



The Montlake Cut

UW Pediatric Neurosurgery: Babies Aren't Just Little Adults

How many times did we all hear that as students: a platitude just as inexplicable as true when you're a twenty-something year-old medical student, because babies are pretty mysterious then, anyhow. Maybe because there are more women doctors now, that's less the case. But until you've had charge of a completely helpless lump of your own DNA, babies remain largely theoretical.

Immediately following the parenting experience, you not only have a lot more respect for your own mother and dad, but also the understanding that babies have to be approached warily, with vigilance and the anticipation of the unexpected.

This is nowhere more true than in the case of a developing nervous system. But as recently as 100 years ago, most hospitalized babies and children in Seattle were not treated separately, but were housed on adult wards.

Seattle Children's Hospital was born early in the 20th century after Anna Clise's son, Willis died of heart disease in 1898. When she discovered that there were no special pediatric facilities (excepting for children who were blind, deaf or mentally subnormal), Mrs. Clise organized 23 affluent woman friends to contribute \$20 each and launch Children's Orthopedic Hospital.

Apparently \$460 was enough then to buy a seven-bed ward in the old Seattle General. In 1908, they moved to a 12-bed cottage on Queen Anne, and three years later, next door into a real 40-bed brick hospital building. A committee chaired by Seattle legend Dorothy Stimson Bullitt moved COH to the Laurelhurst Campus in 1953. Over the years, the name has changed four times.

Seattle Children's Hospital has been associated with the University of Washington since the 1960's. After recent prolonged negotiations with the Laurelhurst neighborhood, the inpatient facilities will soon grow to 500 beds, with simultaneous improvements to the OR and ER. This expansion is necessary because the hospital has been at 90% capacity for more than a decade.

In 1974, there was a merger agreement between the School of Medicine and what was then still called COH. The agreement closed pediatrics at UWMC, including neurosurgery. Jack Docter was the Medical Director at Children's, and he created a formal neurosurgery service directed by a private practitioner, but reluctantly allowed an associate director from UW. John Loeser remembers the meeting to involve our department as largely one-sided; Doctor Docter pretty much said, "no" in the same way that Major Major did in *Catch 22*.

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Left to right: Sam Browd, Rich Ellenbogen, and Carlo Giussani



Seattle Children's

He apparently believed that an academic teaching service would be unfair to the private community.

However, there were really only two trained pediatric neurosurgeons in Seattle then: Tim Stuntz in town, and Loeser at UW. When Tim was killed by an avalanche in British Columbia's Bugaboo Mountains while heli-skiing in 1986, all the other private neurosurgeons resigned from COH. They explained that they were only there to help cover Tim.

As a result, John then became Director of Pediatric Neurosurgery at COH. At the same time he was Director of the UW Pain Center. Thankfully, Paul Kanev, then a junior neurosurgery resident (but who had already finished a peds residency) helped until Mitch Berger arrived later that year. When Ted Roberts, former Chair of Neurosurgery at Utah, moved to Children's, John was able to resign as Director of Pediatric Neurosurgery.

David Tapper, named Chief of Surgery at Children's at about the same time, was dedicated to improving service to the WWAMI Region. With a full time, senior pediatric neurosurgeon in Ted Roberts, the program began to grow.

When Rich Ellenbogen joined the faculty, residents were inserted into a regular rotation on pediatric neurosurgery, and they combined with a core of dedicated nurse practitioners lead by Nadine (Boettcher) Nielsen to make a growing service hum.

More recently, Jan Marino Ramirez became the Director of the Children's Center for Investigative Brain Research, providing the department with world class basic research at Children's.

Studies now underway aim to understand the cellular basis of brain function, and search for novel ways to treat and cure neurological disorders in children, including epilepsy, Rett syndrome, brain tumors, and sudden infant death syndrome (SIDS).

Molecular approaches have exposed a variety of receptor and ion channel subtypes that are developmentally regulated within the CNS. While their specific roles remain to be worked out, studies underway at the cellular and systems level may lead to better understanding ontogenetic changes in networks.

Currently, voltage-gated and synaptic whole cell currents, properties of single channels as well as

second messenger pathways in a functional context, are used to characterize changes in postnatal development of the respiratory network.

The laboratory is particularly interested in understanding developmental alterations of cellular properties involved in the response of the respiratory network to hypoxia. This response elicits molecular events which are regulated by endogenously released neuromodulators such as substance P and endorphins that result in a reconfiguration of the respiratory neuronal network.

Following Ted's death, the Holley family endowed the Richard G. Ellenbogen Chair in Pediatric Neurosurgery, now occupied by Professor Jeff Ojemann.

The service continued to grow administratively, clinically and in the labs. During those few years, the volume of neurosurgery done for children in the UW system more than doubled.

Rich Ellenbogen, Jeff Ojemann, Tony Avellino and Sam Browd have continued to expand pediatric neurosurgery dramatically. In 2009, a total of 711 neurosurgical operations were performed at Children's by our service.

In addition, the team involved in neurosurgical care includes: the new Director of the Epilepsy Center, Professor Edward Novotny; Professor of Pediatrics William Walker, whose interest is in neurodevelopment; Dr. Susan Apkon in Rehabilitation Medicine; and Drs. Wally Kringle and Kit Song from orthopedics.

Our surgeons now have at their command the world's most advanced imaging and surgical techniques for treating children with conditions affecting the central nervous system.

In 2008 and again in 2009, U.S. News & World Report magazine ranked our Neurosurgery program among the top 10 in the country. Using a scheme based on reputation, outcomes, and case-related measures, U.S. News also ranked Seattle Children's itself among the best pediatric centers in the country (out of 160) for the seventeenth consecutive year.

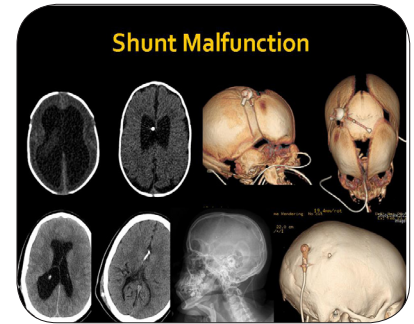
We are a regional referral center for the management of complexities, but also routine problems such as hydrocephalus. We operate on 150-200 children for ventricular obstruction each year, about 20% of the surgical total. In addition to shunt procedures, some types of hydrocephalus can be treated by minimally invasive third-ventriculostomy.



Patient Thank-you wall

Assistant Professor Sam Browd is a member of the Hydrocephalus Clinical Research Network (HCRN), and notes the goals of this group are to:

- * Create a detailed registry of patients at participating institutions
- * Improve shunt placement using ultrasound guidance
- * Reduce infections associated with shunt surgery
- * Improve treatment for shunt infections
- * Manage hydrocephalus in premature children
- * Understand endoscopic third ventriculostomy (ETV), a surgical technique for treating some forms of hydrocephalus without using a shunt



Dr. Browd writes, "Research into the cause and treatment of hydrocephalus provides the ultimate pathway for a cure. Our collaboration with other premier children's hospitals moves us closer to the day when hydrocephalus is relegated to the historical record of pediatric neurosurgery. It is an honor to lead the clinical research effort and partner with our basic science faculty as we build a world-class translation research program devoted to hydrocephalus."

UW Neurosurgery at Children's is also a national referral center for Chiari malformation. Rich Ellenbogen is a recognized national leader in the treatment of this abnormality in children. Twenty-three decompressions for Chiari were done in 2009.

Our craniosynostosis program is one of the largest and best known in the country. In addition to non-operative treatments pioneered by Sterling Clarren and others at Children's three decades ago, surgeons work together when operating on about 120 children each year. The team includes a neurosurgeon and one of three accomplished craniofacial plastic surgeons: pioneer Joe Gruss, Richard Hopper who is now the Chief, and Craig Birgfeld recently arrived from the University of Pennsylvania.

Children's is part of the University of Washington Regional Epilepsy Center, and is the largest pediatric epilepsy program in the Pacific Northwest. About 40 children with epilepsy are surgically treated each year, using the latest technology and techniques to find and remove the seizure focus. Many of these techniques were pioneered at UW, first by Arthur Ward and then George Ojemann, and are now being perpetuated and improved by Professor Jeffrey Ojemann.

Seattle Children's has created the largest pediatric brain tumor center in the Northwest. Each year, our Neurosurgery team treats between 80-120 children with brain or spinal cord tumors, using the most up-to-date surgical procedures and equipment.

Global outreach is another mission for UW pediatric neurosurgery. By extending our resources to underdeveloped countries, we provide training and education around the world to physicians and healthcare providers caring for children with hydrocephalus and other neurological illnesses.

Really Tiny Research

Even smaller than babies, translational research underway at the UW Center for Nanotechnology still involves Professor Rich Ellenbogen's pediatric clinical skills.

This NIH funded program, lead by Professor Miqin Zhang from the School of Engineering, employs nanoprobe 80,000 times smaller than the breadth of the ridge on a fingertip.

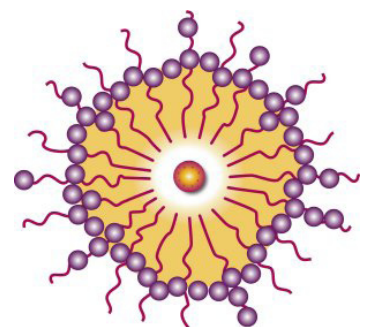
Such tools may unlock a new frontier into cancer research through molecular imaging and the targeting of tumor cells. James Olson, M.D., Ph.D., an established researcher interested in medulloblastoma and PNET tumors at SCCA, is also involved in this work. Dr. Olson is PI on a Cancer Oncology Group study of these childhood tumors.

When our resident, Patrick Gabikian was working in this lab, he designed one of the most promising probes now used to expose experimental tumors. Nanotechnology allows researchers to build new tools that both cross the blood-brain barrier, and are tiny enough to attack cancer at the cellular and genetic level. This revolutionary approach is

so precise that doctors may be able to design unique treatment for an individual medical and genetic profile.

Moving research from bench to bedside is an important goal of the National Cancer Institute's Alliance for Nanotechnology in Cancer. A collaborative plan is underway to share research and development information across scientific disciplines and around the world.

As biomedical applications of nanotechnology evolve, scientists must ensure that nanodevices are safe for both the body and the environment. The National Cancer Institute is optimistic that through coordinated and responsible development, nanotechnology will dramatically change cancer patient care.



A nanoparticle

Save the Date!

The annual meeting of the Washington Society of Neurosurgical Surgeons will be held:

May 21-22
Sun River Lodge Winthrop,
Washington
at the end of the North
Cascades Highway

Guest speakers include Raymond Sawaya, MD, Paul Dreyfuss, MD, and Elizabeth Leedom, JD

Brain Teaser:

Last issue, we asked: Who were Thomas Willis' collaborators when he dissected human brains in the mid 17th century?

Answer: One was the famous Oxford physician Richard Lower. The second was the more unlikely British architect Christopher Wren, who illustrated *Cerebri Anatomi*.

Question: This one's tougher: Cajal and Golgi shared the 1906 Nobel Prize, but they shared much more. Both had peculiar parenting and both had strange habits of investigation. What were they?

Submit a neurosurgery joke, wordgame or riddle to us and you could win a Tully's Coffee giftcard if your *Brain Teaser* is printed in our next issue!



Jack Bonner and his wife, Ramona

Where Are They Now: Jack Bonner

Jack Bonner wrote the following memoir; an exclusive to the MONTLAKE CUT:

I was born in Havre, Montana and went to Carroll College in Helena. For me, neurosurgery began during my first years of medical school at the University of Chicago.

I was impressed by the neuroanatomy course given by Ruth Rhines, and subsequently did a research project under her direction: Spinal Cord Regeneration in the Chick Embryo. Even then, 1959 to 1963, spinal cord injury was a huge clinical barrier, and regeneration was a major research topic.

In addition to Dr. Rhines, I soon met the neurosurgical faculty, Joseph Evans and Sean Mullen, whose lectures also impressed me during our required third year clinical course.

Student neurosurgical rotations were elective, and in my senior year I chose neurosurgery three times (we were on the quarter system, so I consider I had part of my neurosurgical training at Chicago). As I remember it, only one other student took the neurosurgical rotation even once.

Drs. Evans and Mullen were excellent teachers and mentors, and both remained close friends throughout my professional life.

I interned at Duke, with my first two months rotation on neurosurgery. There was a very big and active service there: Guy Odom was Chief, Barnes Woodhall Ex-Chief and still active, Blaine Nashhold, George Tindhall, and residents such as Bob Wilkins and Steve Mahaley. The service was busy, and, the year being 1964, working in the still segregated south was an experience in itself.

Sean Mullen invited me to do a residency at the University of Chicago, but I chose Art Ward and UW for diversity of experience.

Because (in part) of running between four hospitals, the residency was demanding. Pain was shared with my fellow residents Bob Brawley, Lloyd Anderson, John Loeser, Jim Mahnke, Jerry Greenhoot, Randy Smith and John Kusske.

Continued on page 5 . . .

Baby King Kong?

Treating human babies offers technical challenges, but at least they are *Homo sapiens*. How about operating on a baby gorilla?

In January 2008, that's just what a team of our pediatric neurosurgeons did at the Seattle zoo. Two neurosurgeons and a neonatologist from Seattle's Children's Hospital joined the Woodland Park Zoo's Animal Health staff in surgically removing a growth overlying the spine of a two-and-a-half-month-old female western lowland gorilla.

A pre-op MRI had shown that the mass closely resembled a congenital condition found in human infants: a meningocele.

"This gorilla operation was an amazing 'Star Trek'-type of experience for the team from Children's Hospital and University of Washington," said Dr. Richard Ellenbogen, neurosurgeon from Children's.

"Drs. Craig Jackson, Sam Browd, and I were proud to help with an endangered species baby gorilla suffering from a congenital spinal abnormality. The operation was a great success from our perspective, and we are hoping for a full recovery."



Dr.'s Ellenbogen, Jackson and Browd prepare to operate on the Woodland Park Zoo's baby gorilla.

"Surgery confirmed that the mass extended down to the spine but did not invade the spinal column," explained the zoo's Interim Director of Animal Health Dr. Kelly Helmick.

The operation itself, MRI, and consultation by an obstetrician were all donated to the zoo. "We are extremely grateful to the entire medical team for volunteering their time and specialized skills for our young conservation ambassador," added Helmick. The animal recovered completely, and is now normal.

Where Are They Now: Jack Bonner Continued . . .

Suffice it to say that, as the last Montlake Cut Newsletter noted, Art Ward was a brilliant and interesting person who left an indelible influence on those lucky enough to work with him.

In 1969, I became an Assistant Professor in the Department of Surgery at the University of Missouri in Columbia. Sam Black was Chief of the Neurosurgical Division, and Warren Sights, the only other neurosurgical faculty member (a small division in a large department).

Columbia was a good college town, a pleasant place to live, (particularly if you were a football fan, as Dan Devine was coach at that time), and I considered the Department of Surgery, Medical School and University to be good quality. However, I didn't feel we were provided with proper professional support and development, although, as the most junior, I had plenty of the clinical responsibility. So, I decided to leave Missouri and look for another academic job.

1972—the high point of the Vietnam War and low point for university budgets—was a poor time to look for a faculty appointment. By chance, a Fresno neurosurgeon in private practice contacted me a couple of times. On a lark, I stopped there while looking at a job in San Francisco. With a wife and then two small children to support, I decided to work in Fresno temporarily, intending to leave in a year or two to return to academic medicine. Thirty-seven years later, my wife and I are still "temporarily" in Fresno!

I enjoyed private practice and did both adult and pediatric cases. I worked in various professional organizations, locally, statewide and regionally. I was Chairman of our Fresno-Madera Medical Society Delegation to the CMA House of Delegates for a number of years, and served as President of the local Medical Society, President of the California Association of Neurosurgical Surgeons, and am the past historian of the Western Neurosurgical Society. But, in December 2003, I closed my practice to become a full-time Medical Consultant for the State of California, Department of Disability Determination.

I think the major changes during my career were the introduction of the pager (making call more convenient), imaging, neuronavigation, and the double edges of improved instrumentation for fusion, which also seems so overused and abused.

I am fortunate to have a supportive wife, Romona (an RN who was an ICU nurse when I first met her in Chicago), three children (two daughters and one son), and, since 1970, four German Shorthaired Pointers also as family members. The current dog, Blitz, a senior citizen aged 12 ½, is still very affectionate.

I enjoy upland game hunting (with my dogs), running (having completed three marathons), gourmet food and wine, and BMWs.



Arrivals:

Baby Meena

Our administrative specialist in charge of the residency, Kelly Jain, and her husband Maneet provided the department with yet another daughter (that's six straight girls). Meena Margaret was born on February 2nd at 6:30 in the morning. Mother and daughter are doing well, but we're not too sure about the residents.

I remain anxious to publish stories, photos, and ideas about what all of us do in caring for sick people. Please let me know the memories of your time here, what you are up to now, and ways in which you think we might find further common ground. Please contact us at the email addresses below.

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. . . And Departures:

It is difficult to imagine both Buster Alvord and Alex Spence gone, but ironically they died a day apart in mid January. Never mind that Buster was nearly 90, and that Alex had been ill for many years, these old-fashioned academics were colleagues to generations of UW neurosurgery faculty and residents.

Buster, a Seattle legend for 50 years, arrived here via Haverford College, Cornell Medical School, New York Hospital, the AFIP and NIH. Already a world famous neuropathologist on arrival at UW, most of us remember him as a teacher in the best meaning of that word: gentle but demanding instruction.

As a resident on neuropath once, I recall trying to correct his pronunciation of the recurrent artery of Heubner. He looked at me a little pityingly, and taught me German. Everyone in town knows about the Alvord Foundation's support of the humanities, the symphony, the University, the Alvord Endowed Chairs. He is quoted as saying one should "keep a third, give a third to Uncle Sam, and give a third away." He'll be remembered for this always . . . that and the ties. Buster Alvord was the way a person ought to be.

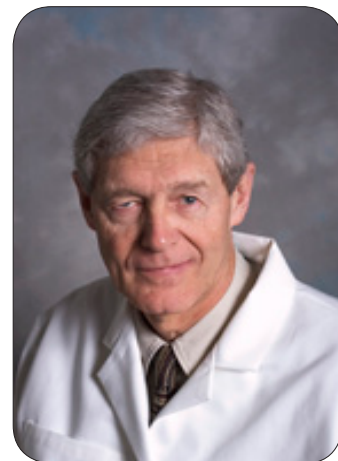
In a more reserved way, Alex Spence offered us the same sort of professional excellence, scholarship and humanitarian approach to the treatment of patients with CNS cancer. Educated at the University of Chicago's Pitzker School of Medicine, Alex trained in both neurology and neuropathology.

Before he joined the UW faculty in 1973, he studied neuropathology with the legendary Lucien Rubenstein at Stanford. An exceptional scholar, clinician and teacher, most of us recall leaning closer and closer to hear Alex talk in clinic or on the wards as the gravity of the discussion increased and the volume of his speech seemed at the same time always to decline. Alex was an important part of neurology, neurosurgery and neuropathology at the University of Washington, and we're diminished by his absence.

Death isn't bad, just sad. Still, for those of us who now keep Buster and Alex only in our memories, the world seems more than a little reduced without them.



Buster Alvord



Alex Spence