

# NEUROSURGERY



**Children's National**

**The Division of Neurosurgery is a regional, national and international destination for newborns and children with disease, trauma, or malformation of the brain, spine or nervous system.**

Hundreds of procedures are performed every year, with excellent outcomes.

**Robert Keating, MD, Chief**

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Children's National neurosurgeons define the standard of care by integrating into all procedures advanced neuro-imaging and neurophysiological monitoring. Our neurosurgeons routinely use minimally invasive strategies when appropriate.

All aspects of neurosurgical consultation and treatment are offered with appointments available as rapidly as possible.

**Diagnostic services and treatment are offered for all conditions requiring pediatric neurosurgery, including:**

- Brachial plexus reconstruction
- Brain and spinal cord trauma
- Brain and spinal cord tumors
- Cerebrovascular disorders
- Chiari malformations
- Craniofacial disorders
- Epilepsy - surgical therapeutics
- Hydrocephalus
- Movement disorders - including spasticity
- Neurofibromatosis
- Peripheral nerve reconstruction
- Skull base disorders including craniocervical disorders
- Spinal dysraphism - including spina bifida/tethered cord
- Tumors - brain and spinal cord

Neurological Problem	Signs and Symptoms	Children's Innovative Approaches
<b>Brain Tumors</b>	<ul style="list-style-type: none"> <li>• Increased intracranial pressure, headache, visual changes, nausea/vomiting («persistent flu»)</li> <li>• Macrocephaly, splayed sutures, full fontanelle</li> <li>• Delay or loss of developmental milestones</li> <li>• Gait / coordination difficulties</li> <li>• Changes in personality/alertness /school performance</li> <li>• Focal deficits: weakness, numbness</li> <li>• Worsening or change in seizures</li> </ul>	<ul style="list-style-type: none"> <li>• Seamless, multidisciplinary inpatient and outpatient care</li> <li>• Inpatient rehabilitation when necessary</li> <li>• Minimally invasive intervention</li> <li>• Intraoperative MRI, image guidance, endoscopic and skull base approaches</li> <li>• Gamma Knife radiosurgery</li> <li>• Non-invasive evaluation with functional MRI, PET scan, MEG</li> <li>• Member of the Pediatric Brain Tumor Consortium</li> <li>• Convection chemotherapy, antiangiogenesis, molecular genetically based therapy, biologic therapy - cellular signaling agents, anti-growth factor agents</li> </ul>

Neurological Problem	Signs and Symptoms	Children's Innovative Approaches
<b>Spinal Cord Tumors</b>	<ul style="list-style-type: none"> <li>• Back pain</li> <li>• Spasticity</li> <li>• Changes in arm / leg function and control</li> <li>• Bowel and bladder changes</li> <li>• Delay or loss of motor skill development</li> <li>• Weakness, numbness, gait disturbance, swallowing difficulties</li> </ul>	<ul style="list-style-type: none"> <li>• Intraoperative motor and somatosensory evoked potentials</li> <li>• Laser and radiofrequency tissue ablation</li> <li>• Osteoplastic laminotomy to restore bony integrity</li> <li>• Focused, minimally invasive surgery using intraoperative MRI</li> <li>• Inpatient rehabilitation when necessary</li> <li>• Expert neuroradiology</li> </ul>
<b>Craiofacial Disorders Cranio-synostosis</b>	<ul style="list-style-type: none"> <li>• Sutural ridging</li> <li>• Skull asymmetry</li> <li>• Associated genetic abnormalities</li> <li>• Increased intracranial pressure</li> <li>• Head growth deceleration</li> </ul>	<ul style="list-style-type: none"> <li>• Multidisciplinary team: Neurosurgery, Plastic Surgery, Genetics</li> <li>• Advanced surgical techniques</li> <li>• Absorbable hardware, external distractors, bone morphogenic protein</li> <li>• Intracranial pressure monitoring</li> </ul>
<b>Epilepsy</b>	<ul style="list-style-type: none"> <li>• Intractable seizures (not controlled by medicines)</li> <li>• Lesional epilepsy</li> <li>• Tumors, cortical dysplasia, mesial temporal sclerosis, TS</li> <li>• Non-lesional epilepsy</li> </ul>	<ul style="list-style-type: none"> <li>• Multidisciplinary team: Neurosurgery, Neurology, Psychiatry</li> <li>• Invasive grid monitoring for cortical mapping and seizure localization, intraoperative MRI</li> <li>• Intraoperative MRI</li> <li>• Non-invasive functional neuroradiology (functional MRI, PET, MEG)</li> <li>• Comprehensive surgical management – Lobectomy and topectomy – Callosotomy and Hemispherectomy</li> <li>• Innovative drug trials / ketogenic diet</li> <li>• Epilepsy summer camp / extensive support infrastructure</li> </ul>
<b>Functional</b>	<ul style="list-style-type: none"> <li>• Spasticity: Spastic diplegia and quadraparesis</li> <li>• Dystonia and other movement disorders</li> <li>• Brachial plexopathies</li> </ul>	<ul style="list-style-type: none"> <li>• Deep brain stimulation</li> <li>• Intrathecal baclofen pump and selective dorsal rhizotomy</li> <li>• Spasticity / Brachial Plexus multidisciplinary clinics</li> <li>• Intraoperative spinal cord and nerve monitoring</li> <li>• Concomitant soft tissue release, rhizotomy, botox/ phenol injections Inpatient rehabilitation when necessary</li> </ul>
<b>Hydrocephalus</b>	<ul style="list-style-type: none"> <li>• Head growth acceleration</li> <li>• Full or tense anterior fontanelle</li> <li>• Splayed cranial sutures</li> <li>• Headache, vomiting, sunseting eyes</li> <li>• Delayed development</li> </ul>	<ul style="list-style-type: none"> <li>• Endoscopic shunt insertion</li> <li>• Endoscopic third ventriculostomy</li> <li>• Image-guided endoscopic cyst fenestration</li> </ul>
<b>Chiari Malformations</b>	<ul style="list-style-type: none"> <li>• Occipital headaches</li> <li>• Exertional neck pain Swallowing difficulty, apnea, excessive drooling</li> <li>• Gait disturbance, sensory, or motor deficits</li> <li>• Scoliosis (associated with syringohydromyelia)</li> </ul>	<ul style="list-style-type: none"> <li>• Intraoperative spinal cord and cranial nerve monitoring</li> <li>• Realtime intraoperative imaging with ultrasound and MRI</li> </ul>

Neurological Problem	Signs and Symptoms	Children's Innovative Approaches
<b>Spina Bifida Tethered Cord</b>	<ul style="list-style-type: none"> <li>• Midline cutaneous markers: dermal sinus, «fawn's tail», hemangioma</li> <li>• Back pain</li> <li>• Leg or foot pain, discomfort, asymmetry, fatigue</li> <li>• Weakness, numbness, bowel/bladder changes</li> <li>• Scoliosis</li> </ul>	<ul style="list-style-type: none"> <li>• Multidisciplinary care: Neurosurgery, Orthopaedics, Urology</li> <li>• Intraoperative spinal cord and nerve monitoring</li> <li>• Intraoperative ultrasound and MR imaging</li> <li>• Laser and radiofrequency tissue ablation</li> </ul>
<b>Cerebro-vascular</b>	<ul style="list-style-type: none"> <li>• Arteriovenous malformations, cavernous malformations, aneurysms</li> <li>• Intracerebral hematoma</li> <li>• Subarachnoid Hemorrhage Acute neurologic deficit</li> <li>• Sudden new onset headache</li> <li>• Stroke</li> </ul>	<ul style="list-style-type: none"> <li>• Image guidance for intraoperative localization, intraoperative MRI</li> <li>• Interventional neuroradiology</li> <li>• Embolization for preoperative reduction / cure</li> <li>• Gamma Knife radiosurgery for inoperable lesions</li> </ul>

**CONTACT US TO DISCUSS A POSSIBLE REFERRAL OR SECOND OPINION:**



For questions about  
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