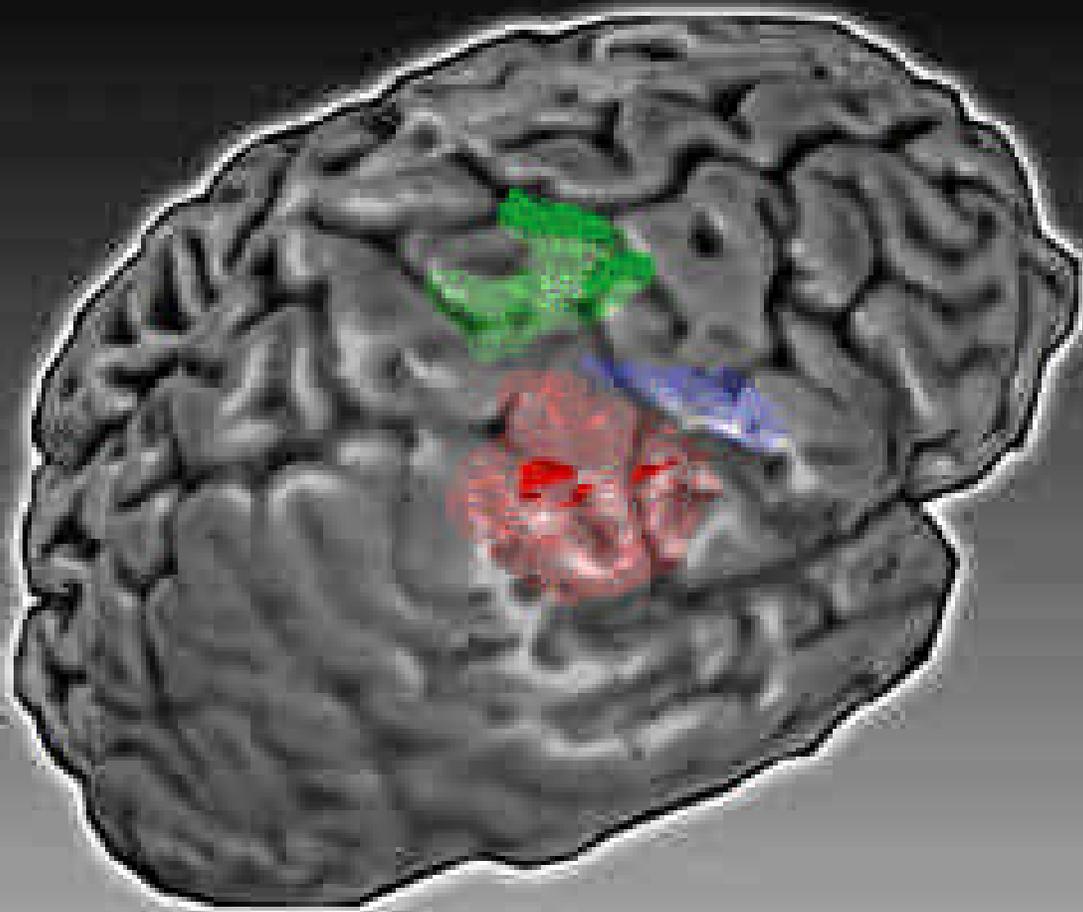


NEUROIMAGE

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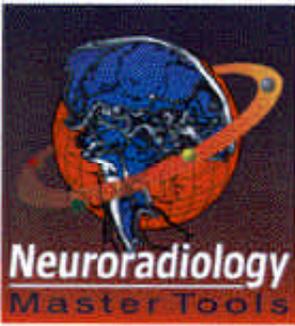
HÔPITAL NEUROLOGIQUE DE MONTRÉAL
MONTREAL NEUROLOGICAL HOSPITAL

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VIDEO-CONFERENCE NEURORADIOLOGY MASTER PROGRAMME 2000

A series of video-conferences has been established between several European Universities (Brussels, Ancona and Toulouse), supported by the European Community. Two years ago, we were approached to become the Canadian partner of this association. The goal of this project is to introduce an international dimension to the teaching of Neuroradiology through cooperation between Universities of North America and Europe using telecommunication and modern facilities. The current partners of this project are: **Dr. D. Balériaux, Brussels University, Dr. U. Salvolini, Ancona University, Dr. C. Manelfe, Toulouse University, Dr. C. Raybaud, Marseille University, Dr. J. Barkovich, San Francisco University and Dr. D. Tampieri, McGill University.**

Among the European partners, pediatric neuroradiology has been chosen as the general topic for the year 2000. A tentative schedule of 8 video-conferences hosted by the various participating universities has been produced in the following sequence : **Mondays, January 31, March 20, April 17, May 15, June 26, September 25 and October 23.**

The first video-conference for this year was held on January 31, 2000 at 11 :00 am Eastern Standard Time at the McGill University Instructional Communications Centre and hosted by the Department of Neuroradiology in Toulouse. The topic was ***Fetal MRI : State of the art.***



We hope that this project will continue to expand to improve neuroradiology learning and to consolidate inter-university links.

We thank both Dr. Danielle Balériaux, Project Director, and Mr. Jean-Guy Moyersoén, Managing Director Communications Touch and Go, for their invitation and support.

DONATELLA TAMPIERI, MD

HEAD OF DIAGNOSTIC AND INTERVENTIONAL NEURORADIOLOGY DIVISIONS

SPONDYLOLYSIS OF THE AXIS

DRS. DENIS SIRHAN & DENIS MELANÇON

A young lady was referred to our MR facility for investigation of left upper extremity weakness, with brisk reflexes in all limbs, including a brisk jaw jerk. The MRI showed an area of cord compression at C2, with intrinsic T2-hyperintense signal at the same level (Fig.1). Further investigation with plain films of the cervical spine and spiral CT of the cranio-vertebral junction disclosed occipitalization of the atlas,(Fig.2) and a dehiscence at the pedicles of the axis (Fig.2 and Fig.3). She underwent posterior metallic fixation from the occiput down to C3.

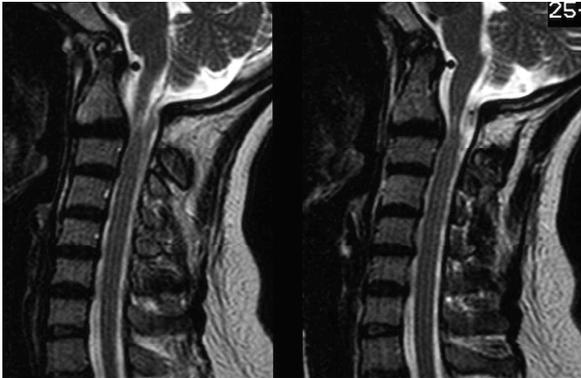


Figure 1



Figure 2



Figure 3

Spondylolysis involving the cervical spine is a rare condition. It is usually associated with other cervical spine anomalies, and therefore believed to be congenital in nature. Spondylolysis involving the axis is even rarer. Already Kohler and Zimmer (1) had made mention of "a hiatus in the pedicle of the arch of the axis, that may lead to considerable displacement. Occasionally, individuals may be entirely symptom-free, or present light cervical pain, at worst torticollis." But patients may present quadriparesis(2). Or the anomaly may simulate a Hangman's fracture (3).

Hirota and al. (2) reviewed 70 cases of the literature: 47 were involving C5, while only 9 were reported at C2. Our case shows that the anomaly had produced instability which, over a period of time, caused focal atrophy and malacia of the spinal cord (Fig.1).

1. A. Kohler, E.A. Zimmer, *Borderlands of the normal and early pathologic in skeletal pathology*,

Grune & Stratton, New York 1968.

2. Hirota S., Amono K., Maeno T., Doi T.: *A case of cervical spondylolysis causing tetraplegia*, Spine 13: 113-116, 1985.

3. Mondschein J. and Karasick D.: *Spondylolysis of the axis vertebra: a rare anomaly simulating Hangman's fracture*, AJR: 172, 556-557, February 1999

INTRAMEDULLARY SCHWANNOMA

DRS. SUZANNE FONTAINE, RONALD POKRUPA, & JOHN RICHARDSON

This is a 35-year-old left-handed gentleman who presented with radiating pain from the head and neck to the right shoulder associated with L'Hermitte sign. Physical examination revealed a right-sided weakness.



Figure 1

Figure 2

Figure3

MRI study of the cervical spine demonstrated a well-circumscribed intramedullary lesion, mostly isointense in T1 (Fig.1) and mildly hyperintense in T2 (Fig.2), associated with edema of the cord, and areas of hypointense signal at the extremities of the lesion. The tumor was homogenously enhancing (Fig.3).

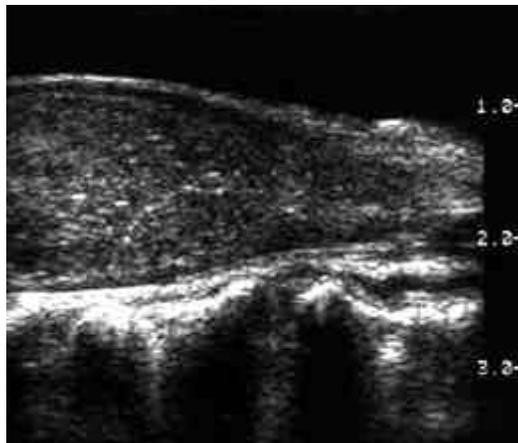
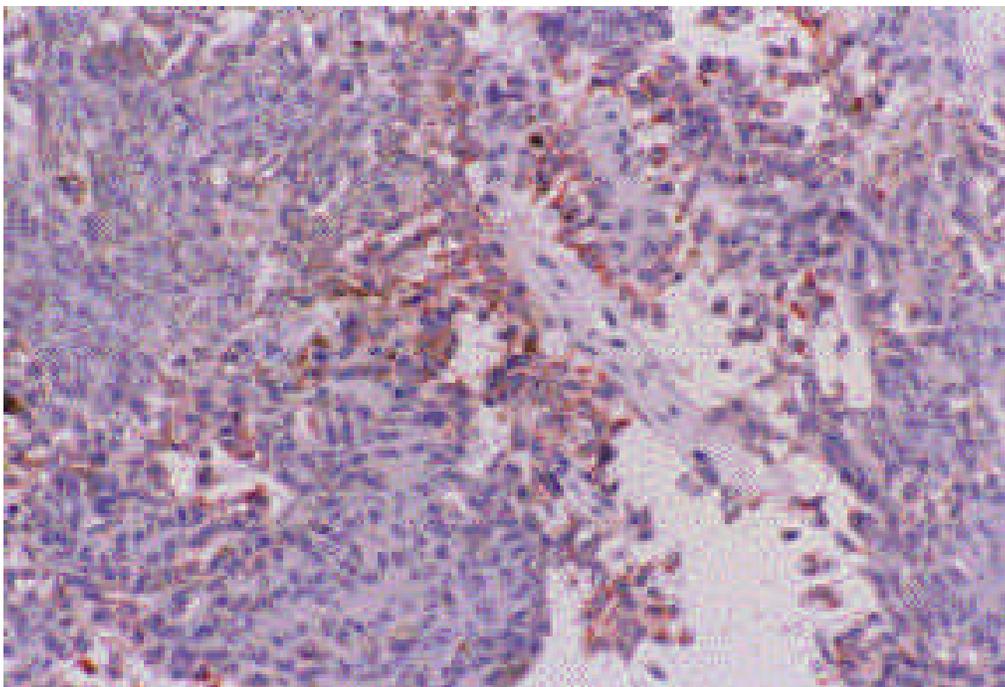
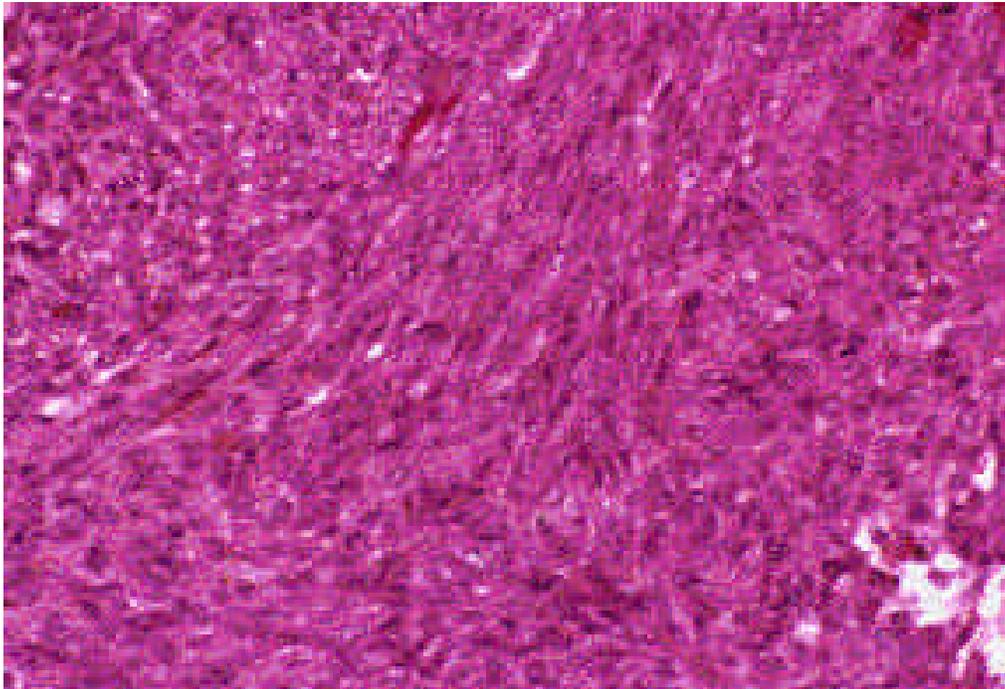


Figure 4

The patient had surgery with intra-operative ultrasound for guidance. This image demonstrates the well-defined caudal end of the lesion (Fig.4).

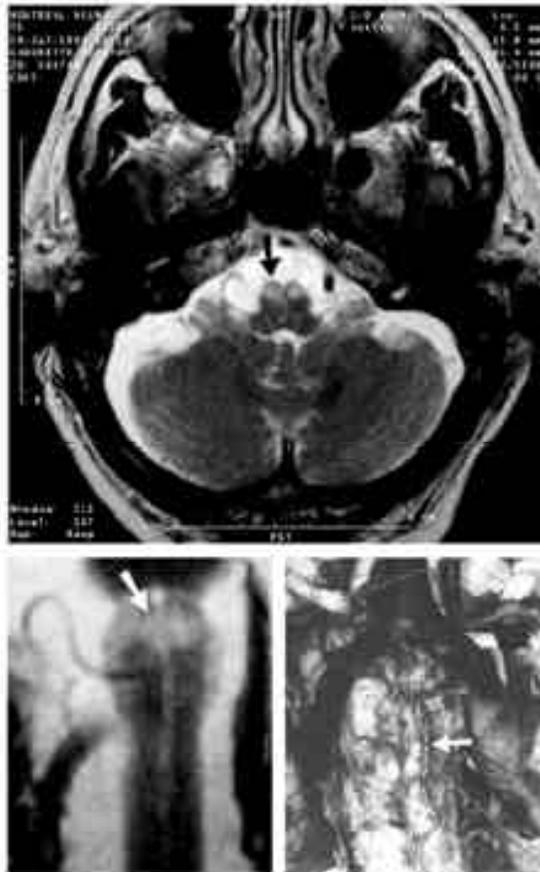
Microscopic examination of the tumor showed it to be composed largely of spindle shaped cells, often arranged in bundles, with some twisting and minimal whorl formation. The nuclei have prominent nucleoli and vary in shape from elliptical to near circular. Some of the cells are pigmented and stain with Fontana stain and these cells are HMB 45 positive. A few mitotic figures are present with a proliferation index of 6-10% with MIB-1. Electron microscopy shows melanosomes and rudimentary cell junctions but no clear basal lamina around the cells. The differential diagnosis was between malignant melanoma and a pigmented mesenchymal tumor, either Schwannoma or meningioma. After consideration of the morphology and immunohistochemistry, it was concluded that this was best considered as an intramedullary pigmented Schwannoma.



ABOUT AN UNUSUAL STROKE

DR DENIS MELANÇON

This is the history of a 71 year old gentleman who presented to medical attention with symptoms and signs of a vertebro-basilar ischemic event. His past medical history was positive for diabetes mellitus and coronary by-pass 8 years before. He had developed weakness of his extremities, left more than right, legs more than arms, in progression. He went on to develop difficulty swallowing. His cranial nerves were normal including function of palate and tongue. On examination, he had no movement of his left arm, and 2/5 strength of his left leg. The weakness of his right leg was assessed at 3/5, and of his right arm at 4/5. Both plantar responses were up-going, his OT reflexes were increased bilaterally, and grossly equal. Doppler studies of his neck vessels revealed an abnormal right vertebral artery. MRI revealed hyperintense pyramids on both PD and T2 images, right more than left. A poor flow was noted in the distal right vertebral artery, compared to the left. The conclusion was focal ischemic lesion, and the patient treated with Plavix.



DISCUSSION

To explain so specific an involvement of the two pyramids, and the right more than the left, one has to think occlusive disease involving the right ramus of the anterior spinal artery, feeder of the right pyramid and contributing to the feeding of the left. An example of this type of supply to the anterior medulla oblongata is shown in the book "Radiologic Anatomy of the Brain", G. Salamon and Y.P. Huang, Springer-Verlag 1976, 308-309, Figure 233.

An instructive reference is the following: Bassetti C., Bogousslavsky J., Mattle H., Bernasconi A.: *Medial medullary stroke: report of 7 patients and review of literature*, Neurology 1997, Apr. ; 48 (4) 882-890

P.S. Thanks to my friend Georges Salamon for permission to reproduce the picture from his book.

FUNCTIONAL MAGNETIC RESONANCE IMAGING

BRUCE PIKE, PH.D.

Magnetic Resonance Imaging (MRI) has revolutionized the field of diagnostic neuroradiology with superb soft tissue contrast and fine anatomic detail. More recently MR techniques have been developed that allow the imaging of not only the structural anatomy of the brain but also the underlying function.

The most commonly used method of functional MRI (fMRI) takes advantage of differences in the magnetic susceptibility of oxy- and deoxy-hemoglobin. In the local micro-circulation surrounding active neuronal populations, the amount of oxygenated blood increases relative to the resting state, and this results in a change in intensity of images produced with certain MR imaging sequences. FMRI uses rapid imaging techniques to acquire multiple pictures of the brain during periods of both rest and neuronal activation. Statistical comparison of the intensity of these image series can be displayed as a colour coded statistical parametric map similar to those seen in Figure 1 A & B.

Figure 1 shows the results of a clinical fMRI study performed for Dr. Gerard Mohr, a McGill neurosurgeon. Pre-operatively it was important to establish the relationship of the large right parietal tumour to the cortical motor and sensory areas in order to plan a safe surgical approach. The patient had two fMRI scanning sessions during which left-hand finger tapping (Figure 1A) and lower face movements (Figure 1B) were performed. The relationship of the respective activated areas to the gadolinium enhancing tumour can be seen in these figures. Figure 1C is a surface rendering of the anatomic MRI with the tumour and areas of functional activation segmented in different colours. The central sulcus can be identified clearly in this 3D view, passing between the fMRI identified motor areas and the tumour.

fMRI not only allows rapid and relatively simple identification of brain functional areas for use in surgical planning, but also provides a valuable research tool for use by a wide variety of neuroscientists investigating the complex relationship between the human brain and its environment.

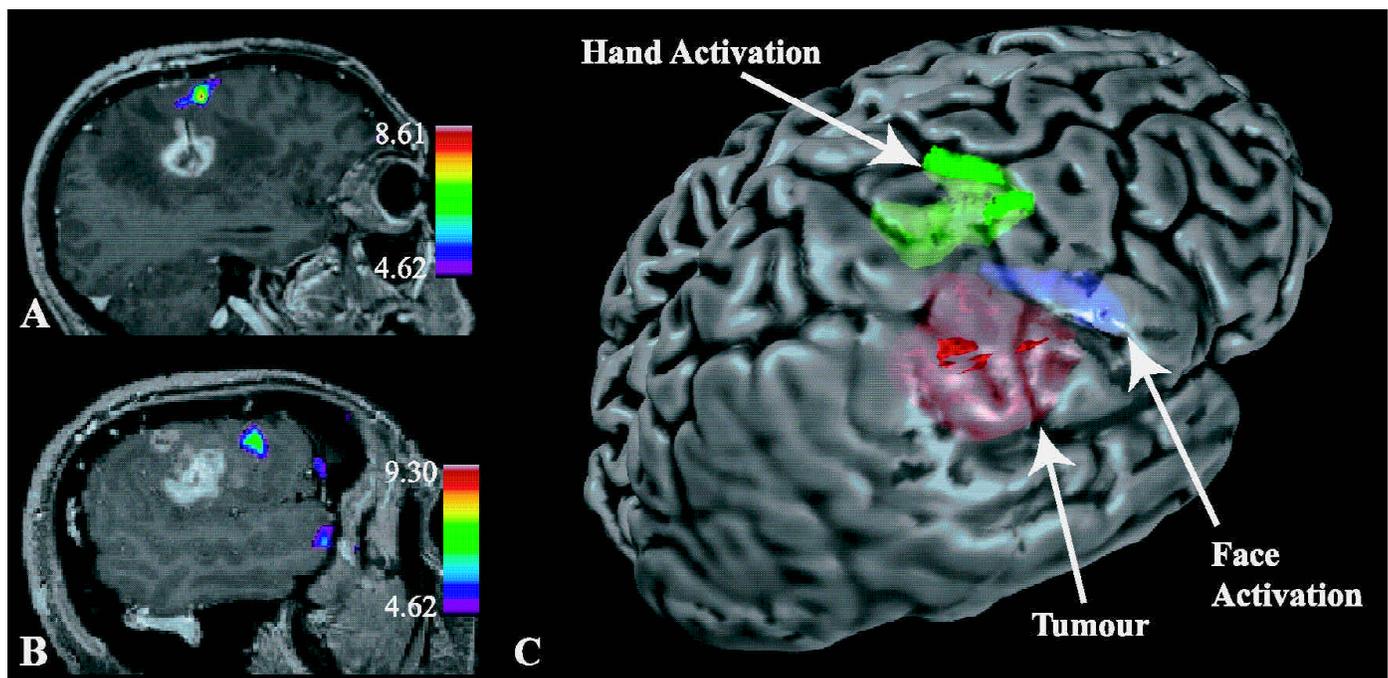
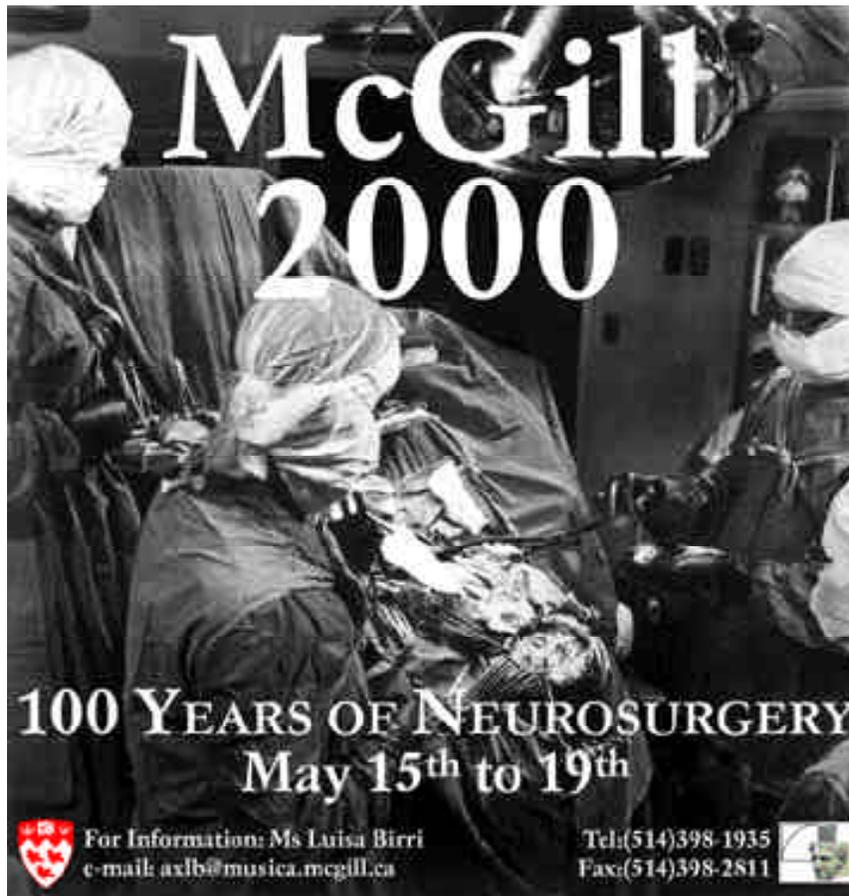


Figure 1



A Neurosurgical Reunion will be held at the Montreal Neurological Hospital and Institute on **May 15 – 19, 2000** to celebrate 100 years of neurosurgery at McGill. One century ago William Archibald and colleagues were involved in craniotomies for brain tumours at the Royal Victoria Hospital. With the coming of Dr Penfield and Dr Cone and the creation of the MNI, neurosurgery at McGill University went through a period of incredible development in large part due to the equally striking progress in neuroradiology, neuroanaesthesia, electroencephalography, neuropsychology and neurology. At the start of the new millennium, neurosurgery at McGill, taking advantage of the many different changes occurring in the system, wishes to maintain an important role in all aspects of neurological surgery i.e. training, research and treatment.

We take this opportunity to invite all our colleagues, neuroradiologists, neuroanaesthetists, electroencephalographers, neurologists, and researchers in neurosciences to join the McGill neurosurgical family and attend the forthcoming reunion.



André Olivier, M.D.,Ph.D.
Chairman / Division of Neurosurgery McGill University
Chief / Department of Neurosurgery McGill University Health Centre

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