

特 別 講 演

The Future of Intraoperative MRI

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The concept of the Intraoperative Magnetic Resonance Image-Guidance was first envisioned in 1990 in the Image Guided Therapy (IGT) Program at Brigham and Women's Hospital, Harvard Medical School. This program in collaboration with General Electric introduced an open configuration Magnetic Resonance Imaging (MRI) system, the SIGNA SP with the nickname of "double doughnut" which is referred to the special configuration of the system. The first of its kind, this scanner was located in a fully functional operating room which was suitable for open neurosurgical procedures. During interventional procedures and surgeries the patient stayed on the MRI table which was also the operating room table.

This novel MRI configuration that was based on novel magnet design and technology complemented and augmented the neurosurgeons' vision and enabled them to see beyond and "under" the exposed surfaces and to discriminate tumors from normal tissue. MRI-guidance not only improved localization and targeting of the tumors, but also, within the limits of MRI's contrast and spatial resolution, identified their margins—a critical step to ensure complete surgical removal. Since then real-time or iterative intraoperative MR imaging at the Brigham has guided over 3,000 surgical and interventional procedures. Those procedures, among others, included open brain surgeries, MRI-guided interstitial laser thermal ablations, MRI-guided Focused Ultrasound Surgery, endoscopic sinus surgery. Coupled with new therapy devices and surgical navigation these systems took on a pivotal role in opening new directions in the surgical management of cancer in general and in neurosurgery of malignant brain tumors in particular within a short period many new interventional and/or intraoperative MRI centers were established around the world and intraoperative MRI and the MRI-guided procedures became widely accepted in neurosurgery.

 Ferenc A. Jolesz

Education:

1971 M.D. Semmelweis Medical School, Budapest, Hungary (Summa Cum Laude)

Postdoctoral Training:

Internship and Residencies

1970-1971 Intern (Rotating), Semmelweis Medical School, Budapest, Hungary

1975-1979 Resident in Neurosurgery, Institute of Neurosurgery, Budapest, Hungary

1982-1985 Resident in Radiology, Brigham and Women's Hospital, Boston, MA

Clinical and Research Fellowships

1972-1973 Research Fellow, (Biomedical Engineering, Computer Sciences), K. Kando College of Electrical Engineering, Budapest, Hungary
 1979-1980 Research Fellow in Neurology, Massachusetts General Hospital, Boston, MA
 1980 Milton Research Fellow in Physiology, Harvard Medical School, Boston, MA
 1980-1982 Research Fellow in Physiology, Harvard Medical School, Boston, MA
 1982-1985 Clinical Fellow in Radiology, Harvard Medical School, Boston, MA

Licensure and Certification:

1982 Educational Commission for Foreign Medical Graduates
 1982 The Commonwealth of Massachusetts Board of Registration
 1987 American Board of Radiology
 1988 American Society of Neuroradiology

Academic Appointments:

1971-73 Instructor, Department of Physiology, College of Physical Education, Budapest, Hungary
 1973-74 Assistant Professor, Department of Physiology, College of Physical Education, Budapest, Hungary
 1973-75 Research Associate, Department of Physics, K. Kando College of Electrical Engineering, Budapest, Hungary
 1974-75 Adjunct Professor, Department of Physiology, College of Physical Education, Budapest, Hungary
 1981-82 Research Associate in Physiology, Harvard Medical School, Boston
 1985-89 Assistant Professor of Radiology, Harvard Medical School, Boston, MA
 1989-96 Associate Professor of Radiology, Harvard Medical School, Boston, MA
 1996- Professor of Radiology, Harvard Medical School, Boston, MA
 1998- B. Leonard Holman Professor of Radiology, Harvard Medical School, Boston, MA

Hospital Appointments:

1985- Radiologist, Brigham and Women's Hospital, Boston, MA
 1985-95 Consultant in Radiology, Dana Farber Cancer Institute, Boston, MA
 1986-95 Consultant in Neurosurgery, Children's Hospital, Boston, MA
 1987-95 Consultant in Neuroradiology, West Roxbury VA Hospital, West Roxbury, MA
 1987-88 Director, Neuro MR Imaging Section, Brigham and Women's Hospital, Boston, MA
 1988- Director, Division of Magnetic Resonance Imaging, Brigham and Women's Hospital, Boston, MA
 1993- Director, Image Guided Therapy Program, Brigham and Women's Hospital, Boston, MA
 2000- Vice-Chairman of Research, Radiology Department, Brigham and Women's Hospital, Boston, MA
 2001-Director, Harvard Imaging Center, Boston, MA

Awards and Honors:

1985 Research Career Development Award
 1991 Visions in Medicine Award, General Electric Medical Systems
 1996 Doctor Honoris Cause, Pannon Agricultural University, Kaposvar, Hungary
 1996 Eugene P. Pendergrass New Horizon Lecturer, Radiologic Society of North America
 1997 Honorary Member, Hungarian Neuroradiology Society
 2002 Radiological Society of North America Outstanding Scientist Award
 2002 Szentgyorgyi Award of Hungarian National Academy of Sciences
 Honorary Doctorate, Semmelweiss Medical School, Budapest, Hungary.