CANS newsletter

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## President's Message

Joseph, Chen, MD

*Cause and Effect*

Final preparations are underway for the 2024 meeting of the California Association of Neurological Surgeons in San Francisco, CA at the newly renovated Intercontinental Mark Hopkins Hotel on Nob Hill. An exciting program has been set with key speakers from leading neurosurgical institutions in the state along with national leaders of organized neurosurgery. In addition to examination of our socioeconomic issues, we will have scientific presentations from neurosurgical trainees across the state along with a mini symposium addressing surgical management of the aged spine.

I'd like to thank our sponsors and exhibitors who have contributed to this event and encourage all of you to participate in this event to take advantage of dialogue, networking and educational opportunities. We welcome your Exhibits/support and please, if you have not already, please use this link to register for the meeting. Reach out to emily@cans1.org to get your space reserved.

Please don't forget to register for the meeting and the banquet. I'm looking forward to seeing all of you there. You can do this at this link: REGISTER HERE!

Resident's, please use this link to submit your abstract: SUBMIT ABSTRACT While your program director or Chair will select the resident to represent at CANS, we are accepting abstracts for a rapid fire presentation. It is no charge for Resident's to attend this meeting.

**Seven Sins**

As a young person, I was enamored with a quote from Bertrand Russell: "A good world needs knowledge, kindliness, and courage; it does not need a regretful hankering after the past, or a fettering of the free intelligence by the words uttered long ago by ignorant men". As a freethinker myself, such words seemed to make a good deal of sense - an approach to human affairs that takes as its underlying assumption that progress and modernity inevitably leads to a more fair and just society.

Over time however, given my own personal observations of human affairs, Russell's quote seems to belie an assumption that there is such a thing as progress in the Hegelian sense, and further, that what we would call "wisdom" should be subordinated to present circumstances regarding the contextual substance of the human condition. Perhaps it is unfair to subject Russell to such treatment, after all, he continues to be a hero of mine in some ways, but one must honestly acknowledge flaws in our heroes, whether they be Lord Russell or George Washington for that matter.

Although he was at the vanguard of analytical philosophy, it is important to understand that Russell straddled the 19th and 20th centuries. His upbringing was clearly in the romantic era, with romanticism being in some ways the apotheosis of a philosophical tradition having its roots in Descartes and the concept of duality of mind and body. With this, the mind and its products occupy a level above that of the body. The notion of emotionality as well as reason is therefore a divine gift and perhaps more importantly, something that has no limitation in the realm of physical substance.

The phrase "cogito, ergo sum" is therefore a basis from which the belief that people are free to make themselves, limited only by their imagination, intelligence and will. We still are dealing with the residue of romanticism today as the underlying assumptions of mind-body duality implies free will and therefore a system that takes as its core tenets complete personal responsibility of guilt, virtue and worth.

Along with romanticism in the 19th century came the industrial revolution. A profound societal change was put in motion and with it came keen observers of industry and economics: Adam Smith, David Ricardo, and Karl Marx among others. Marx, himself being in essence a classical economist, would go further than Smith and Ricardo by proposing an economic reformation based on equality, justice and the primacy of human dignity. Yet, two centuries years later, the Marxist project, along with a number of other utopian and anarchist ideas, appears no closer to realization than it was in the 19th century. As is usually the case in these essays, I shall hazard a nonscientific guess.

At romanticism's height, its seeds of destruction were already being planted at a public hospital in Paris, the Pitie-Salpetriere by a series of neurologists, Charcot, Broca, Babinski. By studying syndromes of neurological deficit along with pathologic studies demonstrating association with discrete lesions of the brain, it was clear that various human actions and behaviors could be shown to be direct products of the physical circumstances of brain anatomy.

Since then an uncomfortable gap exists between radicals of physical determinism and the presently resurgent remnants of the romantic movement. At its core, the conflict between the two lies in the struggle between different ideas of power structures and the survival of their ideological movements.

That being said, I shall return to Lord Russell and his dismissal out of hand of the wisdom of the ancients, because as it turns out, at least in one area, the ancients were on to something.

One of the unfortunate circumstances of modern society is the separation, or alienation between people and the natural world. Few people understand in a visceral way the close similarities between animal and human behavior. The field of ethology has provided fascinating insight into animal behaviors and shown similarities between animal and human behaviors.

A well known experiment from the work of Frans de

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Waal showed in stark relief the emotional expressions of monkey behavior within a "fairness" experiment: Two capuchin monkeys are placed in adjacent cages and are able to directly observe each other. Monkey #1 performs a simple task and in reward, obtains a piece of cucumber. This, the monkey is willing to do over many cycles. Then, Monkey #2 performs the same task, but its reward is different: a grape. Monkey #1, after observing the transaction with Monkey #2, performs its task again and is rewarded with a slice of cucumber. The result is fascinating as Monkey #1 then displays the response of rejection of its reward along with expression of anger or rage. The experiment can be seen here: https://www.youtube.com/watch?v=meiU6TxysCg

Key here is how the monkey responds in a way that is humanly understandable. Those of us that have pets may see flashes of such behavior on occasion. It is likely that these behaviors are therefore not just expressions of abstract higher plane processes, but rather emergent properties of evolutionarily selected structural features of the brain. It occurs to me that the visceral response of the monkey to this behavioral paradigm may be described as expressions of Envy and Wrath, two of the Seven Mortal Sins. My impression is that it is these basic aspects of the human condition that circumvent the Hegelian vision of progress.

The Seven Mortal (or Deadly) Sins are in its most well known form were promulgated by Saint Thomas Aquinas (1225-1274) although iterations were discussed as early as in the second and third centuries. The Sins are commonly accepted in the present day as Lust, Gluttony, Greed, Sloth, Wrath, Envy and Pride. These were recognized from the outset as being abuses of natural desires. Each had a corresponding opposite virtue: Chastity, Temperance, Charity, Diligence, Patience, Kindness and Humility.

It is perhaps the subordination of the sins to the virtues that enables a civilized society to come into existence. Yet, is it the qualities of the Sins that underlie the base survival instincts of man and other animals? Are the Sins a biologically encoded set of behaviors that has been evolutionarily conserved over hundreds of millions of years across a wide range of the order of mammalia? One may hazard a guess to infer that this is the case and applies equally to the base survival instinct of humans, as well as all other mammals.

In the modern era, discussion of the Deadly Sins has been to some degree displaced by Haidt's "Moral Foundations Theory" a schema that is interestingly contemporary since it deals from the standpoint of its institutional and politically based approach rather than the introspective and individual approach of the Sins.

Yet, it is the Sins, as a shorthand for the frailties of individual humans that serve as the constant and most potent limiting factor in all of our affairs. Just as human behavior is an emergent property of the underlying structural biology of the brain, so too are the forms of societies of humans (those Leviatians) that are emergent properties of the human behaviors that form the corpuscles of society.

So to return to Lord Russell, I will attempt to perform a rewriting of his pithy quote: "A good world needs knowledge (of science but also human limitations and frailties), kindliness (towards those who may be more limited and frail than us or may have different thoughts than us), and courage (to accept our own frailties and to defend goodness), it does not need a regretful hankering after the past (yet must learn from the past), or a fettering of the free intelligence by the words uttered long ago by ignorant men (but understand how those men did what they could with what they had).

Despite the great intellectual and scientific progress of humans, it is the poles of the Seven Mortal Sins that has put us as a species today again at the precipice of our own destruction. For humans are only human.

## Quote of the Month

Although the world is full of suffering, it is full also of the overcoming of it.

Helen Keller

## Changing Times

Moustapha AbouSamra

*When to quit?*

Often when you think you're at the end of something, you're at the beginning of something else. Fred Rogers

*Mandatory Retirement Age*

Retirement at sixty-five is ridiculous. When I was sixty-five, I still had pimples. George Burns

Dianne Feinstein, the Senior Senator from California died at the age of 90. The longest-serving woman Senator in the US Senate, she served 30 years and had a spectacular, distinguished career with many firsts. Unfortunately, her last few months in the Senate were marred by health issues. She suffered from, among other things, shingles complicated by encephalitis. She was absent from the Senate for a long crucial period. When she returned, she was unsteady and had to use a wheelchair. She was often confused, and her staff had to make decisions for her. Many called for her resignation, but she steadfastly refused …

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When I was in my late thirties, I served as President of the Medical Staff at Ventura County Medical Center in Ventura, California; the youngest to serve in that capacity. One day, I was asked by the hospital administration, on behalf of the nursing service, to speak to a senior surgeon, in his early sixties, about his tremor, which was

perceived as potentially putting his patients in danger. There had not been any incidents.

I was apprehensive about such an encounter. I requested a face-to-face meeting in his office. He was very gracious. He had a moderate resting tremor that disappeared when he moved his hands intentionally. So, at no time did he have tremors while actually performing surgery. I had to explain how, unfortunately, that perceptions can become reality. He thanked me, indicating that at no time did he think that he may be endangering his patients.

That evening, I asked Joanie to be sure to tell me if she detected in me any signs of potential disability. I really didn't have to do that, knowing well that she would do that. But I also decided to retire before a young colleague would subject me to a similar encounter.

The wonderful surgeon retired shortly after and moved out of state.

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I've been interested in the topic of "senior surgeons" ever since. I retired at age 70, an arbitrary number. I still miss neurosurgery, every day. On occasion, I think "Maybe I should have worked longer," but generally I am happy with my decision as there are many things I plan and want to do outside neurosurgery.

Obviously, surgeons, like other people, age differently. Some need to retire much earlier than others. Some continue to perform at a very high level into their eighties. But I venture to say that, based on my own experience, as we age, and even as we continue to feel invincible, our balance, our hearing, our vision, our endurance, and our memory change. They are no longer as crisp as they were at the height of our careers.

Technical prowess is needed for surgeons to perform safely. This is not the case for senators, judges, tenured university professors, lawyers, and many others. So different considerations may need to be given.

However, there are valid reasons to establish a mandatory retirement age. The question is: what is this number?

Is there an absolute number? Seventy? Seventy-five? Eighty? Eighty-five?

Ninety is certainly beyond what I think is an appropriate retirement age.

Fortunately, we live in a country with a lot of talent. So, it is hard to be convinced that people who insist on working late into their seventies or eighties believe that they are the best people for the job.

This is not a new topic, but the death of Senator Feinstein should prompt us in neurosurgery to take a deep dive into the subject and a serious introspective look into ourselves.

## Photo of the Month

Unfurling Hibiscus.
This photo was taken by Moustapha AbouSamra, MD, on September 7, 2023, in Ventura at 11:30 AM, iPhone 13 Pro

## Academic Practice Corner

Anthony DiGiorgio, DO

"Professional burnout is the sum total of hundreds of thousands of tiny betrayals of purpose, each one so minute that it hardly attracts notice." Richard Gunderman, MD, PhD

Burnout is not an unfamiliar topic to physicians. Neurosurgeons fare better than other specialties, but we still burn out at astonishing rates. The trend has brought a whole new vocabulary. We speak of "moral injury" and "resilience." There are a variety of metrics to quantify burnout. We blame various bogeymen, such as insurance companies, electronic health records, private equity, or the government. Despite the vocabulary, the metrics, and the bogeyman, we have trouble defining burnout.

Simply put, they are "betrayals of purpose." Most doctors genuinely want to help patients. Yet our work environments largely prohibit that. We are so inundated with mindless busy work and inefficient systems that we actively avoid patient care. Each patient is more extra work. Even if we get paid for it, we still shun the burdens that come with patient care. Team members pat each other on the back about "blocking admissions" and "being a brick wall." We speak of "list diuresis" to get rid of patients. The attitude with our colleagues becomes confrontational, as we view each interaction primarily as generating more work, not as helping a patient in need.

The electronic health record (EHR) is a large driver of these "betrayals of purpose." This is a sore spot with me as well. It is clear these programs were not designed for patient care. They force us to choose irrelevant, contradictory or even incorrect diagnosis and billing codes. They harass physicians. Every patient we see generates endless inbox messages, coding queries and billing clarifications. None of these improve patient care. They take us away from our real duties, making care a chore and a burden.

Dr. Kelley Skeff describes these feelings perfectly when he states that "compromises in professional values [are] a major reason for EHR induced distress." We are told by our administrators, insurance providers and government to prioritize EHR over patient care. It challenges physician values by "skewing physician work towards competencies of systems-based practices and away from other crucial competencies." This distress runs from trainees to practicing attendings.

Change is difficult. Many physicians don't want to be labeled as a "problem," or they have accepted a feeling of "learned helplessness." Additionally, we all come up in a system that rewards compliance and metrics. Study hard, get good grades and show up on time is all that it takes for a trainee to succeed. These feelings and attitudes must be changed if the system is to improve. With burnout rates ever climbing, hospitals and clinics won't be able to survive without an emotionally healthy workforce.

The public finds it difficult to empathize with doctors who are burned out. We have secure, well compensated careers. We shouldn't be discussing these topics asking for sympathy. This must be framed as an existential crisis for patient care. Patients are tired of seeing the back of a laptop screen instead of a doctor's face. They are sick of waiting for appointments because there are no more primary care physicians. With more and more neurosurgeons planning to retire due to burnout, and the workforce shortage affecting trauma coverage, the burnout issue could be life threatening for patients.

Our patients, and our profession, deserve a thorough conversation about physician burnout. The current state is the result of thousands of well-meaning policy changes on top of a physician culture which has yet to fight back. We must accurately describe these "betrayals of purpose" so we can then find interventions and help reverse the tide.

Note: This editorial is adapted from notes I took during a lecture by Dr. Kelley Skeff at the annual meeting of the Western Neurosurgical Society meeting in Monterey, CA, in September, 2023. I highly recommend his paper on EHR and burnout, linked above.

## Brain Waves

Deborah C. Henry, MD

A 10-year project ended in a celebration for me last week. I had the pleasure of having CANS past-president Mark Linskey and the Western's whiz Darla Colohan there to help celebrate. When I accepted a full-time teaching position at Coastline College as an anatomy and physiology professor, I wanted students to have the same experience I had in medical school and residency with studying anatomy from a cadaver-or at least prosections. I learned how to write curriculum, developed a dissection class, and ran into the brick wall of school politics and no money.

Some medical schools are moving away from cadaver dissection (e.g., Kaiser in Pasadena) and moving into virtual dissection or on synthetic models. I investigated this too. Virtual dissection lacks the kinesthetic learning of cadavers, and the synthetic models last less time than a cadaver and cannot adequately mimic dissection techniques. Several colleges in Southern California that offer anatomy lab courses catering to graduate health schools' prerequisites have cadaver labs including California State Long Beach and Orange Coast College, so this is not a novel idea. But up against the lack of funding and lack of administrative interest, I looked for other sources of funding. I worked on a grant for over a year, sent it in during the early months of Covid and waited. Through delays in our college due to the change of leadership, it took 3 months to cash the check and get started. Covid and supply chain issues increased the cost by 25%. Lucky for us, the trustees helped us with this unforeseen cost increase.

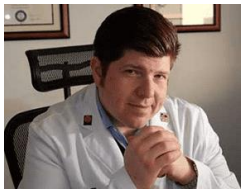
Being a public institution under the K-14 legislation made this no picnic. The bids went out and as per the State requirement, the lowest bid was accepted. Of course, the lowest bid might just represent the slowest construction. What was to be completed in January of this year finished mid-October. Of course, much of the delay was compliments of the DSA-Department of State Architecture. But the result is state of the art!

So, you asked why were Mark and Darla helping me celebrate along with about 80 other people? Mark kindly wrote a letter for me to the trustees of the grant impressing them on the significance of cadaver dissection in learning anatomy. Darla was there as a board member of the Africa Mission Services (I'll get to that).

I wanted a party. Well, again that costs money. So, I turned to the one grant that we have for events, our STEM grant. To showcase our students, their poster presentations, and their other scientific

work, we had an informative luncheon. Darla was our final speaker.

My latest five-year ongoing project is to take pre-medical and biology students to Kenya with Darla. Darla travels to Nairobi several times a year and parks herself in MaraWest Camp among the lions, zebras, and water buffalo. Having been on a safari in 2017, I can say there is nothing better. I could not have experienced anything more wonderful than to see these amazing creatures just feet away. And for students, many who are financially challenged, to experience the wonders of Africa and to help those even more challenged would be a life-changing opportunity. Fund-raising starts now that the party is over. Africa, here we come.



## Private Practice Corner

Brian Gantwerker, MD

Episode 22: Innovation for innovation's sake: to victor go the spoils or who am I doing this for?

"Humility is not thinking of less of yourself, it's thinking of yourself less." -C.S. Lewis

There is a constant push in private practice to distinguish one's self from the crowd. If everyone else is doing what you do, what is the point? If you throw a quarter in California, you might hit a neurosurgeon or spine surgeon. We have one of the most populous states in the Union and our urban centers are extremely densely populated, not to mention the sheer geographical size due to sprawl. California is a difficulty place to practice due to the cost of doing business and a decidedly anti-physician, moderately hostile bend to the current legal and legislative landscape.

We are constantly pressured to do great work and hold our heads above water, and do headstands all the while. Suffice it to say, you cannot just survive in private practice, you have to stand out. Some neurosurgeons develop a niche, others join a large, multispecialty group, others try to be everywhere all at once. We are all trying to make it each and every day.

There are those of us who are looking to define themselves by pushing the surgical envelope. 3 and 4 level lumbar or cervical arthroplasties, a heavy load of T10-pelvis cases, and TLIFs for unilateral sciatica. Some of these surgeons, one would argue are trend-setting, pushing indications, or just being aggressive.

In the new age of diminishing reimbursements, some surgeons are finding themselves operating more often to maintain their income stream. Some employed surgeons may be trying to generate enough RVUs to justify their income. And in some cases, the surgeon's motives are less altruistic, and is willing to go through cognitive gymnastics to justify their surgical indications.

There is a gut check that most of us do, when we get to that precipice when we are about to offer surgery to our patients. In most cases, we have been with the patient through their journey: from initial consult to physical therapy, therapy to injections, and injections to surgical planning. Most of the surgeons I know go through a moment or two of reflection when they discuss surgery with their patients - "is this something I would advise my mother/father/sister/brother to do?"

This is a sort of guidepost for surgeons, and certainly something I practice. Some would argue that makes things too intimate, and may limit one's objectivity. I feel the opposite, and feel it acts as a safety mechanism and builds trust and empathy between you and your patient. In all cases, we are the stewards of their healthy, and need to act accordingly.

So it is with trepidation and great care we need to approach cases where our colleagues and peers have perhaps pushed that trust, or recommended or performed a very aggressive surgery. We all take patient safety into account with every case we perform. But do we take our own ego into account?

Neurosurgery has always promoted cutting edge (pun alert) technique and to push the envelope for the "inoperable." Until about 20 years ago, cavernous malformations in the brain stem were labeled as inaccessible. Pioneers in the field such as Dr. Robert Spetzler developed a systematic way (the two-point technique) to decide on the safest surgical corridor.

In the undercurrent though, was a real sense of dread and humility. A healthy amount of self-doubt is necessary to keep what's difficult separate from what is in advisable or worse. It is important to keep that little voice alive that sits in your shoulder and asks "is that really a good idea?"

As one develops their skill sets and decides where they fit into it all, we see what our strong suits and not-so strong suits are. Those may or may not translate into success in practice. It may make for very painful moments when you realize you may not be as good as you thought. Those life lessons hopefully are instructive and act to curb one's enthusiasm for going close to or beyond the pale of what's best.

There are those whose successes and failure never moderate their enthusiasm. Rather than instilling introspection and reflection, they see other factors as causing the failure of their plan: a smoking history, their approach surgeon retracting too hard on something, returning to an activity too soon and so forth. These are factors to be sure in failure of treatment. We try very hard to counsel our

patients and to anticipate every question possible. That is no guarantee of anything working or not working however.

But when a huge surgery does not "turn out" is it the surgeon's problem? Legal experts can debate that question. The big question we often face is – should we have done it in the first place? And, if it works, maybe ask – am I just lucky or just that good? I am hoping most of us ask those questions after any big case or difficult operation. These questions sound familiar because in peer review these are what gets asked. I argue those are important questions we should try to ask ourselves. Maybe not every time on every patient, but when the "spider sense" tingles, maybe then is a good idea.

Development, control, and cultivation of that inner voice is important in the development of an independent and safe surgeon. In private practice, it is crucial to fostering a sense of trust in yourself and your community. Humility and hubris are two polar opposites in the spirit of the surgeon. A smattering of both is good.

Because in the end, when you are in the operating room or the exam room - you are not the most important person in the room, it's the human being you are about to incise.

## Resident's Corner

*John K. Yue, MD, Neurosurgery Resident (PGY-6), UCSF*

The Startling Intersection of Brain Trauma, Insurance, and Hospital Length of Stay

Fourteen years after working with the first neurotrauma patient at Zuckerberg San Francisco General Hospital (ZSFGH), I remain deeply fulfilled by the opportunity of the very first job as a research associate that inspired me to pursue my career of choice. Inseparable from the lessons learned on my journey in neurotrauma came our recent findings on the complex challenges faced by Medicaid patients with acute traumatic brain injury (TBI), as they experience longer hospital lengths of stay (HLOS), delayed placement to post-acute care (PAC) facility, often at immense and unwarranted costs to the healthcare system.

In the United States and Canada, TBI patients spend on average 2 and 4 more days in the ICU and the hospital, respectively, compared to all-cause admissions.[1–3] Daily costs of hospitalization are considerable (estimated at $4098 in California).[4] 30–50% of hospitalized TBI patients require PAC,[5] and delays in placement increase acute care costs, risks of avoidable complications, and hinder functional outcomes.[6,7] Non-Caucasian races and inadequate health insurance are associated with increased HLOS, and severe TBI patients incur longer recovery times to receive medical and financial clearance before PAC referrals can be initiated.[8] For us at ZSFGH, key underlying questions emerged: to what extent do TBI patients remain in acute care after documented medical stability, and what can be done to systematically address their risk factors?

Together with Drs. DiGiorgio, Manley, Huang, Tarapore, and the multidisciplinary care team, recent work from our ZSFGH TBI population revealed several important findings.[9] Patients in the top 1 percentile for institutional TBI HLOS stayed inpatient for ≥70 days, 56% were severe TBI, 78% had Medicaid, and 100% required PAC placement. We termed this cohort "extreme" HLOS (XHLOS). Perusal of their medical charts provided the startling median of 56 *additional* days of inpatient stay *beyond* the date of documented medical stability. In other words – they remained in-house long after their acute medical issues had resolved.

While the underlying reasons are complex and multifactorial, the combination of low socioeconomic status (SES), Medicaid insurance, and severe TBI is clearly a "triple threat" to expeditious PAC placement. In the general medicine literature, factors associated with delayed hospital discharge after medical stability include financial barriers, behavioral deficits, homelessness, and impaired decision-making [10,11] -- disparities prevalent in the TBI population. Severe TBI patients often have complex care needs (e.g. tracheostomy, gastrostomy, immobility) that require specialized PAC services, which may not be available at in-network PAC facilities. Our patients often have prolonged, symptomatic neurological impairments that can injure themselves or others, thus often requiring temporary safety restraints and/or attendants. In San Francisco, PAC facilities reserve the right to deny patients requiring safety restraints or attendants, and California law prohibits the use of restraints in nursing homes.[12] Hence, our sickest and most-injured TBI patients, with lowest SES and highest need for cost-effective PAC, encounter the greatest barriers to receiving this care.

Our findings in XHLOS TBI patients have been extended to patients ≥95$^{th}$ percentile of institutional HLOS in our follow-up study, where estimated daily charges for a medically-stable inpatient was $17,126.[13] While these are not the final reimbursed cost to the hospital, they stand in stark contrast to the estimated daily cost of $400 for a private room bed in a California nursing home.[14] If these troubling discordances between drastically prolonged HLOS and Medicaid insurance, severe TBI, and need for PAC occur at our busy and well-resourced Level 1 trauma and tertiary referral center *despite* maximal support from hospital social work and case management as part of standard of care, the reality is more grim across more underserved settings.

Our fundamental role as advocates should encourage us to establish a culture of early identification of at-risk patients, and devise institutional resources for provision of care transitions and discharge coordination pathways. From a policy perspective, revision of Medicaid reimbursement rates, expansion of managed care programs to become competitive with private insurers, expansion of PAC acceptance criteria, and incentivizing PAC facilities in urban and underserved areas are imperative steps toward optimizing resource allocation and reducing morbidity. Together with my mentors, expert and like-minded colleagues, and importantly our patients, I remain inspired and impelled to find solutions to address these surmountable challenges.

## Innovators in Neurosurgery

Robert H. Pudenz
1911-1998
*Ventriculoatrial Shunt*

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*Editor's Note: Published with permission from Elsevier*

Robert H. Pudenz was a renowned neurosurgeon in North America in the 20th century, famous for his contributions in the evolution of the shunt valve and ventriculoatrial (VA) shunt surgery. With his innovative idea and help from Heyer, in 1955, he demonstrated that a venous catheter worked best when in the right atrium and that the slit valve should be located at the most distal portion of the shunt system to prevent retrograde filling and thrombosis. He also contributed to various experimental studies on the brain, especially the electrical response of different neural structures. This historical vignette focuses on the work of Robert Pudenz and the evolution of the VA shunt.

Introduction

The management of hydrocephalus is an ordeal for a neurosurgeon. In 1895, Gartner suggested that the most physiologic method for treating hydrocephalus would involve establishing a connection with either the venous or the lymphatic systems of the head and neck (22). Neurosurgeons explored shunting to the vascular system intermittently throughout the first half of the 20th century. In 1951, Nulsen and Spitz reported successful treatment of a patient with hydrocephalus using a 2–ball valve unit attached to a polyethylene tube from the ventricle into the superior caval vein. Subsequently in 1955, Pudenz introduced the VA shunt technique.

Biography

Robert H. Pudenz was born on August 2, 1911, and raised in Cincinnati, Ohio. He was the son of a merchant tailor. He graduated from the University of Dayton with a Bachelor of Science degree and received his medical degree from Duke University Medical School in 1935. He was influenced in his career choice by his brother-in-law, who was a general surgeon. During the period 1935–1936, he completed a clinical clerkship in Neurosurgery.

Pudenz and the VA Shunt

In 1953, Dr. Pudenz and Ted Heyer, an engineer, began their hydrocephalus experiment on animals at Huntington Medical Research Institute. They spent 2 years building a shunt system with several modifications of the valve. In 1955, Pudenz's VA shunt was developed. The burr hole valve shares hydrodynamic properties with the low-profile valve. It has a distal slit valve to prevent the diffusion of blood into the tube during periods when it is nonoperational (e.g., after a Valsalva.

Experimental Neurology and Telestimulator

Dr. Pudenz and Dr. Shelden performed several experimental studies on the brain, specifically the effects of electrical stimulation of the brain on various anatomic structures (areas3, 19, 20, 21) . Dr. Pudenz and his colleagues used a telestimulator for chronic stimulation of the peripheral nervous system and the central nervous system. In 1962, they studied conduction block in the sciatic nerve of a cat by producing a polarizing focus. This experiment led to the development of a full-wave rectifier.

VA Shunt and Outcomes

Dr. Pudenz performed 15 shunt procedures in his private practice. In collaboration with Dr. F. M. Anderson, he participated in another series of 36 shunt operations at Los Angeles County General Hospital and the Children's Hospital (4). In 9 of 15 patients, hydrocephalus was relieved for 5–14 months. In 1 patient, the shunt failed 3 months after surgery. During the study period, 3 patients died. In all 3 cases, the autopsy findings confirmed that the shunt tube was patent.

Conclusions

This article describes the legacy of Dr. Pudenz and the history behind the VA shunt for the treatment of hydrocephalus. It is hoped that this article offers insight into Dr. Pudenz's innovative works on the VA shunt and inspires future neurosurgeons to take the initiative to develop their own innovations in neurosurgery.

## Women in Neurosurgery

Ruth Kerr Jakoby, MD

*First Woman Diplomate of ABNS and first woman neurosurgeon to also become a lawyer.*

Editor's Note: This month's column is being republished with permission from the WINS Webpage.

Dr. Ruth Kerr Jakoby was born in Palo Alto, California. She attended Barnard College of Columbia University, receiving her B.A. in 1949. She remained in New York to complete medical school at the College of Physicians & Surgeons of Columbia. Following an internship at Grace New Haven Hospital, she held the Gilford S. Moss Research Fellowship in Paraplegia at Indiana University Medical Center. In 1959, she completed a neurosurgical residency at George Washington University in Washington, D.C.

Dr. Jakoby became the first woman Diplomate of the American Board of Neurological Surgery in 1961. She became a Fellow of the American College of Surgeons in 1964. She had a private practice in neurological surgery in Washington, D.C. from 1959-1975 and became an Associate Clinical Professor of Neurosurgery

at George Washington University. In 1972, she presided as President of the Washington Academy of Neurosurgery. From 1977-1979, Dr. Jakoby was Chief of the Spinal Cord Injury Service at the Veterans Administration Hospital in Houston, Texas. During this period, she was Associate Professor of Neurosurgery at Baylor College of Medicine and had a joint appointment at Baylor and the Texas Institute of Rehabilitation and Research (TIRR) as Associate Professor of Physical Medicine and Rehabilitation Medicine.

Dr. Jakoby developed an interest in medical-legal issues. She received her J.D. degree from Northern Virginia Law School in 1986, becoming the first woman neurosurgeon to also be a lawyer. She became acting Dean of the Antioch School of Law in 1989 where her special interests included antitrust issues and mergers of medical, legal and educational institutions.

Dr. Jakoby has two sons, Michael and Robert. A memoir of her early years in neurosurgery was published in 1964 in the Journal of the American Medical Women's Association.

## Historical Vignette

Robert Wheeler Rand

*Editor's note: This vignette is republished from Wikipedia.*

**Robert Wheeler Rand, Ph.D., J.D., M.D.** (January 28, 1923 – December 14, 2013), was an American neurosurgeon, inventor, and Professor of Neurosurgery in the Department of Neurosurgery at the University of California Los Angeles (UCLA) from 1953 to 1989.[1] [2]

### Early life and education

Robert W. Rand, the only son of Carl Wheeler Rand, M.D. and Katherine Humphrey Rand, was born in Los Angeles, California on January 28, 1923. His father, Dr. Carl W. Rand, a respected neurosurgeon, was trained under Harvey Cushing, known to be the "father of modern neurosurgery."[3][4]

Robert W. Rand followed in his father's footsteps and became a nationally and internationally known neurosurgeon and Professor of Neurosurgery at UCLA. He received undergraduate training at Harvard College (1940–42) and the UCLA Naval Training Program (1942–44), graduated from the University of Southern California School of Medicine (M.D., 1947) and completed his internship, assistant residency, and residency in neurological surgery at the University of Michigan in Ann Arbor. He also earned an M.S. in Surgery (1951) and a Ph.D. in Anatomy (1952) from the University of Michigan.[5]

### Professional career

Over the course of his career, Rand authored approximately 250 scientific papers and chapters, presented almost four hundred scientific lectures around the world, and wrote and edited several books, including: Intraspinal Tumors in Childhood (1960),[6] Microsurgical Neuroanatomy Atlas (1967),[7] Cryosurgery (1968), and three editions of Microneurosurgery (1969, 1978, 1985) He also holds a number of patents.

He created and performed numerous previously undescribed surgeries on the brain including a new approach to the removal of acoustic tumors that spared vital nerves for facial muscle function which had been routinely sacrificed in older techniques. Rand personally performed over 2,000 surgeries for the treatment of Parkinson's Disease in which he used cryosurgery and selectively froze portions of the thalamus. Tremors were either relieved substantially or completely eliminated in many cases. Rand also utilized cryosurgery to treat thousands of patients with tumors of the pituitary gland via a procedure termed Stereotactic Cryohypopyhysectomy.

In 1957, he and his colleague Theodore Kurze were the first to introduce the surgical microscope into neurosurgical procedures.[1] In the years that followed, the use of the microscope became ubiquitous in neurosurgery, giving rise to a new subspecialty within the field - microneurosurgery.

In 1975, in conjunction with the scientists at the Stanford Linear Accelerator Center (SLAC) in Palo Alto, California, Rand developed a Superconducting Magnet which would hold a liquid silicone-iron compound in position deep within the brain while it solidified, thus obliterating blood vessel malformations which could not be accessed by traditional surgical methods. This technique, called Stereotactic Ferrothrombosis of Aneurysms with a Super-conduction Magnet, was groundbreaking for its time.

Through his close relationship with its inventor, Lars Leksell, Rand brought the first Gamma Knife into the United States and gifted it to UCLA School of Medicine in 1979. The Gamma Knife offers highly selective radiation to pinpoint targets in the brain thus avoiding surrounding tissue damage. Gamma Knife treatments are now commonplace throughout the United States. Dr. Rand also subsequently conceived and designed the Cobalt Scalpel to use the same principles of highly focused radiation for treatment of cancers outside the brain, such as prostate cancer, sparing surrounding normal tissues from injury.

In the early 1980s, at the Jet Propulsion Laboratory in Pasadena, California, Rand was assisted by physicists in creating the instrumentation for another novel procedure he called Thermomagnetic Surgery.[16] In this treatment, cancerous organs such as the uterus or kidney would be selectively heated and destroyed without damaging the surrounding tissues. The premise of this approach was that it would prevent the spread of cancerous cells into the body or blood stream when the malignant organs were removed surgically because the cancers were already dead prior to their removal.

In 1987, Rand and his son Richard P. Rand published the first reports of Cryolumpectomy for Carcinoma of the Breast in the journal Surgery, Gynecology and Obstetrics. Years later, this has become a standard procedure in treating patients with breast cancer.

His creativity and professional accomplishments led Rand to be awarded a Professional Achievement Award from UCLA in 1975

and a Lifetime Achievement Award from the International College of Surgeons in 1995.

### Legacy

In 1949 Rand married Helen Louise Pierce. They had two sons, Carl Wheeler II and Richard Pierce.

After his death in 2013, Rand's family donated a collection of his manuscripts, publications, and research materials to the UCLA Biomedical Library where they remain available to those who continue to advance research in the field of neuroscience.[1]

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## Innovators in Neurosurgery

Frank Mayfield

*The Mayfield Headrest*

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**Eponyms of Cranial Neurosurgical Instruments: An International Collaboration to Optimize the Field of Neurosurgery**

Lukasz Strulak [1], Ferda Gronki [2], Kaveh Shariat [1], Daniel Schöni [1], Alex Alfieri [1 3]

Cranial positioning and fixation are of critical importance for a craniotomy.[6,28,29] One of the most commonly used devices for this purpose is the horseshoe and general-purpose headrest (1967) and skull clamp (1972) (Figure 5B). These were developed by Frank Mayfield (Figure 5A) together with George Kees (Figure 5A), who both also designed the Mayfield arterial clip in 1972.[6,30,31]

With the emerging field of microneurosurgery and subsequent smaller craniotomies, the need for secure head stabilization became increasingly important, resulting in the significant advancement of headrests and clamps.[6] The aim of the Mayfield horseshoe and the general-purpose headrest is to primarily support the head and enable the surgeon optimal surgical access as well as intraoperative mobilization of the head.[6,28,29] Mayfield head clamps, in contrast, firmly stabilize the head during operations by attaching the skull through the clamp to the operating table, thereby reducing any potential head movement to the minimum.[6,28, 29, 30]

Frank Mayfield was born in South Carolina on June 23, 1908, and spent his childhood on a farm.[30,31] He obtained his undergraduate degree from the University of North Carolina and attended Virginia Medical College, where he graduated in 1931.[31] Upon completion of his residency in 1935, he served as a graduate fellow and instructor at the University of Louisville under Roy Glenwood Spurling until 1937 when he established a community practice specializing in neurosurgery in Cincinnati, Ohio.[31] During World War II between 1942 and 1945, Mayfield served as Chief of Neurosurgery at the Percy Jones General Army Hospital in Battle Creek, Michigan.[30,31] He officially joined the University of Cincinnati as an assistant professor of clinical surgery in 1945 and was later promoted as clinical professor in 1967. Concomitantly Mayfield directed the graduate neurosurgical training programs at The Christ Hospital and Good Samaritan Hospital between 1946 and 1977.[30]

He was elected as the president of the Ohio State Neurosurgical Society in 1947, the Academy of Medicine of Cincinnati in 1950, and the Ohio State Medical Association in 1959. In 1958 he was appointed to the American Board of Neurological Surgery and eventually became its chairman in 1962.[30,31] Two years later, he was named President of the Harvey Cushing Society between 1964 and 1965, and in this short period transformed it into the American Association of Neurological Surgeons, in the so-called "Mayfield Proclamation." Unsurprisingly, Mayfield became the first recipient of the prestigious Harvey Cushing Medal awarded by the American Association of Neurological Surgeons.[31,32] He practiced neurosurgery in Cincinnati, Ohio for nearly 50 years, before his death at the age of 82 on January 2, 1991.[30,31]

## Tidbits

October 1 – Governor Newsom appoints Laphonza Butler to fill in the remainder of Senator Dianne Feinstein a few days ago. Butler, the president of Emily's List, was a former leader of the state's largest labor union and an adviser to Vice President Kamala Harris. And she'll be the first openly L.G.B.T.Q. senator from California.

October 2 – The Nobel Prize for Physiology or Medicine was awarded to Dr. Katalin Karikó and Dr. Drew Weissman, both of the University of Pennsylvania. Their work developing

methods to use mRNA paved the way for developing new vaccines including COVID-19.

October 3 - The Nobel Prize in Physics was awarded to Pierre Agostini, Ferenc Krausz, and Anne L'Huillier for their experiments that, according to the Nobel Committee, "have given humanity new tools for exploring the world of electrons inside atoms and molecules." To study the movement of electrons, the scientists had to use pulses of light that last an attosecond. An attosecond is one quintillionth of a second. The number of attoseconds in a single second is the same as the number of all the seconds that have elapsed since the universe burst into existence 13.8 billion years ago, according to the Royal Swedish Academy of Sciences.

October 4 - The Nobel Prize in Chemistry was awarded on Wednesday to Moungi G. Bawendi, professor at the Massachusetts Institute of Technology who was born in France, Louis E. Brus, professor emeritus at Columbia University who was born in the USA, and Alexei I. Ekimov, previously the chief scientist at Nanocrystals Technology, who was born in the former Soviet Union, for being pioneers of the nanoworld. They discovered and developed quantum dots, that are used to tune colors in LED lights and increase the resolution of television screens. They can also be used as fluorescent imaging tools in biomedical applications, like removing cancer tissue. Quantum dots are expected to lead to advances in electronics, solar cells, and encrypted quantum information.

October 4 - More than 75,000 healthcare workers at Kaiser Permanente locations walked off the job this morning, for a three-day strike. This will mark the largest healthcare worker strike in US history. The workers who are on strike represent people who are crucial to patient care, including EMTs, nurses, respiratory therapists, and support staff.

Kaiser Workers from Ventura County Picketed outside Woodland Hills
Medical Center – Photo by Mikki Fletchall

October 4 – Simon Biles won her 20th world championships gold medal as the 26-year-old continued her impressive return from a two-year hiatus away from gymnastics, playing a key role in a historic seventh consecutive world title for the US in the women's team final. The competition took place in Antwerp, Belgium at the World Artistic Gymnastics Championships.

October 5 – The Nobel Prize for Literature was awarded to the Norwegian writer Jon Fosse. He was honored "for his innovative plays and prose which give voice to the unsayable."

October 20th – Killers of the Flower Moon, a Martin Scorcese movie was released. This movie is adapted from the non fiction novel by David Grann: Killers of the Flower Moon: The Osage Murders and the Birth of the FBI

October 25 – A gunman opened fired in a bowling alley and continued a rampage in Lewiston, Maine; making this the nation's deadliest shooting this year.

October 31 – Halloween or Hallowe'en is a celebration observed in many countries on 31 October, the eve of the Western Christian feast of All Saints' Day. It begins the observance of Allhallowtide, the time in the liturgical year dedicated to remembering the dead, including saints, martyrs, and all the faithful departed.

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## CANS MISSION STATEMENT

To Advocate for the Practice of California Neurosurgery Benefitting our Patients and Profession

# Calendar

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|---|---|
| WFNS Cape Town, | December 6-11, 2023 |
| **CANS, Annual Meeting, Intercont Mark Hopkins, San Francisco, CA January 12-14, 2024** | |
| CSNS Spring Meeting, Chicago | May 2-3, 2024 |
| AANS Annual Meeting, Chicago | May 3-6, 2024 |
| NSA Annual Meeting Penha Longa Resort, Portugal | June 16-019, 2024 |

Any **CANS** member who is looking for a new associate/partner/PA/NP or who is looking for a position (all California neurosurgery residents are CANS members and get this newsletter) is free to submit a 150 word summary of a position available or of one's qualifications for a two month posting in this newsletter. Submit your text to the CANS office by E-mail (emily@cans1.org) or fax (916-457-8202). ☐

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- To place a newsletter ad, contact the executive office for complete price list and details.
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**California Association of Neurological Surgeons**

5380 Elvas Avenue
Suite 215
Sacramento, CA 95819
Tel 916 457-2267
Fax 916 457-8202

**www.cans1.org**

**Editor**

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