



# 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: 1<sup>st</sup> 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



[www.neurosurgery.org](http://www.neurosurgery.org)

- 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



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# 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



www.geni.com

# Charles Elsberg

- 1871-1948. Born-New York
- 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



[columbianeurosurgery.org](http://columbianeurosurgery.org)

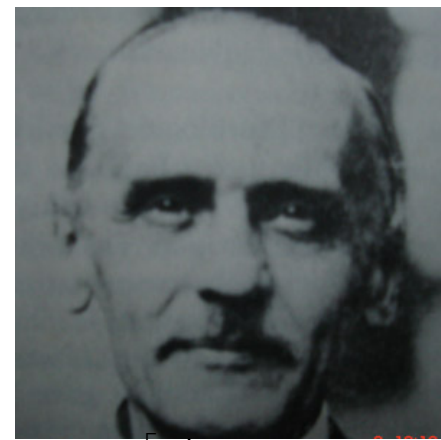
# EGAZ MONIZ

- 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”



[www.snpcultura.org](http://www.snpcultura.org)

# 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: 1<sup>st</sup> EEG of brain tumor
- Hyperventilation to evoke seizure
- Coined psychomotor epilepsy

# Wilder Graves Penfield



[www.wikipedia.org](http://www.wikipedia.org)

- 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
  - Electroencephalography(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

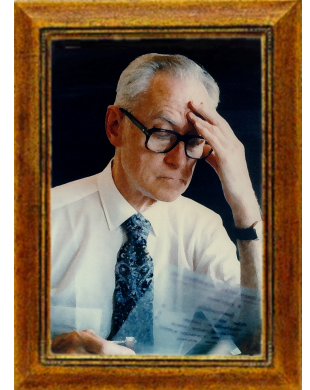


[neurocirurgia-rinaldosouto.blogspot.in](http://neurocirurgia-rinaldosouto.blogspot.in)



# William H Sweet

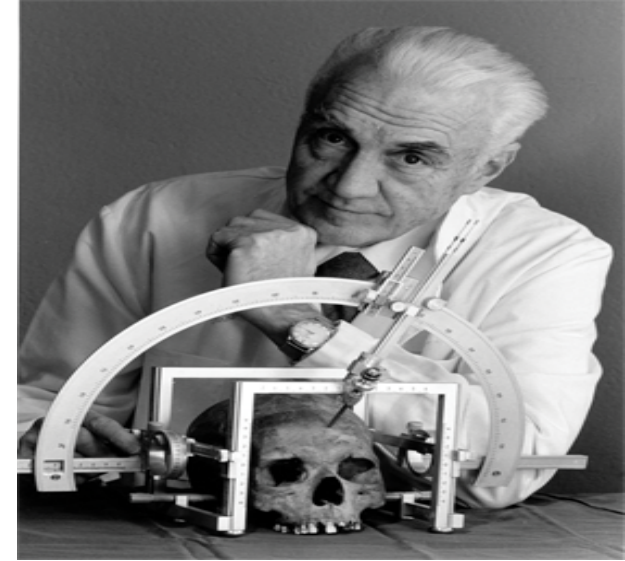
- 1910-2001, Born- Kerriston, Washington
- Harvard Medical School
- Neurosurgical Training under Dr. Percival Bailey.
- Massachusetts General Hospital
- + Gordon Brownell- PET
- Boron Neutron Capture therapy for brain tumors
- Pituitary stalk section –
  - diabetic retinopathy
- Percutaneous thermal rhizotomy
  - Trigeminal neuralgia
- hypothermia during neurosurgical operations
- First carotid bifurcation reconstruction
- Died due to complication of Parkinson's disease



[alumni.neurosurgery.mgh.harvard.edu/chiefs](http://alumni.neurosurgery.mgh.harvard.edu/chiefs)

# Lars Leksell (1907-1986)

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



[www.gammaknifecenter.org](http://www.gammaknifecenter.org)

# 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 20<sup>th</sup> century neurosurgeon**
- **Founder of Microneurosurgery**



[www.neurochirurgie-karlsruhe-online](http://www.neurochirurgie-karlsruhe-online)

# 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.



AJNR 1999 20: 358-359

# 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



Neurosurgery.ulf.edu

# Herbert Olivercrona

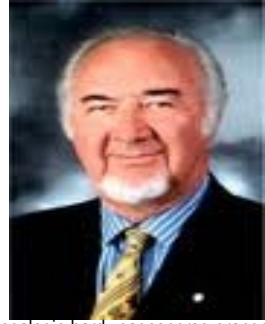
- 1891-1980
- **Founder and Father of Swedish Neurosurgery**
- Serafimer Hospital, Stockholm
- Students-Leksell and Lundberg
- First successful surgery for intracranial AVM.
- Facial Nerve preservation in Acoustic tumors
- First used power suction



[en.wikipedia.org](https://en.wikipedia.org)



# Jules Hardy



[genealogie.hardy.pagesperso-orange.fr](http://genealogie.hardy.pagesperso-orange.fr)

- 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 , cerebro vascular surgery



neurosurgery.org

# Tikeshi Kawase (Tokyo):

- skull base surgery
- kawase approach for petroclival meningiomas.



worldacademyns.org

# ROBERT F SPETZLER



[en.wikipedia.org](https://en.wikipedia.org)

- 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<sup>st</sup> NSx endoscope*
  - *Fulguration of choroid plexus*
- 1918- Walter Dandy-
  - *Endoscopic choroid plexectomy*
- 1923- Mixter- *1<sup>st</sup> ETV using urethroscope*

# NEURORADIOLOGY

- 1918, Walter Dandy: *Pneumoventriculography & Pneumoencephalography*
- 1921, Jean Sicard : *Myelography*
- Arthur Schuller: *Father of modern Neuro-radiology*
- 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.
- 1981: **Gd-DTPA** dimeglumine.
- 1991: **functional MRI**

# ENDOVASCULAR NEUROSURGERY

- **Serbinnenko 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.



biographyha.com

# 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.



wikipedia.org



# Arnold H Menezes

- Born , Mumbai
- Medical Edu.-TNmedical college, Mumbai-1961
- 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



neurocirurgia-rinaldosouto.blogspot.in

- 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



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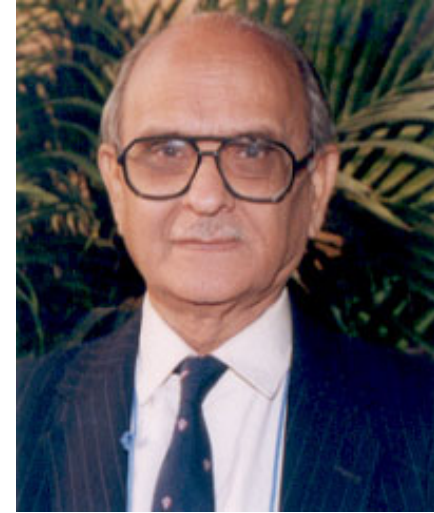
- 1910-2007
- 1949- First Department of Neurosurgery in India at CMC, Vellore.
- Founder President of Neurological Society of India in 1951.
- Started residency programme in CMC, at 1958.
- Pioneer of development of Neurosurgery in India.
- Received Padmabhusan
- Honors from American Associations of 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
  - 1<sup>st</sup> comprehensive neurosciences center, South Asia

# Prof. P. N. TANDON

- Born-13 th Aug-1928.
- MBBS, MS from KGMC, Lucknow
- FRCS(England)-1956
- Neurosurgical training- Ullevål 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,AIIMS.



[www.nbrc.ac.in](http://www.nbrc.ac.in)

- 
- 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.
- **Honors;** Padma Vibhushan(2005), Padma Shree(1973), Padmabhusan(1989), B.C.Roy awards (1982,1993)., various other prestigious awards for development of sciences in india.

# PROF. A K BANERJI



- **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 subspecialties (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, parasagittal approach
- **Paul C Bucy**- premotor cortex, oligodendroglioma
- **Alfred W Adson**- nerve regeneration, sympathectomy (PVD), ANS, upright position, vertical incision

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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**