Contents

Videos

Video 9.1 Epilepsy of infancy with migrating focal seizures due to KCNT1 mutation.
Hirokazu Oguni

Video 9.2 Lennox-Gastaut Syndrome and generalized tonic seizures.
Hirokazu Oguni

Video 12.1 Epileptic spasms.
András Fogarasi

Video 12.2 Lateralization of the seizure onset zone.
András Fogarasi

Video 16.1 Motor mapping: primary motor hand area.
Ingrid Tuxhorn

Video 16.2 Speech mapping.
Ingrid Tuxhorn

Video 16.3 Motor mapping.
Ingrid Tuxhorn

Video 32.1 Awake craniotomy and cortical stimulation.
Tara Der

Video 36.1 Anterior temporal lobectomy and Amygdalohippocampectomy.
Oğuz Çataltepe

Video 53.1 Peri-insular hemispherotomy.
Oğuz Çataltepe

Video 61.1 Endoscopic-assisted hemispherotomy.
P. Sarat Chandra

Video 62.1 Anterior Corpus Callosotomy: an anterior ½ callosotomy was performed via the interhemispheric approach on the left side.
Tai-Tong Wong

Video 63.1 The technique of endoscopic complete corpus callosotomy with anterior, hippocampal and posterior commissurotomy.
P. Sarat Chandra

Foreword

Many diseases of the central nervous system with diverse etiology affect our patients of all ages with acute, subacute, or chronic symptoms and deficits, which are most distressing. Since ancient times up until the present day, rational, irrational, and alternative modes of treatment have been researched, analyzed, and applied. The passion to discover the cause of disease and to explore treatment possibilities and alternative methods has engaged the intellects of the medical field since ancient times, and continues today.

On 4 January 1953, at University Hospital Zürich in Switzerland, the very first day of my professional career as a neurosurgeon, Professor Hugo Krayenbühl performed surgery on a young patient with intractable temporal epilepsy. A right-sided anterior two thirds temporal lobectomy was the planned procedure. In the adjoining room with glass windows, Professor Rudolf M. Hess, a neurologist and EEG specialist, trained by Dr. W. A. Cobb in London and G. Walter in Bristol, directed and guided the intraoperative EEG recordings. Two nurses, one resident, and one technician assisted him in the coordination of EEG leads and connections. A very long overhead metal tube originating from the enormous EEG machine and a carrier for the connections curved over the window into the operating room and hung over the open wound to accept the leads from electrodes placed on the exposed surface of the brain. The surgery was time-consuming and progressed slowly. After one millimeter removal of cortex, an EEG recording checked the status of electrical activities in the temporal region. Professor Hess delivered short messages: "Still spikes around…!", until, finally, with a sense of happy relief: "No more spikes!"

Professor Krayenbühl turned and spoke to us, his observers: "The treatment of epilepsy is an obligation for neurosurgery." The impact of this challenging remark on my first day made a deep impression on me and I contemplated that cooperation between neurophysiology and neurosurgery could be a rational approach to pursue.

Whether a coincidence or my destiny, now sixty-five years later, I am honored to write this Foreword for the second edition of *Pediatric Epilepsy Surgery* by Oğuz Çataltepe and George I. Jallo. This volume of 74 chapters covering specialized aspects of epilepsy, with contributions by experts in this field, has been conducted into a captivating and thought-provoking symphony by the two editors. Advances in mathematics, basic sciences, scientific technology, and the flourishing medical industry have all contributed to developments in the past 200 years. Since the 1950s, a surge in research and the resulting accomplishments have empowered unforeseen breakthroughs in several fields of the sciences and offered the potential to progress towards a more profound research in the broadest fields of the neurosciences.

This particular volume explores the progress and achievements in all the fields of neurosciences pertaining to epilepsy, including the impact of neurosurgery, e.g., the events leading to diagnosis, diligent consideration of indications for the various neurotherapies, the concerns in pre-, intra-, and postoperative nursing, and the importance of neuropharmacology, neuropsychology, neurophysiology, speech therapy, and social care.

Wilhelm Sommer (1852-1900), in Erkrankung des Ammonshorns als aetiologisches Moment der Epilepsie, Archiv für Psychiatrie und Nervenkrankheiten (1880;10:631-675), documented changes in Ammon's horn on the autopsy of brains of 36 epilepsy patients and deducted that this finding could explain the epileptic factor. He gave credits to the observations of G. B. Morgagni and J. E. Greding made in the eighteenth century, and also to Th. H. Meynert, who noted changes in the hippocampus of epilepsy patients in the nineteenth century. Sommer expressed his hope that the results of his study would be confirmed by others. In the year 1899, E. Bratz demonstrated a normal hippocampus on a woodcut, compared it with a hippocampus with gross atrophy and microscopic cell loss from the brain of an epilepsy patient with Ammon's horn sclerosis (Ammonshornbefunde der Epileptischen. Archiv für Psychiatrie und Nervenkrankheiten. 1899;31:820-836). The availability of modern visualization technology and advances in histopathology are processes that confirm the diagnosis of hippocampal sclerosis, cortical dysplasia, gliosis, and micro-infarctions.

The second half of the nineteenth century ushered in a period of major progress in medicine and surgery, for instance, new concepts for hospitals, appointment of licensed nurses, and especially the courageous attempts to alleviate the burden and stress of patients with intractable seizures (see the timeline discussed later).

Selective amygdalo-hippocampectomy was pioneered by Paul Niemeyer in 1954, and was developed into the pterional transsylvian approach by myself, which, in the meantime, has also been complemented by the paramedian supracerebellar transtentorial approaches by Uğur Türe. Both are effective in treating patients with medial basal temporal epilepsy. These approaches are surgical explorations in a small, compact, highly functional area of the central nervous system. Successful approach and elimination of the seizure focus is dependent on knowledge of this complex anatomy, and competence in micro-neurosurgical skills and techniques. Laboratory training offers the ideal environment for cadaver dissection to learn cisternal, vascular, and parenchymal neuroanatomy, and to perfect micro-technical skills.

Selection of treatment modalities relevant to the particular seizure problems of an individual patient is a determining factor in achieving cessation of epileptic events or at least in reducing seizure frequency and severity, and therefore improving quality of life. A center with a multidisciplinary team established within a hospital and dedicated to the treatment, study, and research of epilepsy and its medical and social repercussions has the resources to offer more qualified service to these patients.

The range of topics, information, and data in these chapters, when combined together, represent the current opportunities and indicate the future research and treatment landscape in the realm of epilepsy. The insights, judgments, and balanced assessments and conclusions have the potential to stimulate young colleagues to accept the challenge of preventing these debilitating and frightening episodes called epilepsy.

M. Gazi Yaşargil, MD
Professor of Neurosurgery
Yeditepe University Hospital
Istanbul, Turkey

Timeline of the endeavors of neuroscientists and neurosurgeons to develop effective therapies for the various epilepsy types and the etiology of this disease:

1879	W. Macewen	Cortical resection following brain trauma; a 7-year-old boy
1880	J. L. Corning	Electrostimulation of the cervical carotid artery
1882	W. Alexander	Bilateral ligation of the vertebral arteries
1886	V. Horsley S. H. Jackson	Removal of scar tissue
1893–1912	F. Krause	Faraday stimulation. First accurate image of motor strip. Removal of scar tissue
1925–1935	O. Foerster	First use of EEG for epilepsy surgery
1930–1980	W. Penfield H. Jasper M. Baldwin T. Rasmussen W. Feindel	Partial temporal lobe resection and several other excisions
1954	P. Niemeyer	Transventricular selective amygdalo-hippocampectomy
1973	M.G. Yaşargil	Pterional anterior transylvian approach for amygdalo-hippocampectomy
2012	U. Türe	Paramedian supracerebellar transtentorial approach for amygdalo-hippocampectomy
Cerebral Hemispherectomy		
1938	K. G. McKenzie	
1950	R. A. Krynauw	
1970	T. Rasmussen	
1992	J. Schramm	
1993	J. G. Villemure	
Callosotomy		
1940	W. P. Van Wagenen et al.	
1962	J. E. Bogen et al.	
1970	A. J. Luessenhop et al.	
1993	A. R. Wyler	
Cortical Resection of Dysplasia		
1971	D. C. Taylor et al.	
2003	R. I. Kuzniecky	
2004	W. J. Hader et al.	
Vagus Nerve Stimulation		
1990	J. K. Penry, J. C. Dean	
1998	A. Handforth et al.	