McDonald, Roger Gilliatt, and Ralph Ross-Russel. He subsequently completed 2 years of registrarship at the National Hospitals for Neurology and Neurosurgery and obtained his MRCP from London. Here, he worked under the tutelage of stalwarts such as John Morgan Hughes, J. N. Blau, Robin Willison, and William Cobb. He then moved to Boston and completed his neurology board membership (United States as well as Canada). At the National Institute of Health, he came in contact with Dr. Bruce Schoenberg, the famous epidemiologist, who kindled Dr. Bharucha's interest in this sub-specialty. Dr. Nadir Bharucha returned to India and joined the Bombay Hospital and the KEM hospital in 1983. The neurology department was further strengthened by his contributions to clinical and academic neurology. Dr. Bharucha did pioneering work in neuroepidemiology in India. He established a neuroepidemiology department at the Bombay

Hospital in 1984, which was the first such department in India. In his long and illustrious career, Dr. Nadir Bharucha has contributed immensely to the neurology patients and students of neurology. He has delivered prestigious orations like the Baldev Singh oration of the National Academy of Medical



Figure 1: Dr. Eddie Phiroze Bharucha



Figure 2: Dr. B. S. Singhal receiving the Rameshwardas Birla national Award. (L-R: Padmabhushan Dr. B. K. Goyal, Madhya Pradesh Chief minister Mr. Shivraj Singh Chohan, Chairman of the Bombay Hospital Trust Shri Bharat kumar Taparia and Dr. B. S. Singhal)



Figure 3: Dr. Nadir Bharucha receiving the Wokhardt Lifetime Achievement Award from Mr. Kamal Nath (fourth from left) Mr. Habib Khorakiwala was present (third from left)

Sciences, the IAN oration and he has been the recipient of the Wockhardt Harvard Lifetime Achievement award [Figure 3].

Anchored by Dr. Singhal and Dr. Bharucha, the Bombay Hospital neurology department became a very popular department for service and academic neurology alike, catering to a very large number of inpatients and outpatients.

EXPANSION OF THE DEPARTMENT AND SUBSPECIALTIES

In 1993, the department added two more consultants, Dr S. V. Khadilkar and Dr. J. A Lalkaka. It was Professor Singhal's vision to induct individuals who had subspecialty training, to expand the specialty services. With the increased number of consultants, clinical services became more easily accessible for general neurology and subspecialties started to take roots.

Dr. Khadilkar obtained his DM degree from the Grant Medical College in Mumbai in 1989 and the DNBE from the National Board. He then went to Dunedin in New Zealand, where he trained in diseases of the peripheral nerves with Professor Martin Pollock. He then moved to Perth, Western Australia as the special assistant to Professor Byron Kakulas, a giant in the field of muscle diseases. Being an associate of Raymond Adams, Dr. Kakulas believed that a neurologist is not complete until he is acquainted with the basics of neuropathology, and he insisted that Dr Khadilkar spend 6 months in neuropathology doing brain cuts and learning laboratory techniques. Later, Dr. Khadilkar also spent time at the Institut de myologie, Salpetriere, Paris where he came in contact with the pillars of French myology, Drs. Fardeau and Tomme. Dr. Khadilkar is one of the first few Indian neurologists to specialize in neuromuscular disorders. At the Bombay Hospital, he established tertiary care facilities in diseases of the nerve and muscle, one of the initial such facilities in India. Dr. Darab Dastur and Dr. Arun Chittle, the pathologists and Dr. Jayashri Nadkarni, Dr. Pradnya Gaitonde and Dr. Rashna Dastur, the geneticists, were integral to the development of immunocytochemical and genetic facilities at the Bombay Hospital. Dr. Khadilkar headed of the Department of Neurology at the Grant Medical College for 12 years and the Maharashtra government recognized his contribution by conferring the Emeritus Professorship on him. He has delivered several prestigious orations such as the Netaji oration, Munje oration, Anusaya Taly oration, U. K. Seth oration, and the S. N. Kulkarni oration. He has received the Dronacharya award, gifted teacher national award of the Association of Physicians of India and the most admired doctor award. He has been the source of inspiration to many, to take up neurology as their career [Figure 4].

Dr. Lalkaka passed his DM in neurology from the Grant Medical College in 1990 and joined Bombay Hospital. In addition to clinical neurology, he took early interest in movement disorders and trained with the movement disorders specialist, Professor Ivan Lorentz in Sydney, Australia. He has mastered the

techniques of Botox injections for various movement disorders. With the help and efforts of Dr. Khushnuma Mansukhani, they have been very successful in injecting complex movement disorders with gratifying results [Figure 5].

Dr. Nirmal Surya was one of the first few students to take up DNB neurology at the Bombay Hospital and he cleared the examination in 1990. He has subsequently taken a keen interest in the field of neuro-rehabilitation. He joined the department of neurology at BHIMS in 2007 and focuses on neuro-rehabilitation and epilepsy, besides general neurology. He has been credited with the establishment of this subspecialty in India and represents India in this field internationally. He holds epilepsy camps in rural Maharashtra and runs an Epilepsy Foundation. Dr. Vibhor Pardasani completed his DM from the prestigious All India Institute of Medical Sciences and works in general neurology and epilepsy, having been trained in epilepsy at the Mayo Clinic. He presently takes interest in the EEG facilities. For some time now, the video EEG monitoring has been made available at the BHIMS. Dr. Rakesh Singh is a neuro-interventionist and is trained in Stroke in France and India. His early neurology training has also been from the Grant Medical College and Sir J J group of Hospitals. He has brought with him, expertise in stroke intervention and regularly performs complex procedures at the hospital, a facility that is not easily available in Mumbai. Dr. Varsha Patil is the youngest associate consultant in the Neurology Department of BHIMS. She is taking keen interest in activities of the department. Dr. Pardasani, Dr. Singh and Dr. Patil are taking keen interest in training postgraduate students and are contributing substantially to the Department's Teaching Program.

Besides these consultants who are presently in the department, Bombay Hospital has been fortunate to have had celebrated neurologists like Dr N H Wadia on their staff. In addition, Dr. Viraj Sanghi and Dr. Shekhar Patil were associated with the department and offered pediatric neurology services and Dr. Jayanti Mani, an epileptologist, worked in the field of epilepsy at BHIMS for some years [Figure 6].

As you can see from the above picture, the atmosphere in the department has been very congenial, with a lot of camaraderie. Every now and then, there is a celebration of some event in the department. Students find this happy environment very useful for their development.

The department of clinical neurology has also been fortunate to have an excellent association with the allied departments. In the daily clinical work, in sorting out difficult situations and in collaborative research work, all the departments mentioned below have been very kind and cooperative, helping to raise the overall standard of care.

EEG DEPARTMENT

As clinical neurology was evolving, so were the gadgets used by the neurologists. The hospital acquired an EEG machine early in



Figure 4: Professor Satish Khadilkar receiving the Master Teacher award in Chennai in 2017



Figure 5: Dr. J. A. Lalkaka demonstrating Botox injections. Dr. Ivan Lorentz is seen in the background

the course. It was a Grass 8 channel German machine, with pen electrodes that used ink. Dr. B. N. Apte was initially appointed as the EEG technician. After having worked in this capacity for few years, he made a career in genetics, having worked in the laboratory of Watson. The overall charge of the EEG department was with Dr. Singhal and he later trained Dr. Lily Pastakia who has subsequently been reporting the EEGs. She also took interest in the procedure of lumbar puncture and is often called for the difficult ones. At present, the charge of the EEG department is held by Dr. Vibhor Pardasani and the hospital has three modern EEG machines and one video EEG machine.

DEPARTMENT OF CLINICAL NEUROPHYSIOLOGY, ELECTRONEUROMYOGRAPHY, AND EVOKED POTENTIALS

This dedicated, neuro-electrodiagnostic department was possibly the first in the city – maybe the country, to be established in a private hospital in August-September 1975. It was headed by Dr. (Mrs.) Shubha Pandya. She set up the department with a



Figure 6: Department of neurology in a happy mood ! (May 2019)



Figure 7: Electrophysiology symposium in 1986 (From L-R: Dr. B. S. Singhal, Dr. Jun Kimura, Dr. Shubha Pandya, Dr. Cheryl Desouza, and Dr. Khushnuma Mansukhani)

DISA EMG machine. Soon she had a waiting list of patients and within a year, Dr. Cheryl D'Souza joined the department after being trained by her. The machine strength grew to two Medelec machines and an apple computer. Dr. Pandya wrote a software program -called "database" for printing outpatient reports and keeping records – quite an impressive feat at that time. The first evoked-potential hands-on work-shop was organized by Drs. Pandya and D'Souza in 1986, which was conducted by three foreign faculty from U.K. Soon after, separate equipment for evoked potential study was installed in the department. Internationally reputed subject experts such as Prof Jun Kimura and Prof. Bhagwan Shahani visited the department in 1993 and conducted a 2-day hands-on workshop [Figure 7].

Dr. Khushnuma Mansukhani is presently the head of the department and is ably steering this well reputed department. The department has grown in strength and there are 3 full-time consultants who are able to perform various routine and advanced electrodiagnostic and evoked potential tests on adults and children – using top of the line equipment. (Natus: Ultra -pro, Nicolet and Synergy EMG machines). Future plans of the team are to develop a diagnostic "movement disorder" section and to assist regularly in the intra-operative nerve action potential recordings for nerve repair surgery.

NEURORADIOLOGY

The department of neuroradiology has been providing great support to the clinicians in neurosciences and consultants in the radiology department have been sought after for second opinion reviews from all over Mumbai and beyond. Dr. Inder Talwar has spent a long part of his career at BHIMS, superbly marshaling his department. Dr. Sunila Jaggi, Dr. Sonali Shah, and Dr. Neha Shah have taken on the mantle of interacting with the clinical services and providing quality opinions. Dr. Meher Ursekar, a well-known neuroradiologist, was on the consultant board of BHIMS for many years. The departments of neurology and neuroradiology have many long-term research projects currently underway.

NEUROPATHOLOGY

[Figure 8] Dr. Darab Dastur formed the backbone of a very strong neuropathology department at the Bombay Hospital and was internationally acclaimed for his work on leprosy. His brain cutting sessions were extremely popular and very educational. He was included in the elite list of neuropathologists who have made an impact in the century! Along with the famous neurosurgeon Dr. Bhagwati, he published a monogram on brain tumors. He was ably supported by Dr. V. S. Lalitha and Dr. Daya Manghani.

NEUROEPIDEMIOLOGY

Under the guidance of Dr. Nadir Bharucha, this unique department has been actively functioning at the BHIMS. It is largely responsible for carrying out early community based epidemiological studies using defined and pretested methodology, particularly to assess the prevalence of neurological disorders in Parsi colonies in Bombay. Strokes and epilepsies were seen as common neurological diseases and hypertension was an important risk factor. This data have been published in various international medical journals and are still widely quoted.

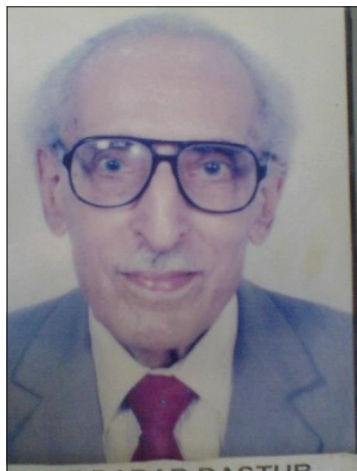


Figure 8: Dr. Darab K. Dastur, the celebrated Neuropathologist



Figure 9: The rural epilepsy project working group: L-R: Dr. Piloo Bharucha, Dr. Eddie Bharucha, Dr. Nadir Bharucha, Dr. Hanneke de Boer, and Dr. Richard Holmes with volunteers and patients

Another important activity of the department was the Maharashtra Rural Epilepsy Project, carried out at Vasai Taluka in 1985 [Figure 9].

The WHO selected Dr. E.P. Bharucha as one of the investigators for this study. A door-to-door survey was carried out in 16 villages and patients with epilepsy who were deemed suitable for treatment with phenobarbitone, were treated. This program continued for at least 25 years, and not only did patients receive treatment but also epidemiologic data such as prognosis, including morbidity and mortality figures, were obtained. This provided an understanding of the long-term outlook for epilepsy in a rural community. In 1991, in association with the NIH, the Neuroepidemiology Department organized a Neuroepidemiology Satellite Symposium at the Bombay Hospital. The first of its kind, it was attended by national and international neurologists.

INTERACTION WITH THE DEPARTMENT OF NEUROSURGERY

At the Bombay Hospital, the departments of neurology and neurosurgery have a close interaction. Illustrious neurosurgeons such as Dr. R G Ginde, Dr. S N Bhagwati, Dr. K E Turel, and Dr. C E Deopujari have successively held charge of the neurosurgery department and they have had dynamic colleagues with them. Dr. Deopujari has promised to provide a write up of his department for the Bombay Hospital Journal, where you will know more about them.

ACADEMIC AND RESEARCH ACTIVITIES OF THE NEUROLOGY DEPARTMENT

The MUHS recognized DM training program started in 1993 at the BHIMS. The neurology department was initially headed by Professor B S Singhal, then by Professor Nadir Bharucha, and presently is led by Professor Satish Khadilkar. All the three professors have had an academic mindset. They have encouraged students and faculty members to participate in academic activities and taken efforts to ensure that they excel in various aspects of neurology. As a result, the neurology department has consistently been very productive in the fields of research, education, and academics.

The faculty has contributed substantially to the neurology literature. Professor Singhal discovered the megalencephalic leukodystrophy and worked on various aspects of the disease including its genetics. His other notable contributions have been the clinical report of Eale's disease and description of its pathology along with Dr. Darab Dastur, early Indian reports of multiple sclerosis and the epidemiology of myasthenia gravis in a large cohort of over 800 patients. It is noteworthy that the very early thymectomies in India were performed by Dr. Nimish Shah on Dr. Singhal's patients, at the Bombay Hospital. With efforts of Dr. Lalkaka and Dr Singhal, a substantial work on non-compressive myelopathies and tropical spastic paraplegia was undertaken. Later, they were joined by the Japanese team of Professor Osame and his colleagues and together they studied the HTLV virus in patients having tropical spastic paraplegia. These studies make oft quoted manuscripts.

Professor Nadir Bharucha wrote pioneering manuscripts on epidemiological aspects of various neurological conditions such as multiple sclerosis, epilepsy, and cerebellar ataxias. His long-term work on the cohort of epilepsy patients at Vasai has given a road map for epidemiological studies in epilepsy. These manuscripts have very high citation rates and are very well-regarded. Dr. Nadir Bharucha's love for neurology is very evident in his vast reading and the immense knowledge he possesses is freely shared by him with all. He has been steadily contributing to the written literature over the decades.

Professor Satish Khadilkar has written or edited seven textbooks of neurology and has over 250 national and international publications. He is credited with the first Indian



Figure 10: Epilepsy Foundation programme in the S. P. Jain auditorium BHIMS. L-R: Dr. R. V. Patil, Dr. B. K. Goyal, Dr. Nirmal Surya and Dr. Rajesh Benny



Figure 11: Dr. Madhu Bala Singla: Winner of the Indian Academy of Neurology National quiz in 2017 in Chennai

descriptions of sarcoglycanopathies and dysferlinopathies. His group has given the early Indian data on the genetics of dystrophinopathies and spinal muscular atrophies. The first description of genetics of sarcoglycanopathies in India was given in collaboration with Dr. Madhuri Hegde of Emory University, Atlanta. The group has detected a new founder mutation in the calpainopathy gene among the Agarwal community. In another study, a genetic link between the patients of Rajasthan ancestry and the European Romas was discovered by the group, further establishing that Romas originated in northwest India. Professor Khadilkar also discovered a new clinical sign, the “Hip abduction sign” and recently has added new disease descriptions to the world literature of chronic immune radiculopathies.

Dr. Nirmal Surya’s contribution to neuro-rehabilitation has been large and he has been responsible for building the subspecialty in the Indian Academy of Neurology. His rural epilepsy camps have been hailed as the “Maharashtra model” at national and international levels. He has many publications to his credit. He has also contributed by hosting various national and international congresses [Figure 10].

The neurology department has been very active in organizing national and international conferences. Neurology updates, world Parkinson’s day, physicians training programs, summer school of the Indian academy of neurology, Asian Oceanian Myology Center meeting, yearly crash course for the neurology students of DM and DNBE, world federation meeting of neuro-rehabilitation, Indian academy of neurology annual conference and recently, and the annual conference of the electrophysiology subsection of Indian Academy of Neurology are some of the meetings where there was active participation of members of the department.

Since 1993, after the establishment of the postgraduate teaching institute, the DM neurology program has been attracting medical students from various parts of the country. Our students have done consistently well in the examinations securing merit, and also in competitions at state and national levels [Figure 11]. The department has trained over 50 students till now. It is a matter of great pride that they have done exceedingly well in clinical practice, professorial assignments, and neurological research. While the large majority of these specialists work in India, some have chosen to make their careers abroad, while some others have returned to India after long foreign stints. The department of electrophysiology also runs a 2-year training program for electrophysiologists and MUHS recognition for a 1-year fellowship course in this field.

FUTURE PERSPECTIVES

The department plans to expand the existing subspecialty services and build new ones like neuroimmunology and neurogenetics, to be able to deliver contemporary expertise to our patients. Along with this, postdoctoral training programs and setting up teaching modules are also in consideration.

ACKNOWLEDGMENTS

The author thanks Dr. B. S. Singhal, Dr. N. E. Bharucha, Dr. J. A. Lalkaka, Dr. N. Surya, and Dr. K. A. Mansukhani for their invaluable help in the preparation of this manuscript.

This work is licensed under a Creative Commons Attribution 4.0 International License. The images or other third party material in this article are included in the article’s Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/> © Khadilkar SV 2020.