MODERN NEUROSURGICAL GIANTS
Neurosurgery

“Only the man who knows exactly the art and science of the past and present is competent to aid in its progress in the future”

Christian Albert Theodor Billroth
Neurosurgery

1. Pre-modern: before Macewan, 1879
   when all 3 tenets used in practice

2. Gestational: 1879-1919
   transition into distinct profession

3. Modern: after Cushing, 1919
   develops into distinct profession

4. Contemporary: present day
   operative microscope, imaging advances, GKS
HARVEY WILLIAMS CUSHING

- April 8, 1869- October 7, 1939.
- Born- as Tenth child. Cleveland, Ohio.
- Education- Yale University and Harvard University
- Surgery Residency- Johns Hopkins, Baltimore under William Halsted
- Neurosurgery under Kocher, at Bern and Sherrington at Liverpool.
- Started private practice. Became Associate Prof. Johns Hopkins.
- Also served in World War I. as rank of Colonel
HARVEY WILLIAMS CUSHING

- First American Neurosurgeon
- Father of Modern Neurosurgery

+ Ernest Amory Codman: 1st anesthetic, “Ether Chart”

First to map human cerebral cortex with faradic stimulation in conscious patients

March 1909, first operation for Acromegaly

1910, Small silver clip (Cushing’s clip).
HARVEY WILLIAMS CUSHING

- Standardization of Surgical techniques-
  - Compressing scalp for hemostasis,
  - Waxing the bone edges,
  - Hemostatic clips,
  - Electrocautery, motor driven suction

- Classified brain tumors with Percival Bailey

- Experiment with cocaine nerve blocks,
  - coined ‘Regional anaesthesia’

- Medical Historian: Biographer of Sir William Osler (Pulitzer, 1926)

- Died on 7 October, 1939 – myocardial infarction

- Interestingly - Autopsy found colloid cyst in 3rd ventricle
Walter Edwards Dandy

- April 6, 1886 - April 19, 1946.
- Sedalia, Missouri
- Medicine - Johns Hopkins University
- William Cushing and William Halsted - teachers
- + Kenneth Blackfan, established modern concept of circulation of CSF and hydrocephalus.
- Developed choroid plexectomy, third ventriculostomy and catheterisation of aqueduct of sylvius
- Ventriculography in 1918. (Nominated for Noble prize in 1933)
- “The Greatest single contribution ever made to brain surgery.” - Samuel J Crowe
Walter Edwards Dandy

- Expose & resects Pineal tumor
- 1917, Remove 1st Acoustic neuroma completely
- Pioneer in Surgery of AVM and intracranial aneurysm neck clipping
- Rx - Meniere’s disease by sectioning CN VIII
- First to intracranially section CN IX - *Glossopharyngeal neuralgia.*
- Section sensory root of CN V - *tic douloureux*
Fedor Krause

- 1856-1937, German
- Studied – Music. !! Later Medicine- Berlin
- Worked with Neurologist Oppenheim.
- Father of German surgical neurology
- Extensively used radiography for diagnosis
- With Hartley- ‘Modified’ Preganglionic resection of CN V-trigeminal neuralgia( Hartley- Krause operation)
- Transfrontal craniotomy- pituitary tumors
- With Foerster-Epilepsy surgery in Germany
- Acoustic neuromas-
  - sitting position, intradural posterior fossa craniectomy
- Suprasellar subtentorial approach
to pineal gland & posterior third ventricle
Charles Elsberg

- Studied-At Columbia University
- Neurology Institute New York.
- Pioneer in spine surgery
- Emphasized on careful neurological examination and spinal manometric studies to localize blocks
- Describes Spinal cord tumors and surgical techniques
- First to decompress Intramedullary Glioma and Excise Cauda Equina Ependymoma
EGAZ MONIZ

- 1874-1955
- Portuguese neurologist, Lisbon:
- 1920s-Cerebral angiography & encephalography (Nominated for Nobel prize, 1928)
- Founder of Neuroradiology
- 1935- Prefrontal leucotomy for schizophrenia (Nobel prize, 1949)
- Coined term – “Psychosurgery”
Otfrid Foerster

- 1873-1941
- Foerster’s operation: dividing posterior roots did not cause spasticity in hemiplegic
- Defined dermatomal borders
- Anterolateral cordotomy: for pains
- Successful removal of intramedullary tumor
- Surgery for post traumatic epilepsy
- + Altenburger: 1st EEG of brain tumor
- Hyperventilation to evoke seizure
- Coined psychomotor epilepsy
Wilder Graves Penfield

- 1891-1976, Spokane, Washington
- “Greatest living Canadian”
- Princeton University.-Excellent Student and Football player
- First world war – worked as Dresser and wounded
- Convalesce at home of Sir William Osler-
- Under Great influence – graduated from John Hopkins University.
- 1928, Joined Mc Gill University, Montreal.
- Pioneer of Epilepsy Surgery
- Centre-encephalic theory of generalized epilepsy
- + Herbert Jasper:
  - Montreal procedure - destroying originating nerve cells
  - Electrocorticography (1941)
Wilder Graves Penfield

- ‘Penfield dissector’
- “Montreal neurological institute”
- Outlined Motor and Sensory Homonculus using stimulation studies
- Established role of Cortical Excision in treatment of medical refractory epilepsy, specially in Temporal Lobe Epilepsy.
- Also wrote Novel “No other God”
Falconer:
- En bloc temporal lobectomy with excision of uncus, hippocampus and amygdala.

Rasmussen:
- modified technique to reduce morbidity and mortality and improve outcome of epilepsy surgery.
- also describe intramedullary tumors of spine and surgical considerations
A Earl Walker

- 1907- 1995
- Born: Winnipeg, Canada
- University of Chicago 1937-47
- Johns Hopkins Hospital, 1947-onwards
- Stereotactic or functional neurosurgery
- Post traumatic epilepsy
- Anatomic studies on thalamic systems
- Dandy Walker syndrome
- Walker-Warburg Syndrome
William H Sweet

- Harvard Medical School
- Neurosurgical Training under Dr. Percival Bailey.
- Massachusetts General Hospital
- + Gordon Brownell- PET
- Boron Neutron Capture therapy for brain tumors
- Pituitary stalk section –
  - diabetic retinopathy
- Percutaneous thermal rhizotomy
  - Trigeminal neuralgia
- hypothermia during neurosurgical operations
- First carotid bifurcation reconstruction
- Died due to complication of Parkinson’s disease
Lars Leksell (1907-1986)

- Swedish,
- Stereotactic frame -1949,
- With Larson—principles of Radiosurgery,
- Gamma knife- 1968.
- Leksell rongeurs,
- Recanalisation of cerebral aqueduct in atresia
Irving S Cooper

- 1922-1985, Born-Atlantic City, New Jersey
- MD. From George Washington Uni.
- Ph.D from Uni. Minnesota. Fellow at Mayo Clinic
- 1952- Joined New York Medical College
- Pioneer in functional neurosurgery
- Parkinson Disease
  - ligated anterior choroidal artery to control tremor and rigidity
  - chemopallidectomy and cryothalamectomy
- electrical stimulation cerebellum/thalamus (DBS)
  - to treat spasticity
Mahmut Gazi Yasargil

- Born in July, 1925
- Lice village, Turkey
- Education at Ankara.
- Medical Edu-Jena, Germany then Basel.
- Prof. Hugo Krayenbuhl-Teacher
- University of Zurich
- Training of Microvascular Anatomy at University of Vermont, Burlington.
- Greatest 20th century neurosurgeon
- Founder of Microneurosurgery
Mahmut Gazi Yasargil

- 1967: first cerebral vascular bypass (EC/IC) under Microscope
- Invented
  - floating microscope,
  - self retaining adjustable retractor,
  - microsurgical instruments,
  - ergonomic aneurysm clips and appliers
- With Rand-First Operated Spinal cord AV angioma
- Extensive study of subarachnoid cisterns-
- 330 Research Papers and 6 volume of “Microneurosurgery”
Charles G Drakes

- 1920-1998
- Born-Windsor, Ontario
- Medicine Graduate-Uni. Of Western Ontario
- 1952-Faculty at University.
- Posterior circulation aneurysm surgery
- Giant aneurysm
- Occlusion of bilateral vertebral artery, basilar or middle cerebral artery.
- Pioneered work on Vasospasm with Allcock and Aitken.
Albert Rhoton Jr

- Born, Kentucky
- Studied at Washington University
- Residency-under Dr Henry Schwartz
- Professor, 1972. University of Florida
- Fatherly figure for microscopic neurosurgery
- Brain anatomy - microsurgical perspective
Herbert Olivercrona

- 1891-1980
- Founder and Father of Swedish Neurosurgery
- Serafimer Hospital, Stockholm
- Students-Leksell and Lundberg
- First successful surgery for intracranial AVM.
- Facial Nerve preservation in Acoustic tumors
- First used power suction
Jules Hardy

- Born, 1932, Sorel
- Prof. at Notre-Dame Hospital and University of Montreal
- Trans sphenoidal pituitary surgery with Peroperative Fluoroscopy, Microscope and Microinstrumentation.
- First to recognize small intrapituitary lesions “Micoradenomas”
Ossama Al-Mefty

- Skull base surgery, meningioma,
- Brain tumors, cerebrovascular surgery

Tikeshi Kawase (Tokyo):

- Skull base surgery
- Kawase approach for petroclival meningiomas.
ROBERT F SPETZLER

- Born, 1944, Germany
- Director, Barrow Neurological Institute, Arizona
- Atlas of Microneurosurgery
- Vascular surgery
- Skull base surgery
- Spetzler–Martin grading for AVM
Neuroendoscopy

- 1910- L’ Espinasse- $1^{st}$ NSx endoscope
  - *Fulguration of choroid plexus*

- 1918- Walter Dandy-
  - *Endoscopic choroid plexectomy*

- 1923- Mixter- $1^{st}$ ETV using urethroscope
NEURORADIOLOGY

- 1918, Walter Dandy: Pneumoventriculography & Pneumoencephalography
- 1921, Jean Sicard: Myelography
- Arthur Schuller: Father of modern Neuroradiology
- 1947, George Moore: Radionuclide imaging
1972-CT scan:
• British engineer Godfrey Hounsfield & Allan Cormack, jointly awarded the Nobel Prize in 1979.

1970-1974—MRI
• Block & Purcell—Nobel prize winning work in 1940’s

2003—
• Nobel Prize to Paul C Lauterbur and Peter Mansfield for their discoveries concerning magnetic resonance imaging.

1991: functional MRI
**ENDOVASCULAR NEUROSURGERY**

- **Serbinenko F A:**
  - Founder of Endovascular Neurosurgery
  - Nondetachable Balloon for endovascular treatment

- **Guido Guglielmi:**
  - Detachable Coil (GDC)

- **Pierre Lasjaunias:**
  - Expertise in treating Vein of Galen Malformation
  - pediatric arteriovenous malformation.
MADJID SAMII

- Born, 1937, Tehran
- Neurosurgical training in Germany
- Director, International Neurosciences Institute, Hanover
- Microneurosurgery
- Skull base surgery
- C-P angle tumors
- Microscopic Nerve repair with good functional outcome
- Established microneurosurgery training laboratory.
Arnold H Menenzes

- Born, Mumbai
- Medical Edu.-TNmedical college, Mumbai-1967
- Neurosurgical Training at university of Iowa.
- Craniovertebral junction anomaly-surgical techniques-investigations
- Spinal dysraphic states
- Hydrocephalus
- Spinal bony compression lesions in children
- Cranial base
- Rheumatoid arthritis and the cervical spine
- Tethered spinal cord
- Craniosynostosis - craniofacial dysostosis
- Somatosensory evoked potentials for the diagnosis of tethered cord in patients with myelomeningocele
Laligam N Shekhar

- Born, Tamilnadu
- Medical education, MMC-1973
- Residency – Cincinnati college, Pittsburgh
- Professor, University of Washington.
- Skull base tumors (meningioma, chordoma, acoustic neuroma)
- President of WFNS, Skull Base Societies
- Aneurysmal, A-V malformation surgery
- Surgery for trigeminal neuralgia, hemifacial spasm - Microvascular Decompression
PROF. JACOB CHANDY

- 1910-2007
- 1949- First Department of Neurosurgery in India at CMC, Vellore.
- Founder President of Neurological Society of India in 1951.
- Started residency programme in CMC, at 1958.
- Pioneer of development of Neurosurgery in India.
- Received Padmabhusan
- Honors from American Associations of Surgeons, WFNS, WHO and World Council of Churches.
Prof. Balasubramaniam Ramamurthi

- 1922–2003
- October 24, 1950 started the neurosurgical service at the Government General Hospital, Chennai.
- December 8, 1951 - Neurological Society of India - founder Secretary
- First editor of *Neurology India*
- 1970, Institute of Neurology - 1st comprehensive neurosciences center, South Asia
Prof. P. N. TANDON

- MBBS, MS from KGMC, Lucknow
- FRCS(England)-1956
- Neurosurgical training- Ulleval Hospital, Oslo University 1957-58; Montreal Neurological Institute, McGill University 1959-60.

Posts held-
- Prof Neurosurgery-lucknow(1963-65)
- Prof Neurosurgery-AIIMS(1965-90)
- Bhatnagar Fellow(CSIR),AIIMS-1990-95
- President, National Brain Research Society.
- Emeritus Professor, AllIMS.
• Visiting Prof. of various prestigious National and International medical universities.
• Worked as editorial member/editors in many national and international journal.
• Fellowships of many international institutes.
• **Contribution:**
  - Revolutionized management of various form of CNS tuberculosis
• Pathophysiology of Head injury-
  - Temporal lobe injury
  - primary and secondary brainstem injury
  - enlarging skull fractures in children
• Pituitary tumors, Glioma, Brain abscess, Cysticercosis, optic nerve injuries, brachial plexus injuries.
• Spontaneous subarachnoid hemorrhage,
• National Neural Transplantation Unit at AIIMS (1986)
• Has written 8 books, 14 monograph,
• Approximately 220 publications in national and international journal.
PROF. A K BANERJII

- **Educational Qualifications**
  - MBBS 1957, K.G. Medical College, Lucknow
  - M.S. (Surgery) 1961, K.G. Medical College, Lucknow.
  - M.S.(Neurosurgery) 1964, Christian Medical College, Vellore.

- **Professional Experience in Neurosurgery**
  - Lecturer Christian Medical College, Vellore 1964-65
  - Assistant Professor AIIMS, New Delhi 1965-69
  - Professor AIIMS, New Delhi 1979-95
  - Head of Dept. of Neurosurgery AIIMS, New Delhi 1988-90
  - Chief of Neurosciences Centre AIIMS, New Delhi 1988-95
• Director & Senior Consultant VIMHANS, New Delhi 1995-Feb 2007
• Emeritus Consultant Apollo Hospital, New Delhi March 2007 onwards
• Emeritus Professor AIIMS, New Delhi 2003-Life time appointment

Main contributions
• Established Microneurosurgery in India.
• Standardised neurosurgical training & evaluation in the country.
- Developed or had major role in development of all the neurosurgical sub-specialties (aneurysm surgery, peripheral nerve surgery, transphenoidal surgery, surgery for pineal region tumors) of the present.
- Played a major role in continuing medical education of neurosurgeons of India through World Federation of Neurosurgical Societies (India) Trust of which he is a life trustee & Secretary
Neurosurgical Giants

- **Norman McOmish Dott** - aneurysm, facial pain
- **Sir Geoffrey Jefferson** - atlas #
- **Charles Harrison Frazier**
  - subtemporal approach (tic douloureux), cordotomy
- **James Clark White** - ANS, chronic pain, neuroprotection
- **William Jason Mixter** - herniated PIVD, spinal injuries
Neurosurgical Giants

- Max Minor Peet - pineal gland, sensory root (gasserian ganglion) division, 50% dextrose in raised ICP, arterial HTN (B/L splanchnic section), favored local anaesthesia
- Kenneth G Mckenzie - clips, skull tongs
- Hugo Krayenbuhl
- Gerard Guiot - hypothermia in NS, pituitary tumors (TNTS), thalamus, stereotaxic frame, parasaggital approach
- Paul C Bucy - premotor cortex, oligodendrogloma
- Alfred W Adson - nerve regeneration, sympathectomy (PVD), ANS, upright position, vertical incision
Bibliography

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- Pandya SK: Neurosciences in India- Retrospect and Prospect, 1989
- Bucy Paul C. Neurosurgical giants: Feet of Clay and Iron, 1985
THANK YOU