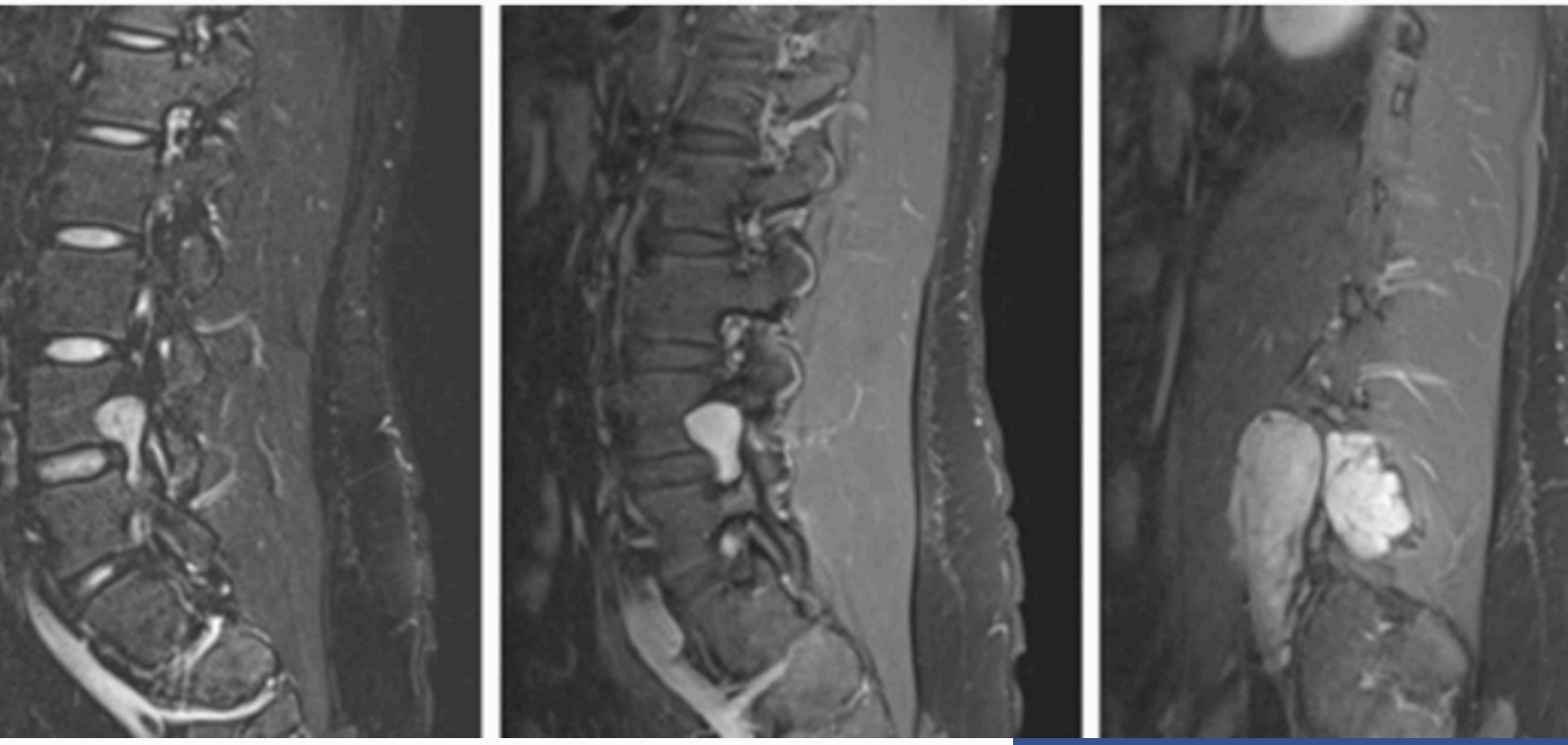
Neurobulletin

MAY 2026

Dandy Netherlands Neurosurgical Club



Case:

A 20-year-old man presents to you with lower back pain and in the left lower extremity down to the calf and anteriorly into the thigh, according to the L4-L5 distribution. The neurologist examined and found solely a weakness in left knee extension. The MRI showed a circumscribed T1 isointense (see figure), T2-hyperintense mass at the L4-5 level, with extension into the soft tissue space with L4 nerve root compression. A CT confirmed an extramedullary extradural lesion within the L4-5 neural foramina, paraspinal and psoas muscles.
A CT-guided biopsy was done on a vascular lesion revealing a benign vascular lesion suspected to be an hemangioma. Subsequently, a DSA (digital subtraction-angiography) was performed, showing an enlarged L4-segmenntal artery with feeders in the L4 nerve root hemangioma. A preoperative embolization with NBCA was done reducing the vascularisation, afterwards an operative removal of the tumor is preferred due to the proangiogenic nature of the hemangioma. During the operation, the tumor was found to be intertwined with the ganglion and couldn't be fully resected since it would damage the functional root. A maximal debulking was done with limited blood loss (300 mL) partially because of the preoperative embolization. The operation included a complete L4 laminectomy, partial L3 laminectomy and a left-sided L4-5 facetectomy for exposure of the tumor and decompression of the thecal sac. Ultrasound evaluated the intradural component with its free nerve roots. Nerve roots were visualized laterally and demonstrated that the tumor integrated into the exiting L4 root with adherence to the dural sheath. Neuromonitoring and direct stimulation were used for the determination of functionality in the location they were operating on. Pedicle screws were bilaterally placed at L4 and L5 for stability. Post-operatively, the man's radicular symptoms disappeared. His proximal left leg weakness was improved after 3 days when discharged.

Reference: *Peng, S., McGuire, L.S., Saman, K. et al. Extradural lumbar nerve root and ganglion capillary hemangioma: case report. Spinal Cord Ser Cases 7, 74 (2021). https://doi.org/10.1038/s41394-021-00438-x*

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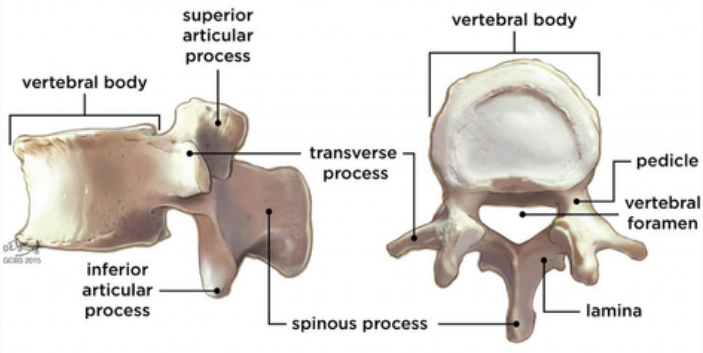
FROM INOPERABLE TERRITORY TO SHARED DOMAIN: A CLINICAL AND HISTORICAL JOURNEY THROUGH SPINAL SURGERY

The history of spinal surgery reflects one of the major transformations in modern medicine: the evolution of the spine from a region once considered surgically inoperable into a highly specialized and interdisciplinary field. This transition did not result from a single discovery, but from the progression of understanding and gradual convergence of anatomy, neurology, antisepsis, anesthesia, biomechanics, imaging, and surgical innovation.

Long before operative spinal procedures became feasible, physicians recognized the consequences of spinal deformity and disease. Ancient descriptions attributed to Hippocrates discuss spinal curvature and traction-based treatment, including methods intended to correct deformity through longitudinal extension. Nevertheless, meaningful intervention remained limited for centuries. The close relationship between the vertebral column and the spinal cord made surgery inherently hazardous, particularly in the absence of anesthesia, antisepsis, reliable hemostasis, and accurate localization methods. Infection, hemorrhage, paralysis, and death were common risks of operative intervention. For much of the eighteenth and nineteenth centuries, spinal pathology was therefore managed conservatively. This was especially true for spinal tuberculosis, later termed Pott's disease after Percivall Pott, who described the association between vertebral destruction, kyphotic deformity, and neurological compromise. Tuberculous spondylitis became one of the defining diseases in the early history of spinal surgery because it forced clinicians to confront the consequences of progressive spinal cord compression directly. Vertebral collapse could produce severe kyphosis, instability, abscess formation and paraplegia, often in children and young adults.

A typical patient in the late nineteenth century might present with progressive lower-extremity weakness, radiating pain and incontinence. To a modern clinician, this suggests spinal cord compression. At the time, however, diagnosis depended almost entirely on clinical examination and anatomical reasoning. Imaging did not yet exist, and localization relied on careful neurological assessment and detailed knowledge of spinal anatomy.

The second half of the nineteenth century marked a decisive turning point. Antiseptic technique, introduced by Joseph Lister, together with the development of reliable surgical anesthesia, transformed operative practice throughout medicine. These advances did not eliminate the dangers of spinal surgery,



but they made longer and more controlled procedures possible. At the same time, progress in neuroanatomy and pathological localization allowed surgeons to approach spinal disease more systematically and with greater anatomical precision.

Among the most influential pioneers of this transition was Victor Horsley. In 1887, Horsley performed one of the earliest successful operations for an intradural spinal tumor using clinical localization alone, without radiographic guidance. More importantly, his work demonstrated that neurological deficits caused by focal spinal lesions were not necessarily irreversible and that carefully planned surgical decompression could produce meaningful recovery. This represented a major conceptual shift: the spine was no longer viewed solely as a sort of inoperable anatomical corridor protecting delicate neural structures, but as a region that could, in selected cases, be approached therapeutically.

Early spinal procedures nevertheless remained technically formidable. Surgical exposure was limited, hemostasis was primitive, and surgeons operated without intraoperative imaging, magnification, or antibiotics. Posterior laminectomy became one of the earliest standardized approaches to spinal decompression. Although outcomes were inconsistent and postoperative morbidity remained high, these procedures established the principle that relieving pressure on the spinal cord could improve neurological function rather than inevitably worsen it. Tuberculosis continued to shape the development of spinal surgery well into the early twentieth century. Decompressive surgery alone often proved insufficient here because progressive deformity and instability persisted even after neural elements had been relieved.

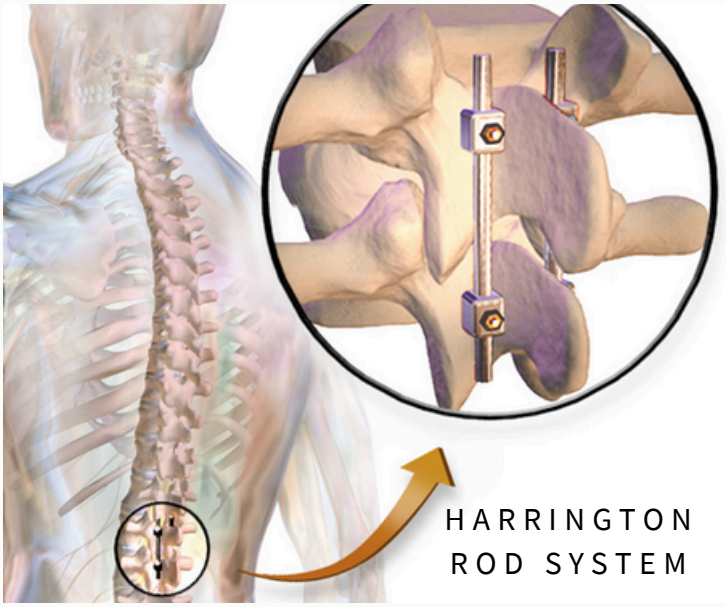
WRITTEN BY:
AKIN SÖNMEZDAĞ

Surgeons increasingly recognized that the spine functioned not only as a protective canal for neural structures, but also as a biomechanical column whose structural integrity was essential for function. This realization led to the development of spinal fusion techniques by pioneers such as Fred H. Albee and Russell Hibbs in 1911. Their work on bone grafting and posterior arthrodesis introduced the concept that spinal alignment and stability could be surgically maintained. Fusion procedures were initially used to control deformity progression in tuberculosis and scoliosis, but they also transformed the broader philosophy of spinal surgery. The field increasingly began to integrate neurological decompression with biomechanical reconstruction.

This biomechanical perspective became particularly important in the treatment of scoliosis and other spinal deformities. Severe scoliosis could produce pain, progressive functional limitation, and cardiopulmonary compromise, yet early operative correction carried a substantial risk of neurological injury. Non-operative treatments such as bracing and traction frequently failed to prevent progression in advanced disease. Despite these limitations, surgeons gradually established that spinal deformity could be corrected surgically when the anticipated functional benefit justified the operative risk.

A major milestone came with the introduction of the Harrington rod system by Paul Harrington in the 1950s. Harrington instrumentation allowed controlled distraction and stabilization of scoliotic curves and became one of the first widely adopted internal fixation systems in spine surgery. Later developments, including segmental fixation and Cotrel-Dubousset instrumentation, improved rotational control and three-dimensional correction, moving deformity surgery away from relatively crude mechanical straightening toward more sophisticated biomechanical reconstruction.

The management of spinal trauma also evolved substantially during the twentieth century. Industrialization, motor vehicle accidents, and wartime injuries increasingly confronted surgeons with unstable spinal fractures and spinal cord injury. Growing understanding of spinal instability, together with advances in internal fixation and pedicle screw systems, allowed surgeons to pursue earlier stabilization and mobilization after traumatic injury. Biomechanical concepts such as Denis' three-column model further refined the assessment of spinal stability and influenced modern approaches to trauma surgery. At the same time, another major transformation was occurring: the emergence of surgery for degenerative spinal disease. In 1934, William Jason Mixter and Joseph Barr published their landmark paper linking lumbar disc herniation to sciatica and nerve root compression. This fundamentally altered the understanding of radiculopathy and low back pain.



HARRINGTON ROD SYSTEM

Lumbar disc herniation became recognized as a surgically treatable cause of neurological symptoms rather than merely an inevitable consequence of aging. Lumbar discectomy subsequently became one of the defining operations of twentieth-century spine surgery and helped further establish spine surgery as a major clinical discipline. Furthermore, as spinal procedures became increasingly complex, spine surgery evolved into a collaborative field shared by neurosurgery and orthopedic surgery. Neurosurgeons contributed expertise in neural decompression, intradural pathology, and preservation of spinal cord and nerve root function. Orthopedic surgeons brought extensive experience in biomechanics, deformity correction, fracture stabilization, and reconstruction. Over time, these approaches converged into a multidisciplinary specialty defined less by ownership than by overlapping technical and anatomical expertise.

Modern spinal surgery is now shaped by tools and techniques that earlier generations could barely imagine. Pedicle screw fixation, intraoperative fluoroscopy, neuronavigation, robotic assistance, and neuromonitoring have improved the precision and safety of complex procedures. Minimally invasive and endoscopic approaches have reduced tissue trauma, blood loss, length of hospitalization, and postoperative morbidity. Advances in oncology, biomaterials, critical care, and rehabilitation have further expanded the range of treatable spinal disease. A child presenting today with thoracic spinal tuberculosis and progressive paraparesis would likely undergo rapid MRI evaluation, microbiological diagnosis, antituberculous therapy, and, when necessary, decompression with instrumented stabilization. Neurological recovery would be substantially more likely than in the nineteenth century. This transformation reflects not only technological progress, but also a profound evolution in surgical philosophy and medical and anatomical understanding.

The vertebral niche as a sanctuary for metastatic disease

Epidural spinal cord compression (ESCC) represents one of the most urgent conditions in neuro-oncology. It is not rare; up to 10% of cancer patients will develop symptomatic spinal metastases during their disease course. Unlike primary brain tumors or even intracranial metastases, ESCC presents neurosurgeons with a narrow therapeutic window, where delay may mean irreversible neurological injury.

The challenge is striking: a systemic disease manifests as a focal mechanical problem. A tumor grows silently within the vertebral column, until suddenly, it does not. Pain becomes weakness, weakness becomes paralysis. And here, neurosurgery re-enters the stage—not to cure cancer, but to preserve function, autonomy, and dignity.

But how does a systemic malignancy translate into acute spinal cord failure? And how do we decide when surgery truly changes the course of disease?

Pathophysiology

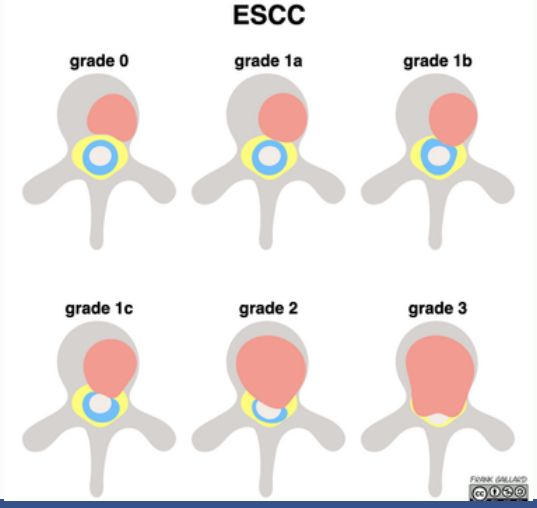
Spinal metastases most commonly arise from hematogenous spread via the valveless Batson venous plexus, allowing tumor cells to seed the vertebral bodies. The thoracic spine is most frequently affected, followed by the lumbar and cervical regions.

Once established, metastatic lesions typically begin in the vertebral body. Progressive tumor growth leads to cortical bone destruction, vertebral collapse, and extension into the epidural space

It is this epidural extension that ultimately compresses the spinal cord. Unlike the brain, the spinal canal offers limited reserve space. Even small increases in volume can result in significant neural compromise.

At the cellular level, tumor growth induces a complex tumor microenvironment involving osteoclast activation, inflammatory signaling, and vascular proliferation. Osteolytic metastases, such as those from breast, lung, or renal cell carcinoma, actively degrade bone through RANKL-mediated pathways, weakening structural integrity. In contrast, osteoblastic lesions, classically seen in prostate cancer, produce disorganized and brittle bone, which is equally prone to collapse.

Compression of the spinal cord leads to a combination of: Direct mechanical deformation, Vascular compromise and secondary ischemia and edema. If untreated, this culminates in irreversible spinal cord injury. Importantly, neurological decline is often stepwise but can become rapidly progressive once critical compression is reached.



Clinical presentation

Pain is the earliest and most common symptom of spinal metastases. It is often localized, worse at night, and exacerbated by movement. Radicular pain may reflect nerve root involvement.

As compression progresses, neurological deficits emerge such as motor weakness, ensory disturbances, gait instability, and autonomous dysfunction (bowel/bladder impairment)

A key clinical principle remains: the patient's neurological status at the time of treatment is the strongest predictor of outcome. Ambulatory patients are far more likely to remain ambulatory after intervention than those who have already lost function. This creates a clinical urgency that is unique to ESCC, time is spinal cord.

Classification and grading

The most widely used system for ESCC is the Bilsky grading scale, based on MRI findings:

- Grade 0: Bone-only disease
- Grade 1: Epidural impingement without cord compression
- Grade 2: Cord compression with visible CSF
- Grade 3: Cord compression without CSF (severe compression)

This grading directly informs management decisions, particularly the feasibility of radiation versus the need for surgical decompression.

In parallel, prognostic scoring systems such as the Tokuhashi or Tomita scores incorporate factors like primary tumor type, systemic disease burden, and functional status to guide treatment strategy.

WRITTEN BY:
ERIC CHEUNG

Imaging

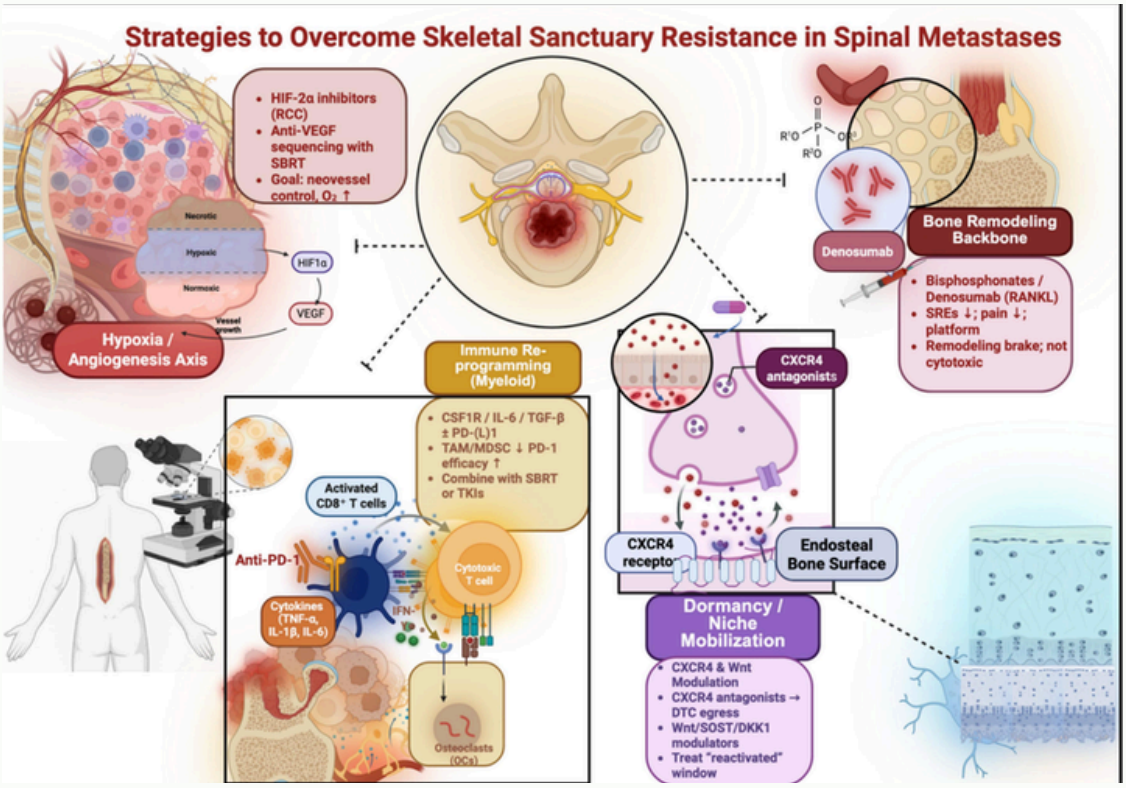
MRI is the gold standard for diagnosing ESCC. It provides high-resolution visualization of tumor extent, degree of cord compression, spinal stability and soft tissue involvement
T1-weighted images typically show hypointense vertebral lesions, while T2 and STIR sequences highlight edema and cord signal changes. Post-contrast imaging delineates tumor margins and epidural extension. CT remains valuable for assessing bony destruction and surgical planning, particularly for instrumentation. Emerging techniques, including functional MRI and radiomics, are being explored to better characterize tumor biology and predict treatment response, reflecting the growing interface between imaging and precision oncology.

Neurosurgical management

The management of ESCC is inherently multidisciplinary, involving neurosurgery, oncology, radiation therapy, and rehabilitation. The central question is not simply whether to operate, but when and in whom. Surgery is typically indicated in cases of high-grade cord compression (Bilsky 2–3), mechanical instability, radioresistant tumors (e.g., renal cell carcinoma, melanoma), and progressive neurological deficits despite radiotherapy. The landmark Lancet study by Patchell et al. (2005) demonstrated that surgical decompression followed by radiotherapy significantly improved ambulatory outcomes compared to radiotherapy alone. Modern surgical approaches emphasize circumferential decompression of the spinal cord, stabilization with instrumentation, separation surgery and creating space between tumor and cord to facilitate stereotactic radiotherapy. This concept of “separation surgery” reflects a major paradigm shift. The goal is no longer maximal tumor resection, but minimal effective decompression to enable high-dose, targeted radiation.

Outcome

Outcomes in ESCC depend heavily on pre-treatment neurological status, tumor biology, and systemic disease control. Patients who are ambulatory at presentation retain walking ability in the majority of cases after treatment. In contrast, recovery of ambulation after complete paralysis is significantly less likely, particularly if paralysis has been present for more than 48 hours. Survival is largely dictated by the primary malignancy, but local control of spinal disease plays a crucial role in maintaining quality of life. Pain relief is achieved in most patients following combined surgical and radiotherapeutic approaches. Importantly, as systemic therapies improve, patients live longer with metastatic disease. This shifts the focus toward durable spinal stability and long-term functional preservation.



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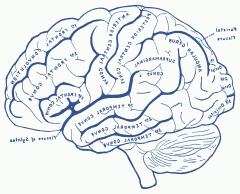
MEET THE BOARD: SERHAT ÇIFTÇI

Every month, we will highlight another member of our board, so you get to know us better. This month you can read about Dandy's Treasurer: Serhat Çiftçi!

Getting to know Serhat

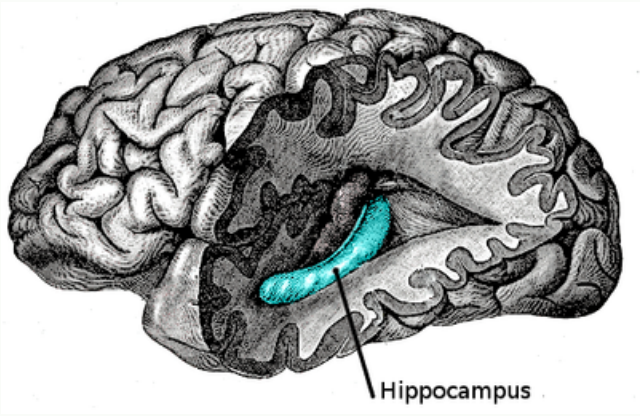


Which faculty are you in, and what year are you in? And what do you like most about your faculty?

I study at the Vrije Universiteit Amsterdam and am in my third year. I like the people and my friends the most.

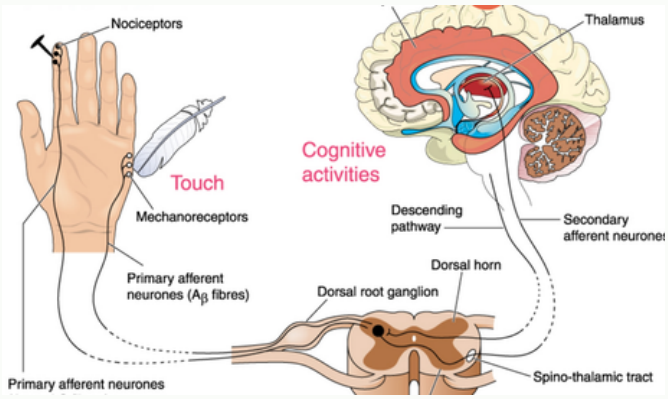
Where are you from, and where do you currently live?
I live in Den Haag

What's your favourite brain structure and why?
My favourite brain structure is the hippocampus, because of its essential role in forming new memories and helping us navigate and learn from experiences. I find it fascinating how a relatively small structure has such a major influence on identity and how we understand the world around us.



Neurosurgical questions

If you could share one neurosurgical fact to everyone in the Netherlands, what would it be?
If I could share a fact, it would be that although the brain processes pain, it does not actually feel pain itself, because it has no pain receptors. This is why certain brain surgeries can be performed while a patient is awake.



You have a long surgery coming up. Which genre of music do you listen to?
I don't really listen to music

What sparked your interest in neurosurgery?
My interest in neurosurgery was sparked by the unique combination of precision, complexity, and the direct impact on patients' lives—where small interventions can lead to profound changes in function and quality of life.

Joining the Dandy Netherlands Board

What do you enjoy the most about being the Treasurer of Dandy?
What I enjoy the most is meeting people from different faculties and organizing events that connect students with neurosurgery.

What made you sign up for the Dandy Board?
I signed up for Dandy because of my strong interest in neurosurgery and the opportunity to improve my skills in organizing lectures and events.

Personal Preferences

If you were a superhero, what would your power be?
If I were a superhero, my power would be instant knowledge translation. I want the ability to instantly understand any language, field, or concept and explain it clearly to anyone.

What's your ultimate guilty pleasure when you're cramming for exams?
My ultimate guilty pleasure when I'm cramming for exams is taking "just a quick break" that turns into a lot of scrolling through completely unrelated topics for way longer than I planned.

What's your favourite season?
Winter

Rapid Fire Round 🔥

Sweet or savory?
Sweet

Books or movies?
Movies

Cats or dogs?
Cats

What word or phrase do you use slightly too often?
Komt goed (will be fine)

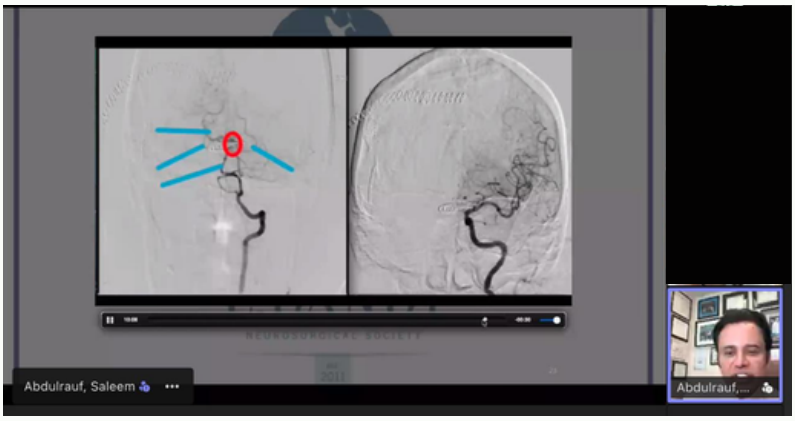
Excited to meet next year's board?
Subscribe to the newsletter and tune in for upcoming editions!

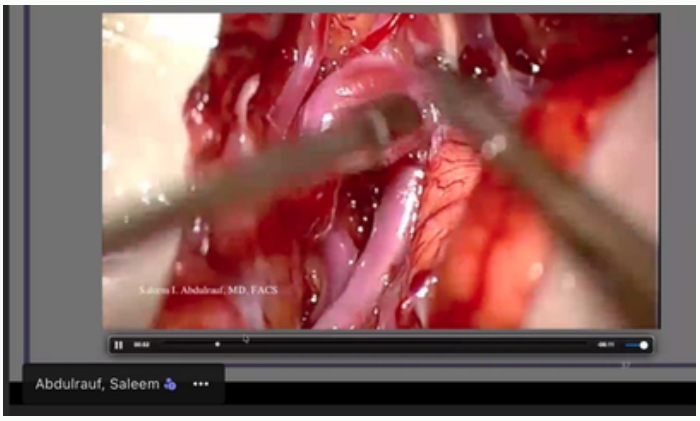
Word Finder

T	Y	C	N	C	O	Z	L	H	Y	X
V	R	R	A	S	M	S	O	Y	Z	J
S	C	A	L	P	E	H	B	P	N	Z
S	O	N	U	S	B	U	E	O	W	L
P	R	I	U	M	U	N	I	F	X	L
M	T	O	I	W	A	T	A	Y	H	M
P	E	T	J	A	V	C	T	S	Q	Z
O	X	O	A	V	J	G	I	E	O	G
N	I	M	P	U	L	S	E	R	H	C
S	V	I	A	F	C	O	U	Y	K	Q
G	L	I	O	B	L	A	S	T	W	H

GLIOBLAST
CVA
CORTEX
PONS
LOBE
SCALP
SHUNT
HYPOFYSE
TRAUMA
CRANIOTOMIE
IMPULS

RECAP: LECTURE ON ANEURYSM CLIPPING BY PROF. DR. SALEEM ABDULRAUF

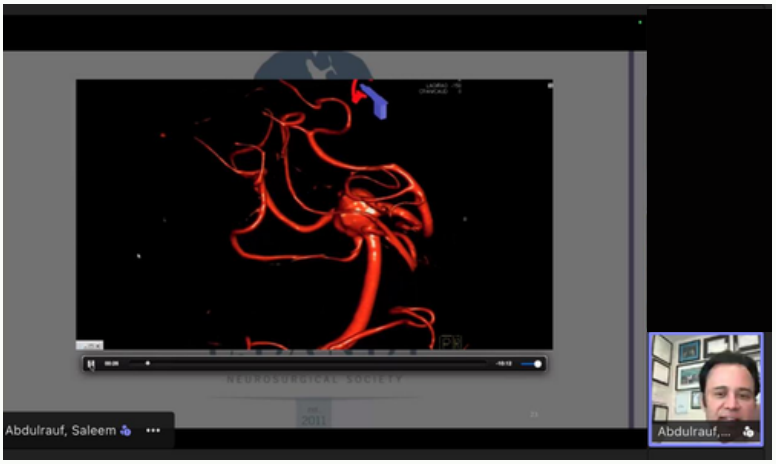


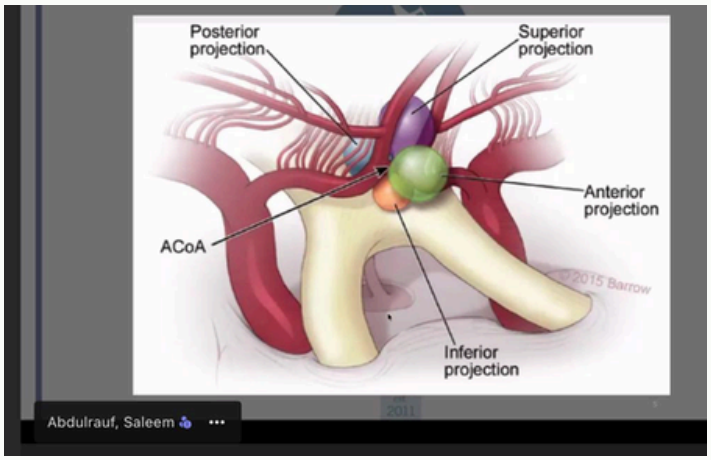


On the 14th of April, our sixth lecture of this academic year was held online, hosted from the Netherlands with the speaker joining from the United States and participants attending from around the world. We were honoured to host Prof. Dr. S. Abdulrauf who gave us his insights on innovative approaches to arteriovenous malformations (AVMs), intracranial aneurysms and Moyamoya disease. His work continues to contribute to innovation in neurosurgery through the development of advanced microsurgical and cerebrovascular techniques.

During the lecture, Prof. Abdulrauf discussed the importance of individualised treatment strategies and the continuous evolution of cerebrovascular neurosurgery. Particular attention was given to cerebral revascularisation procedures and decision-making in challenging cerebrovascular cases.

The session concluded with an engaging discussion in which participants from different countries had the opportunity to ask questions and exchange perspectives on the future of vascular neurosurgery. Prof. Abdulrauf also shared a personal reflection on pursuing a career in neurosurgery, emphasizing that one recognizes it as the right path when they cannot envision themselves pursuing any other profession.





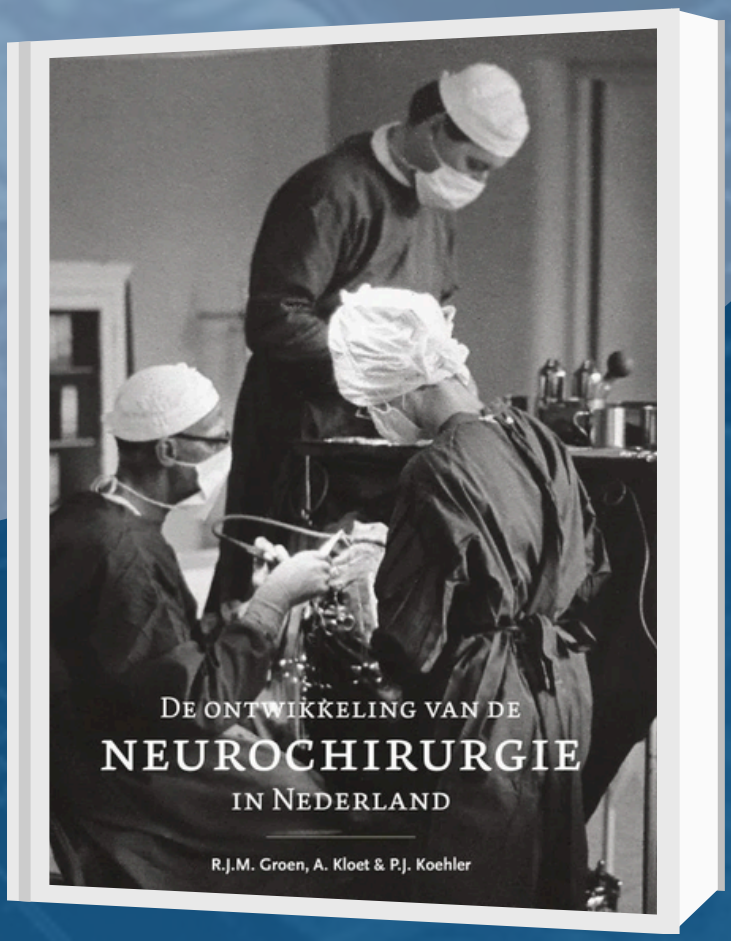
WRITTEN BY:
ROMILDA BONTES

LEESTIP!

Duik diep in de inspirerende geschiedenis van de

NEUROCHIRURGIE

Neem een kijkje door de deskundige lens van R.J.M. Groen, A. Kloet en P.J. Koehler.



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– WILLEM VAN ALTENA, TNN

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Beantwoord deze vraag:
Waar en in welk jaar werd de eerste neurochirurgische afdeling geopend in Nederland?

Stuur je antwoord in naar info@dandynetherlands.nl en maak kans op deze **unieke** prijs!

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