

History of Neurospinal Surgery in Kerala



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The history section of the current issue of Journal of Spinal Surgery is focusing on the History of Spinal Surgery in Kerala—"The God's Own Country." Spinal surgery has gained its momentum in Kerala in recent years after the advancement in sophisticated imaging modalities and technological advancements in modern implants. It is time to recognize the hardships and individual contributions of pioneers in the field of spinal surgery in Kerala.

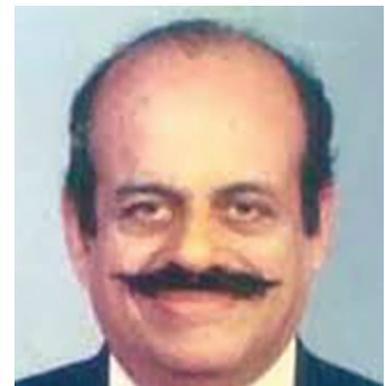
This article offers the reader a compilation of interesting highlights in the history of spine surgery in Kerala in the perspectives of prominent neurospine surgeons, with some added information I gathered from conversations with pioneers and senior faculty members who served and contributed a lot for the development of spinal surgery in Kerala. References for this article are few as history articles lack in Kerala literature.

Contributions from Government Medical Colleges

Contributed by: Dr Anil P, Professor and Head of the Department of Neurosurgery, Government Medical College, Trivandrum

Dr Vinu V Gopal, Associate Professor, Department of Neurosurgery, Govt. Medical College, Kottayam, Kerala

Spine traumas were handled way back from 1930 in the state by general surgeons like Dr AE John and Dr Poduval. Colonel Dr Sabesan, Professor of Surgery and Dr KI George, the senior consultant of Orthopedics used to operate on spinal tumors after diagnosing and localizing them with myodil myelograms. Government Medical College, Trivandrum, can be considered as a "citadel sculpturing spinal surgery in Kerala," since many who were molded as neurosurgeons in this institution, later on, sculptured spinal surgery in Kerala to the present status. The history of spinal surgery in this institute is synonymous with the history of spinal surgery in Kerala, as this was the first medical college to start a Neurosurgery Department within the State. The hard work, perseverance, unconditional effort, and untiring dedication to the profession by doyens like Dr Sambasivan and Dr SK Ramachandran led to the starting of a separate Neurosurgery Department in the college in 1966. Simultaneous developments were going on in other medical colleges in the state. In Calicut, Dr Sanal Kumar became the Head of Neurosurgery in Medical College, Kozhikode. Dr Jacob Alappatt was his assistant at that time. In Kottayam, during this period, other students of Dr Sambasivan from Trivandrum, Dr Ekbal and Dr Jayakumar, joined Dr Rajan in Medical College Kottayam, to handle the spine cases in that district. These achievements were only possible due to the great vision of Dr Sambasivan, who started the first neurosurgical training center in the state and spread his students all over the state to provide service to every nook and corner of Kerala.



Dr Sambasivan

Dr Marthanda Pillai who was trained from CMC Vellore joined the Trivandrum Medical College in 1972. He borrowed a dental drill and started doing corpectomy and odontoidectomy through the anterior approach. Dr Pillai popularized occipitocervical fusion for atlanto-occipital dislocation by contouring the rods obtained from the stainless steel perforator of suction drain and steel wires.

In 1993, Dr Bhavadasan became the Head of the Department at Trivandrum and the period he headed can be considered as the “golden era of instrumentation” in the history of the department. He was very encouraging and motivating for the younger Neurosurgeons. Dr Suresh KL became the head of Trivandrum medical college for 2 years from 2005 to 2007. Emergency spinal fixation was done in a big way and costly implants were made available to poor patients at a low cost. Along with Dr Ajith R, he did lateral mass screw fixation of cervical spine in 2007. His period witnessed the resurgence of posterior foraminotomy procedures in the state after much debate. In 2013, Dr Anil Peethambaran became the Head of Department in Medical College Trivandrum. Under his leadership, Dr Jyothish did the first C1 lateral mass–C2 pedicle fixation (Goel’s technique) in 2014. He popularized the PEEK cages and laminoplasties with ceramic beads. Dr Rajmohan BP did a lot of work in bringing forward the superspeciality block for department. Dr Ajith R has made commendable contributions to the development of spine surgeries in Kerala. In 2002–2003, he did hemilaminectomy with a Taylor retractor after his experience with Dr Bahuleyan at Indo American Hospital. Tension band expansile laminoplasty with a spacer was developed by him and given the name Medical College Thiruvananthapuram (MCT) Spacer. In 2003, he did cervical interbody fusion with titanium drilled cage. Moss Miami fixation and posterior lumbar interbody fusion (PLIF) was done for the first time in Trivandrum medical college in 2005. Dr Ajith along with Dr Raymond Morris were very enthusiastic introducing the Destandau technique of the interlaminar approach to lumbar disc as early as 2005. In 2006, anterior odontoid screw fixation was done for odontoid fracture. In 2011, he performed the mini TLIF at Alappuzha Medical College. First artificial cervical disc replacement was done in Kerala by Dr Sunil Kumar BS under the leadership of Dr K Mahadevan at Kottayam.



Dr Marthanda Pillai

Spinal Surgery in Sree Chithra Tirunal Institute of Medical Sciences and Technology (SCTIMST)

Contributed by: Dr Prakash Nair, Assistant Professor, Neurosurgery, SCIMST on development of Sree Chithra Spine Unit

Spine surgery began at SCTIMST in 1978, under the stewardship of Prof George Mathew and Dr SM Pillai. In an era long before the advent of CT or MRI, Prof VRK Rao and Dr Ravi Mangalam performed myodil myelograms to localize the lesion before the patients were taken up for surgery. They initiated spine surgery at Sree Chitra, which included a research arm investigating the tissue changes occurring in degenerative spine diseases. Prof D Rout then took over at Sree Chitra as the new head of neurosurgery. He had earlier worked at PGI, Chandigarh, and brought with him his experience in treating CV junction anomalies. He was probably a pioneer in the area of CV junction surgery in South India. Prof Rout and Prof Suresh Nair were thus instrumental in advancing the techniques of atlantoaxial fixation and occipitocervical fusion. This was accomplished by stainless steel wires and bone grafts obtained from the anterior superior iliac crest. While posterior procedures for the CV junction were being done routinely, transoral odontoidectomy was initiated by Dr Bishnu and carried forward by Prof BRM Rao.

Another milestone was introducing anterior cervical discectomy in clinical practice. Prof Malla Bhaskar Rao was instrumental in bringing this procedure to Sree Chitra along with Dr Sai Sudarsan. Prof BRM Rao was also instrumental in introducing lumbar pedicle screws for lumbar spinal stabilization, and lateral mass screws for C2 and the subaxial spine into routine surgical practice at Sree Chitra.

Following his departure, the spine service is looked after by Prof Krishnakumar. In the absence of trauma patients, the main focus of clinical work is in the areas of degenerative spine diseases, CVJ anomalies, and tumors of the spine.

Another key area where work forays were made was in the management of intramedullary tumors. Microsurgical resection of ependymomas and astrocytomas was pioneered by Prof BK Misra. Following his departure, this work was then carried forward by Prof Suresh Nair. He was responsible for refining the microsurgical procedure, emphasizing on meticulous microsurgical dissection, gentle tissue handling, and minimal use of bipolar coagulation. His surgical series of intramedullary spinal cord tumors and hemangioblastomas is probably one of the largest in the subcontinent. Sree Chitra was one of the earliest institutions to acquire intraoperative neurophysiological monitoring, following which a large number of these tumors were operated upon under neurophysiological monitoring.

The support of the department of interventional radiology was especially critical in the management of conditions like vertebral hemangiomas and dural AV fistulas. Vertebroplasty for compression fractures and hemangiomas was performed. Prof Mathew Abraham had popularized hybrid procedure of using intraoperative angiography for locating feeding vessels in DAVF’s.

LEGENDS WHO PROPELLED SPINAL SURGERY IN PRIVATE SECTOR IN KERALA

Dr Bahuleyan (Indo American Hospital)—Pioneer of Spine Surgery in Kerala—1980s

Contributed by: Dr Anu Thomas, Senior Consultant, Indo American Hospitals

Dr Kumar Bahuleyan was one of the pioneers to establish and promote spine surgery in India. He was qualified in neurosurgery from US and UK. As early as 1980, he started practicing microsurgical principles and minimally invasive techniques in spine surgery. He established a fully dedicated center for brain and spine disease. The Indo-American Hospital at Vaikom in 1996 is private sector in Kerala, with a fully dedicated spine surgery unit with microscope, CUSA, electric drill, intraoperative USS, angio compatible C-arm and facilities CT-assisted spine procedures, first of its kind in Kerala. He introduced the minimally invasive discectomy for lumbar spine. He used to do 1.5 cm microlumbar discectomy with small Taylor retractors from 1988. In an era of very limited radiographic capabilities, he introduced the mobile C-arm imaging system, Schimadzu. He recognized the advantage of the anterior cervical procedure in cervical spondylotic myelopathy over conventional wide cervical laminectomies which was popular at that time. He was also passionate for anterior cervical corpectomy. He believed that by proper surgical techniques, fixation could be avoided after anterior corpectomy. He was also fond of the far lateral approach in CVJ tumors. Presently, at 93 years, he is active physically and professionally, still passionate in bringing up the latest equipment for minimally invasive spine surgery like the 360° Allen spine table (first of its kind in India), 3D C-arm, and other gadgets to Kerala.



Dr Kumar Bahuleyan

Dr JKBC Parthiban (Early 1990s)—The Game Changer

Contributed by: Dr Vinu V Gopal, Associate professor, Department of Neurosurgery, Govt. Medical College, Kottayam, Kerala

The role of Dr JKBC Parthiban in the history of the development of spinal surgery in Kerala needs special mention. He started his Neurosurgical Practice in Medical Trust Hospital, Cochin, in 1991. He had special interest in spinal surgeries and had pioneered many innovative procedures in the field. As early as 1991, he did anterior odontoid screw fixations. Using the single C-arm with well-coerced repeated AP and lateral views (tried on the previous day with one of his residents as the model), the C-arm was fixed in position at the head end in the operation theatre on the previous day itself. He chose a lateral malleolar lag screw from his orthopedic colleague (Dr Nandakumar), to fix the odontoid type 2 fracture through a wide extra (retro) pharyngeal approach. Though he could not get a bicortical purchase at that time, the single thick screw was placed in the odontoid peg with a fracture gap of 2 mm. A good external immobilization with a Philadelphia collar was given. Surprisingly, he achieved a good fusion and excellent clinical result. Dr Penteleni, Hungarian Neurosurgeon, was delighted to see this, and the case became the pilot case in India subsequent to his repeated presentation and later publication in Neurology India.

In 1993, he introduced expansile laminoplasties in the state. Pedicle screw fixation was done for wedge compression fracture of thoracic spine as early as 1993. The use of electrical drill in pedicle drilling was never done earlier in India and was used with precision in the first pedicle screw placement and subsequently pedicle screws and plates in unstable dorsal, lumbar, and sacral spines became popular.

Kerala state witnessed the first live spinal surgery demonstration during his period. He along with his mentor Prof Dr PS Ramani conducted the workshop and CMEs. This opened the gateway for a change in spinal surgery scenario in Kerala. He tried the transsternal approach in anterior upper thoracic vertebral body lesion as early as 1993, but later on adapted Dr Sundaresan's Claviculo Manubrial approach for all lesions above the D3 vertebral body after assessing the anatomical position of arch of aorta and manubrial notch. Lateral Mass Screw Plate Fixation—Roy Camille to Magerl—was also introduced and popularized by him in Kerala. India's first ever CD on the Lateral Mass Screw Technique was released by him in 1995 during the memorable fourth Neurotrauma conference in Cochin. Later on, he moved to Kovai Medical Center Coimbatore in 1999. He was the past president of NSSA, present Editor in chief of Journal of Spinal Surgery, and the member of WFNS Spine committee.



Dr JKBC Parthiban

Dr Unnikrishnan—Innovative Spinal Surgeon (mid 1990s)

Contributed by: Dr Ajith R, Senior Consultant, SUT Hospitals, Pattom

Dr Vinu V Gopal, Associate Professor, Department of Neurosurgery, Govt. Medical College, Kottayam, Kerala

The role of Dr Unnikrishnan cannot be forgotten in the history of spinal surgery in Kerala. Dr Unnikrishnan was trained from CMC Vellore in 1983 under Dr KV Mathai and he was in fact the first person to do intertransverse fusion in CMC Vellore. At that time, there was a big controversy between anterior cervical discectomy with and without fusion. He observed that fusion reduced the incidence of radiculopathy significantly. So, he continued to fuse cervical spine with iliac crest graft and found that radiculopathy was lesser in discectomy with fusion. Along with Dr Mathai, he used to do costotransversectomy for TB spine. He used to fix spine with stainless steel implants.

In 1993, he used to do anterior cervical discectomy in Lisie Hospital at Ernakulam using “dovel” iliac crest graft—the term he used to say. He was innovative and had the attitude of doing procedures in a scientific way with the use of available magnification. He tried to do “Bosworth” graft notched into interspinous space. Later, when he moved to Muscat in 1994 for a short period, he started using modern implants for fixation. He came back to India in late 1994 and popularized three-level corpectomy with iliac crest graft for degenerative spine diseases. The graft was placed under traction beveling the body and the patient was immobilized in the Minerva jacket. He standardized the anterior-cervical discectomy fusion by drilling the uncovertebral joint. He had good acquaintance with famous Orthopedic surgeon Dr KV Menon, and together they did circumferential fusion in thoracolumbar compression fractures. He routinely did Steffi plate fixation with locally made stainless steel implants, anterior odontoid fixation with a lag screw using uniplanar C-arm, CV junction fixation with Hartshell loops, and Brooke Galle fusion. Dr Ajith R was his first assistant at Lisie Hospital in 1995. He has many international and national publications.



Dr Unnikrishnan with Dr Ajith R

Dr Sajesh Menon

The role of Dr Sajesh Menon as a spine surgeon is very enterprising. He was very instrumental in starting the first spine fellowship program in state at Amrita Institute, Kochi. He is now the president elect of NSSA. This pioneer is now the lead person for scoliosis surgery in Kerala.



Dr Sajesh Menon

GROWTH OF MINIMALLY INVASIVE TECHNIQUES

2005–2010 witnessed the rise of minimally invasive techniques in Kerala with Dr Ajith leading the main role, while he was working as a faculty in Government Medical College, Trivandrum. In 2006, he did first percutaneous pedicle screw fixation for spine fractures using the sextant system along with Dr Santhosh 2007 at Pariyaram Medical College for a tribal lady. He started doing minimally invasive spine using metrix tube along with Captain Jayakumar at Holy Cross Hospital, Kottayam.

Later, when Dr Ajith R moved to SUT Hospital Pattom, Trivandrum, he popularized minimally invasive techniques by conducting workshops in Government Medical Colleges.

He started teaching and motivating younger neurosurgeons to take up spine as a separate specialty. He purchased the metrix tube in SUT in 2013 and started doing long segment (6–7 levels) percutaneous pedicle screws routinely. In 2014, he did minimally invasive TLIF with the PEEK cage and over the top decompression for lumbar canal stenosis. In 2015, he started doing spinal tumor resections including craniovertebral junction tumors through the metrix tube. Minimally invasive cervical foraminotomies and neuronavigation in spine are also routinely done by him.

Spinal surgery in Kerala has marched forward from the era of uninstrumented spine surgery to the present phase of most sophisticated minimally invasive spinal surgeries with the effort of these pioneers and present day innovative spinal surgeons. Many Kerala faculties are now important members of prestigious institutions like WFNS, AO spine, thus spreading Kerala’s fame across the globe. Regular conferences, spine fellowship programs, and workshops are being conducted. Research and publications in spine are coming a big way.



Dr Ajith R