Curing problems of the brain without manipulating the brain or without much manipulation of the brain has been the goal of neurosurgeons for decades. Difficult problems such as aneurysms and arteriovenous malformations were dealt with by operating on the cerebral vessels. With the improved technology it now is possible in many patients to block selectively with microcatheters such threatening vascular problems using endovascular coils (or endovascular stents) or injection of substances via the microcatheters to selectively obstruct vessels within the brain. All of this can be done without open operations on the brain.

Ischemic stroke was thought to be a condition simply to be diagnosed but not treated. Now, depending upon the time of occurrence, the thrombosed vessel may be treated by antithrombolytic agents and/or microcatheter techniques to remove the thrombus/embolus and insert a microstent to keep the artery patent. Endovascular neurosurgeons have been very active in this area. In some medical centers, these strokes are called ‘brain attacks’ (like myocardial infarction is called ‘heart attack’) to emphasize the need to treat them aggressively and early, if possible.

Treatment of spine disorders has undergone a renaissance. Now 75–85% of most neurosurgical practice in the United States involves the diagnosis and treatment of spine problems. Numerous types of spine instrumentation are available to do spinal fusions. Minimally invasive spine techniques are available, allowing patients having various spine operations to return home the same day. The role, if any, of the artificial disc is being evaluated. There are attempts to close the hole in the annulus of the disc in patients having an operation for disc herniation to assess whether the risk of recurrent disc herniation is decreased. Spacers are being evaluated that are placed between the spinous processes to prevent lordosis in patients with spinal stenosis who have compression of spinal cord and/or nerve roots with extension of the spine. In neurosurgery, in general, and in spine surgery, in particular, the pace of technical advances often has been outpacing demonstrable clinical efficacy.

A significant resurgence in the surgical treatment of epilepsy has followed a series of publications over the last 10 years. Wiebe et al. [1] prospectively studied patients with mesial temporal sclerosis, the most common cause of adult intractable epilepsy, and reported their findings in the New England Journal of Medicine. Their publication was the first prospective, randomized study to show definitely that epilepsy surgery was superior to best medical therapy in medically intractable temporal lobe epi-
lepsy. In their series, 58% of patients in the epilepsy sur-
gery group were seizure-free at 1 year while only 8% of
patients in the best medical group therapy group were
seizure-free (p < 0.01). Complication rates were similar
between the two groups. This publication, along with
publications showing that epilepsy surgery was highly
cost-effective, had a very low permanent complication
rate and led to substantial improvements in quality of life,
has caused neurologists and neurosurgeons to consider
epilepsy a surgically remediable disease.

Deep brain stimulation has been used to treat epilepsy
in patients with the seizure focus in eloquent cortex or
where there are multiple seizure foci not amenable to re-
section. This treatment is helpful in those difficult situa-
tions.

The idea of therapeutic stimulation of the brain for
chronic neurologic disorders was first attempted in move-
ment disorders. Deep brain stimulation of the subtha-
lamic nucleus was introduced as a last resort therapy for
patients with severe Parkinson’s disease as a reversible
therapy to replace the older technique of selective lesion-
ing of the globus pallidus. What was once considered an
experimental technique is now supported by class I evi-
dence of efficacy. Outcomes are similar to expected best
outcomes of medical therapy, but without the disabling
side effects of medical therapy. Extensions of deep brain
stimulation treatment of movement disorders have led to
successful treatment of both essential tremor and dysto-
nia.

Another advance in cranial neurosurgery is in the
field of intraoperative navigation and intraoperative im-
ageing. Neuronavigation, the ability to use stereotactically
registered pre-operative images during surgery to pre-
cisely locate lesions, has been around for more than 15
years. Neuronavigation is commonly found in operating
rooms throughout the United States. A relatively small
but growing number of institutions have the capability to
do actual intraoperative imaging. Intraoperative MRI
and CT scanners are being introduced with mixed re-
views. Preliminary results have shown these devices to be
of some use in brain tumor surgery to further assure a
maximal safe resection.

Intraoperative CT scanning and portable CT scanners
in the operating room have been used to identify land-
marks more reliably and place spinal instrumentation.
Investigations are being done currently to see if the use of
this technology leads to less radiation exposure to the pa-
tient and to the operating room staff.

The advances in neurosurgery, partially summarized
above, give an indication of why the past years have been
a significant leap forward for the field of neurosurgery.

Reference
1 Wiebe S, Blume WT, Girvin JP, Eliasziw M: A randomized controlled trial of surgery for