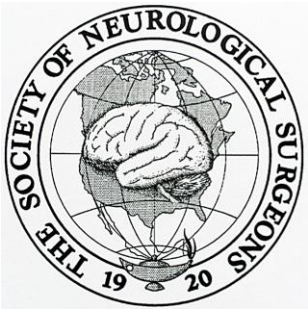


Introduction to Neurosurgical Subspecialties:

Spine Neurosurgery

Brian L. Hoh, MD¹ and Gregory J. Zipfel, MD²

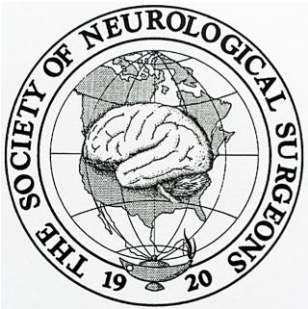
¹University of Florida, ²Washington University



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Spine Neurosurgery

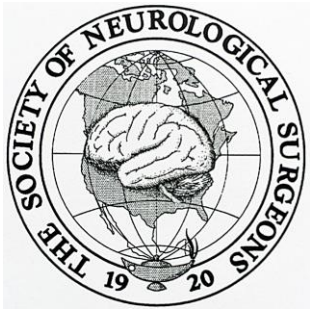
- Spine neurosurgeons treat patients with:
 - Degenerative spine disorders
 - Herniated discs
 - Spinal stenosis
 - Spondylosis
 - Spondylolisthesis
 - Spine fractures
 - Tumors of the spine
 - Deformity and scoliosis



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Spine Neurosurgery

- Both neurosurgeons and orthopedic surgeons can specialize in spine surgery
- Fellowship not required for neurosurgeons, but some neurosurgeons opt for specialized training via complex spine fellowship

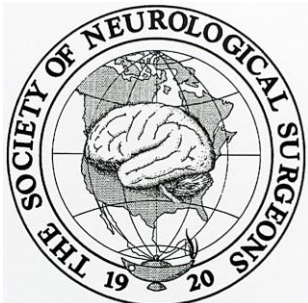


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Spine Neurosurgery

Case Illustration #1

50 yo woman with progressive chin-on-chest deformity and presenting with cervical myelopathy



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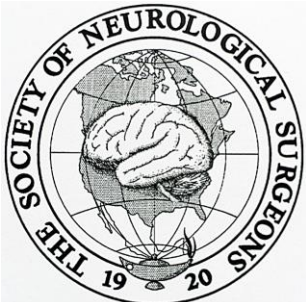
Spine Neurosurgery

Case Illustration #1

Pre-traction

Post-traction

Cervical 360 Reconstruction

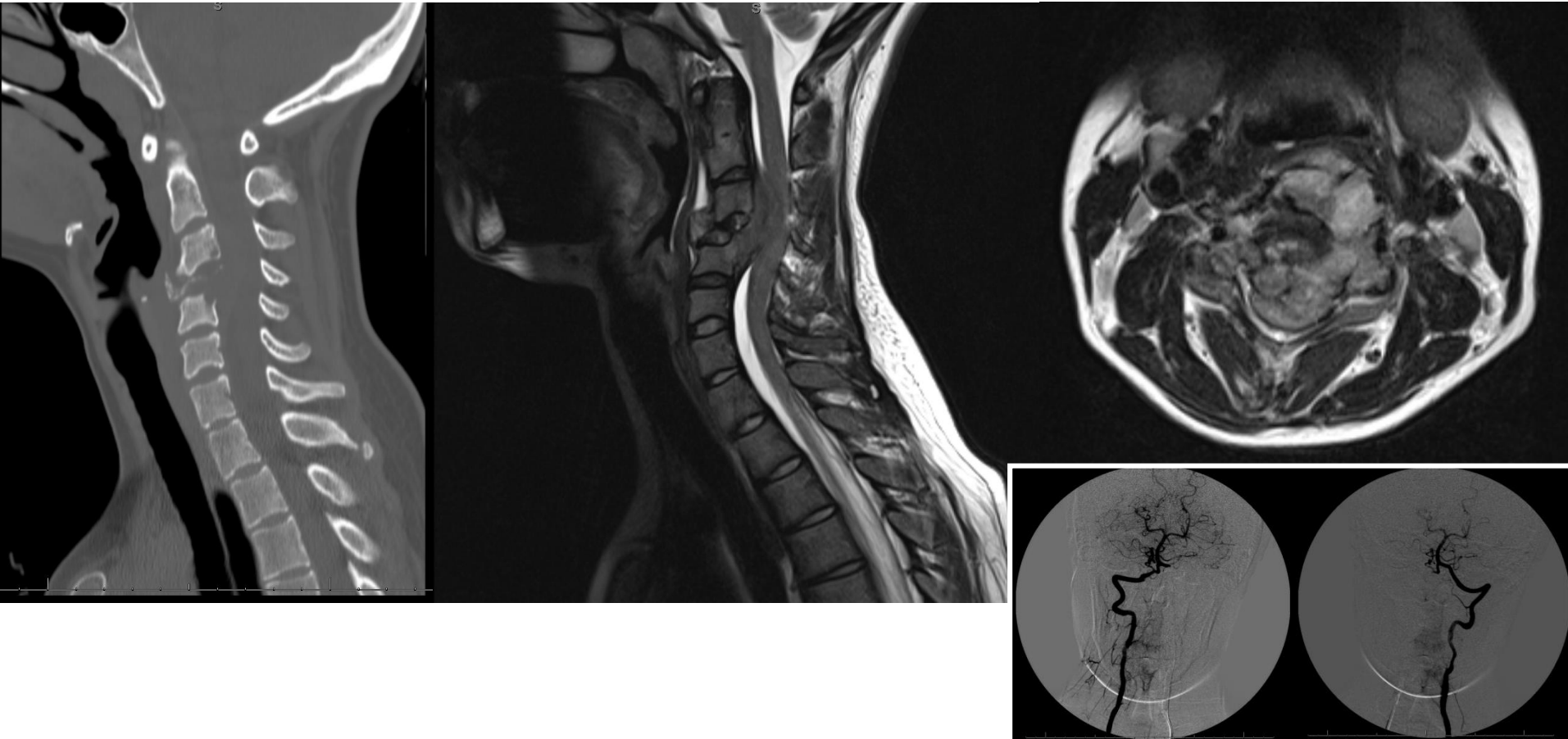


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Case Illustration #2

21 yo female with cervical chordoma with progressive pathologic fracture and myelopathy. Tumor encircling bilateral vertebral arteries. Passed preoperative balloon test occlusion of vertebral arteries.



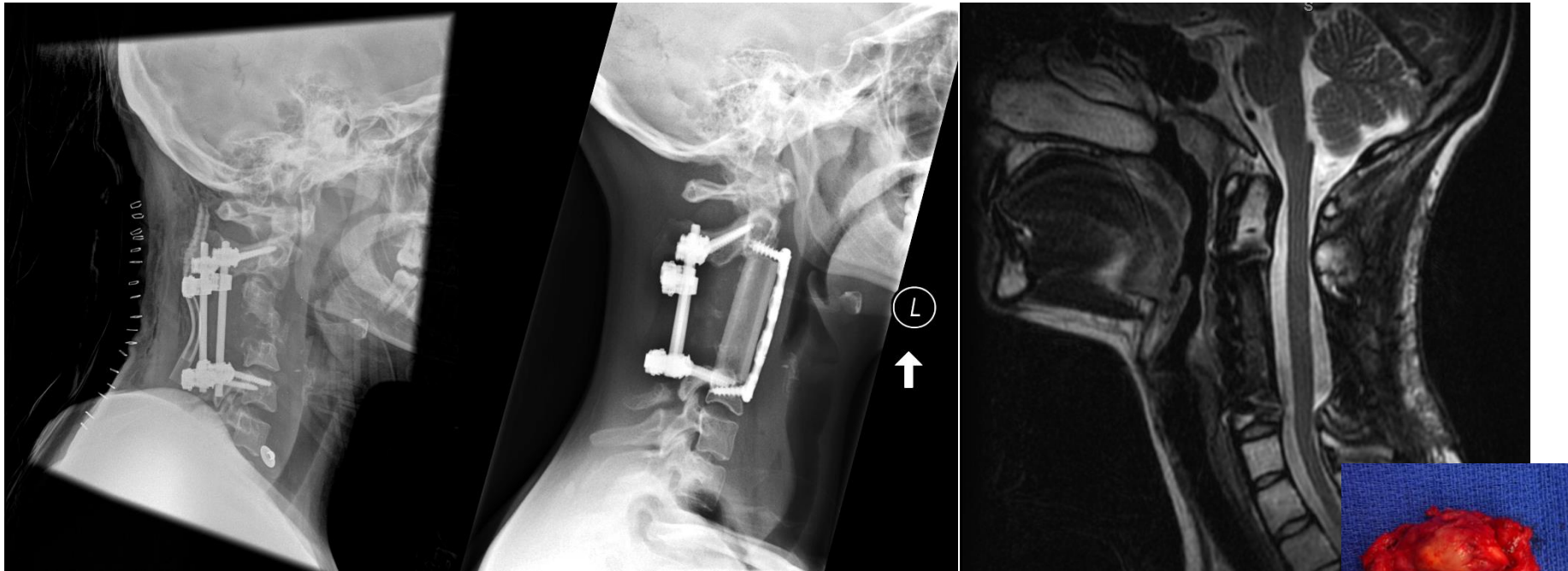
Spine Neurosurgery

Case Illustration #2

Staged posterior - anterior tumor resection and cervical 360 reconstruction.

Stage 1: posterior tumor removal and stabilization

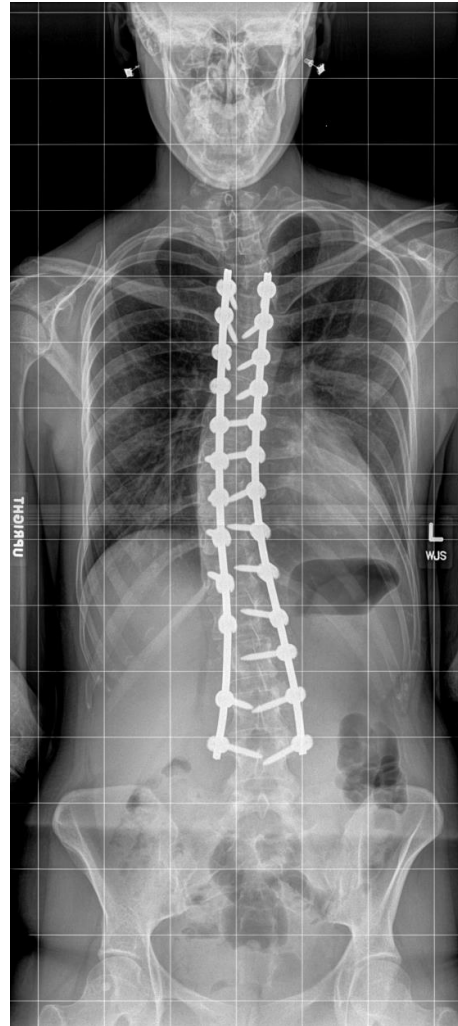
Stage 2: multilevel anterior corpectomy and reconstruction



Spine Neurosurgery

Case Illustration #3

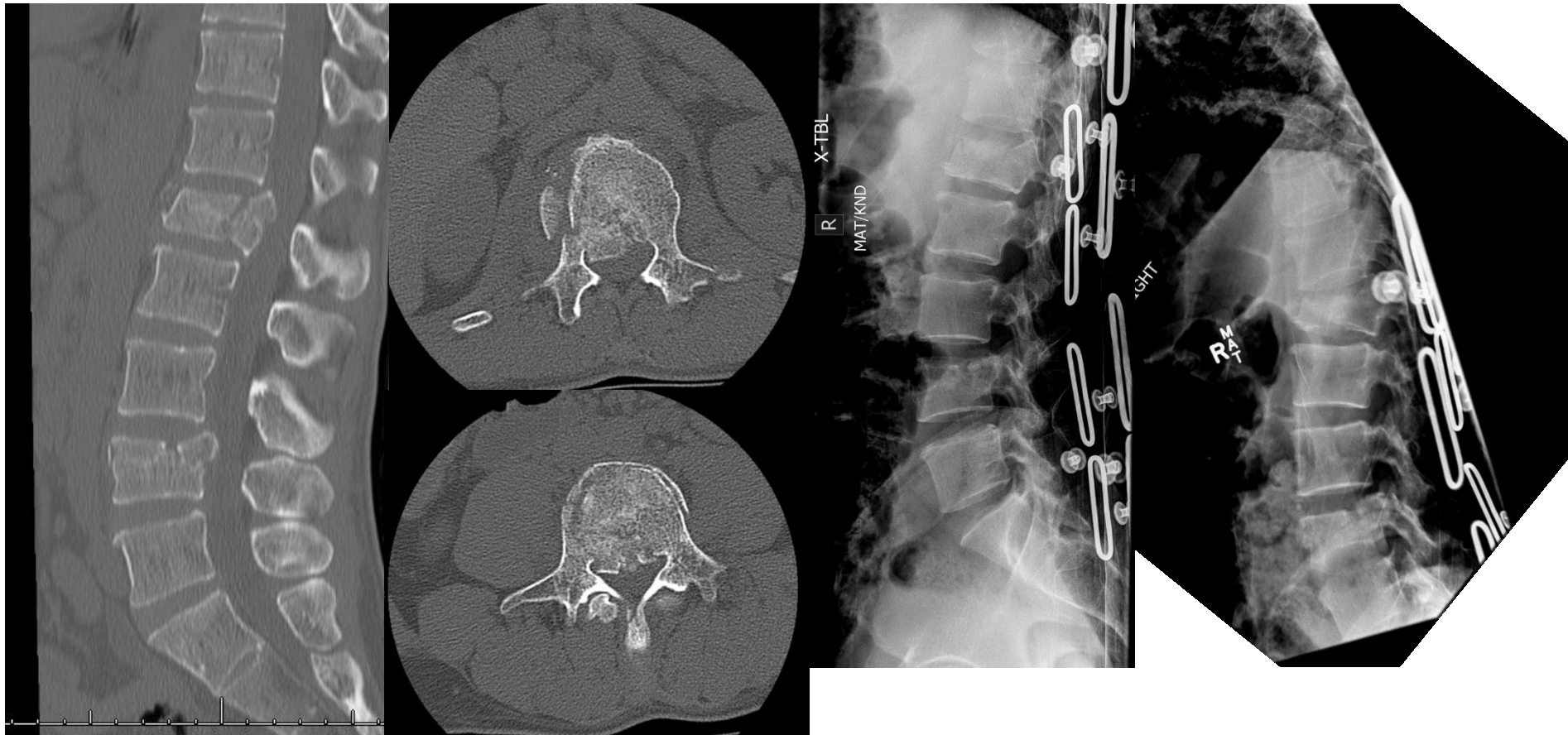
28 yo female presents with history of scoliosis and back pain.



Spine Neurosurgery

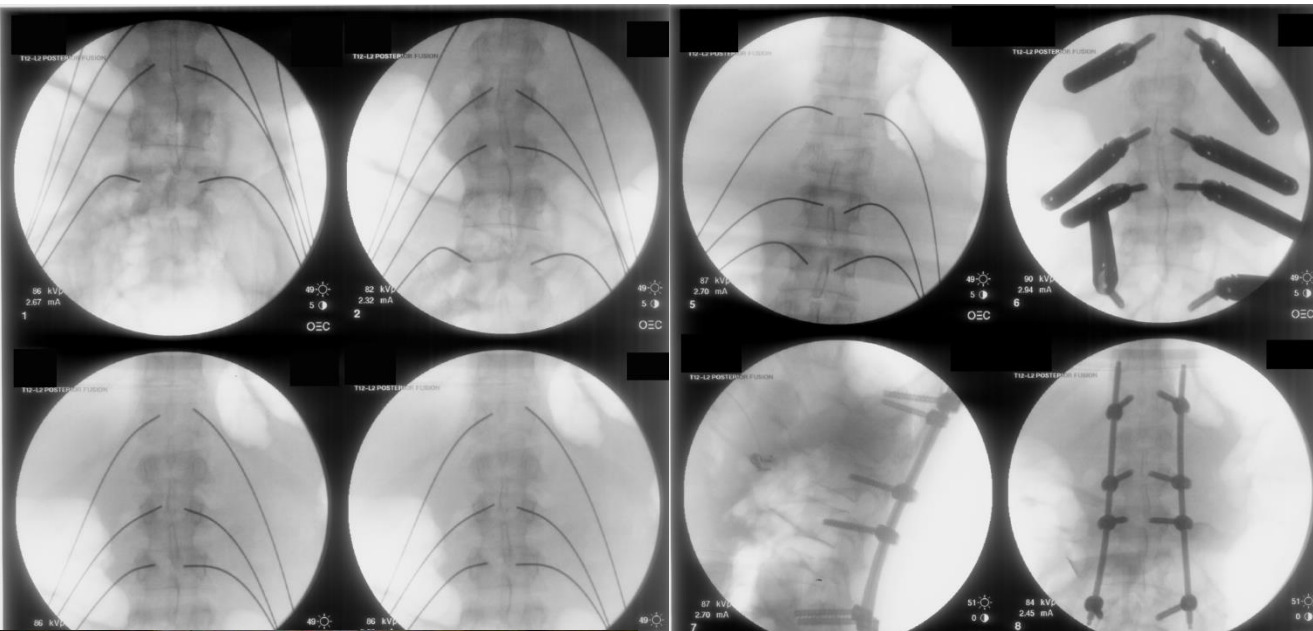
Case Illustration #4

40 yo fell from a height. L1 and L4 burst fractures. Standing upright with a brace resulted in kyphosis and leg numbness consistent with acute instability



Spine Neurosurgery

Case Illustration #4



Minimally invasive,
percutaneous stabilization
across both fractures

Guidewire insertion
Cannulated screw placement
Percutaneous connecting rod
placement

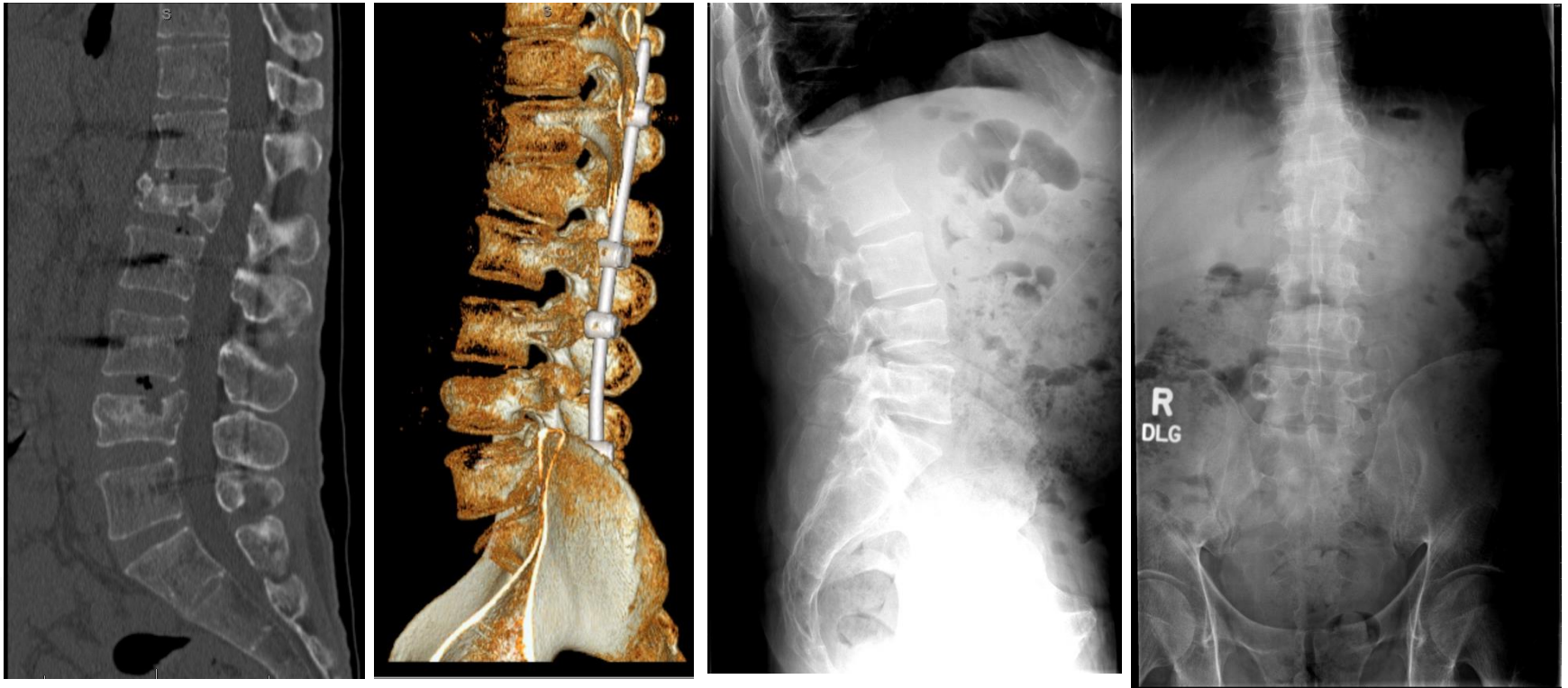
Closure of 8 x 1 cm incisions



Spine Neurosurgery

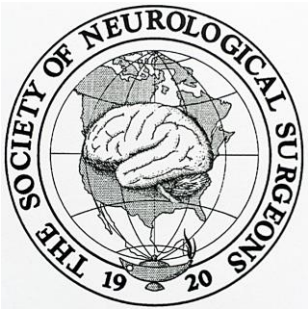
Case Illustration #4

>4 months postop shows healing of both fractures. Screw and rods removed.



Peripheral Nerve Neurosurgery

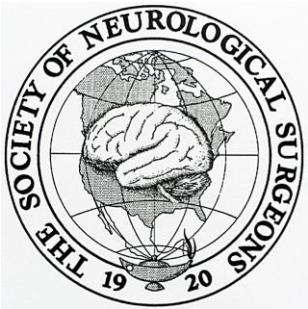
- Peripheral nerve neurosurgeons treat patients with:
 - Carpal tunnel syndrome
 - Ulnar nerve entrapment
 - Brachial plexus injury
 - Other peripheral nerve injuries



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Peripheral Nerve Neurosurgery

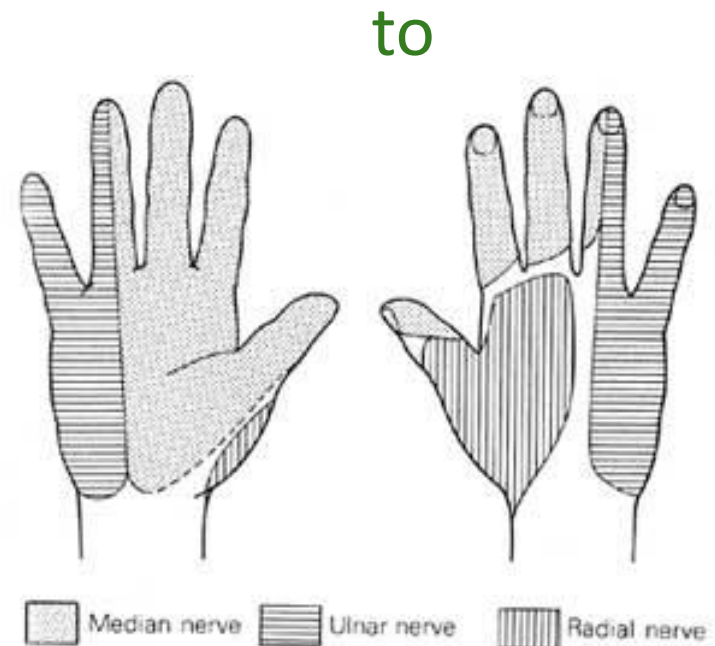
- Neurosurgeons, orthopedic surgeons, and plastic surgeons specialize in peripheral nerve surgery
- Fellowship for peripheral nerve neurosurgery is not required but some may opt for specialized training via fellowship



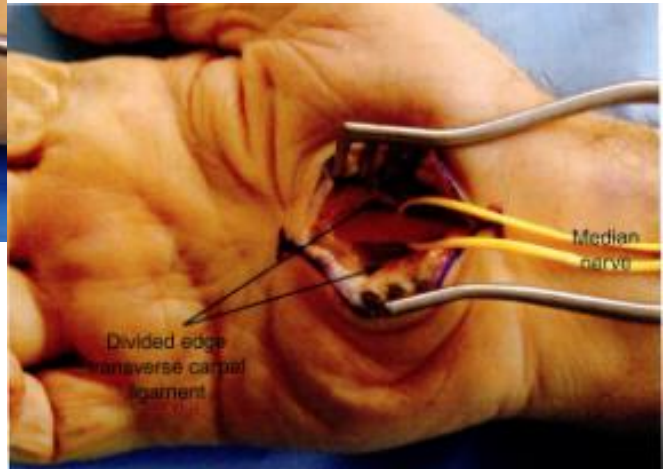
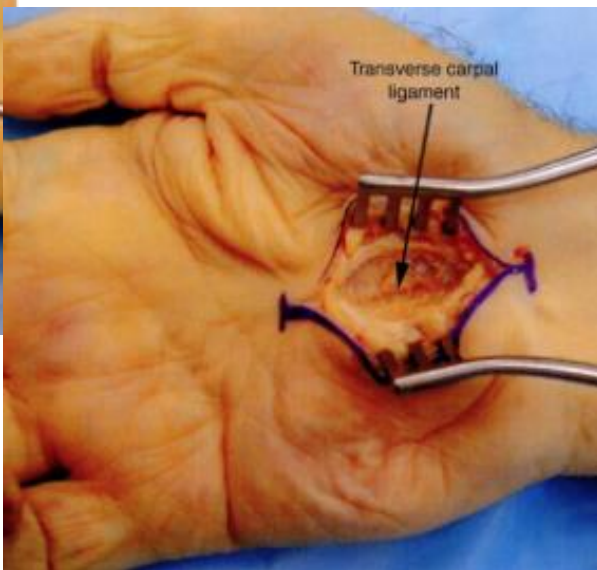
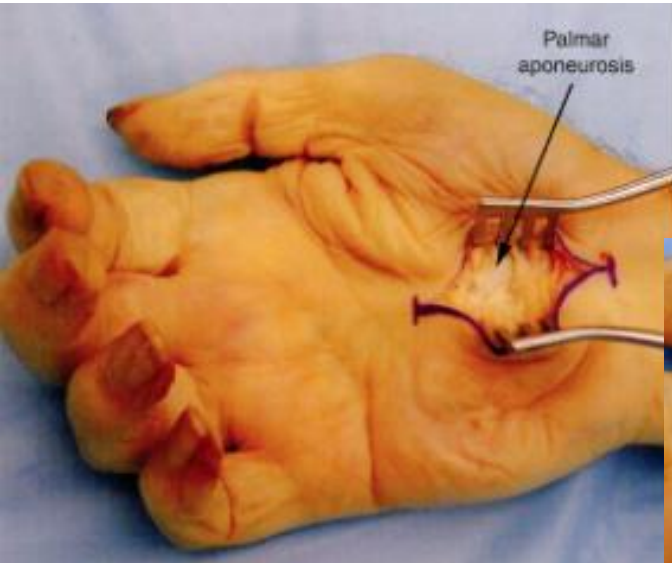
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Carpal Tunnel Syndrome

- Most common peripheral nerve entrapment neuropathy
- Compression of the median nerve at the level of the wrist (flexor retinaculum)
- Nocturnal symptoms of having “shake out hands”; sensory in palmar aspect of

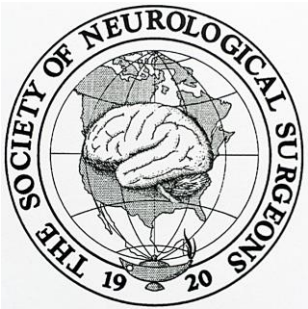


Carpal Tunnel Syndrome



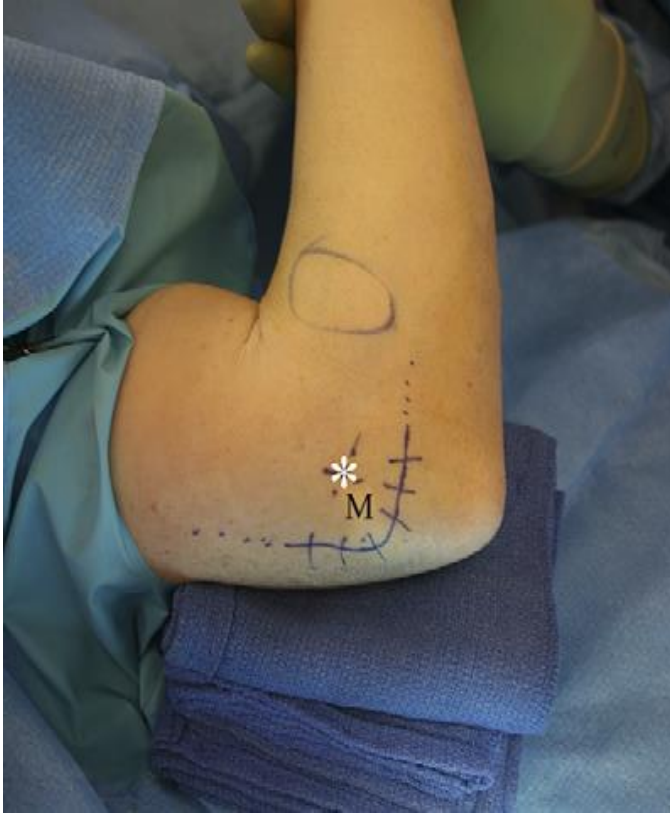
Cubital Tunnel Syndrome

- Second most common peripheral nerve entrapment neuropathy
- 4th and 5th digit numbness and hand weakness
- McGowan classification
 - Grade 1 – Minimal; parasthesias and numbness present, but no weakness
 - Grade 2 – Intermediate; wasting of interosseous muscles
 - Grade 3 – Severe; complete intrinsic paralysis

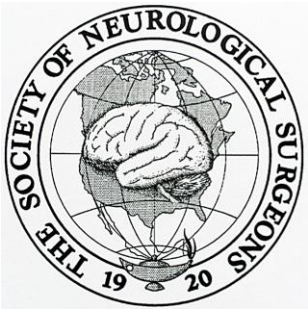
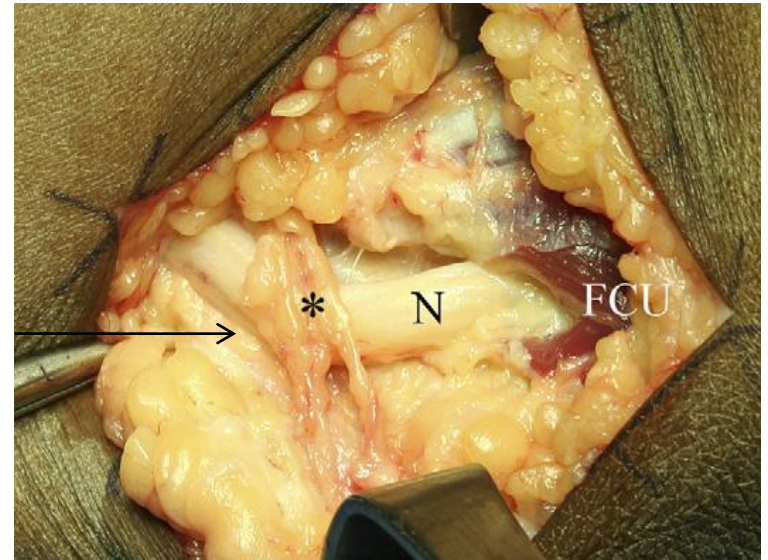


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Cubital Tunnel Syndrome



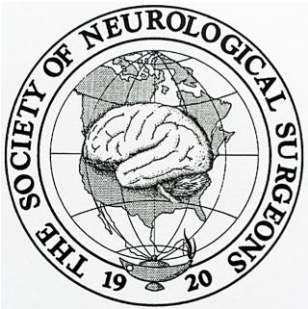
MABC



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Nerve Transfers

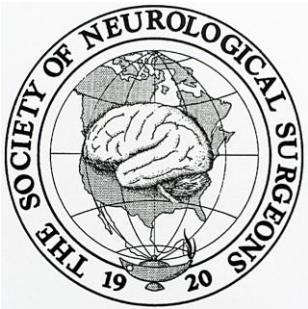
- Utilize redundant or less critical nerve function to reinnervate more critical denervated/injured target muscles
- Transform proximal injuries to a more distal injury by placing regenerating axons closer to the denervated motor endplates



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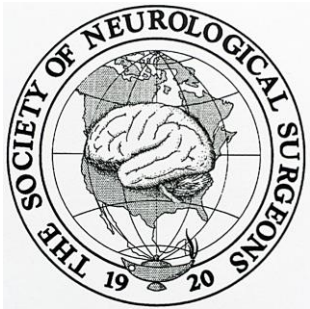
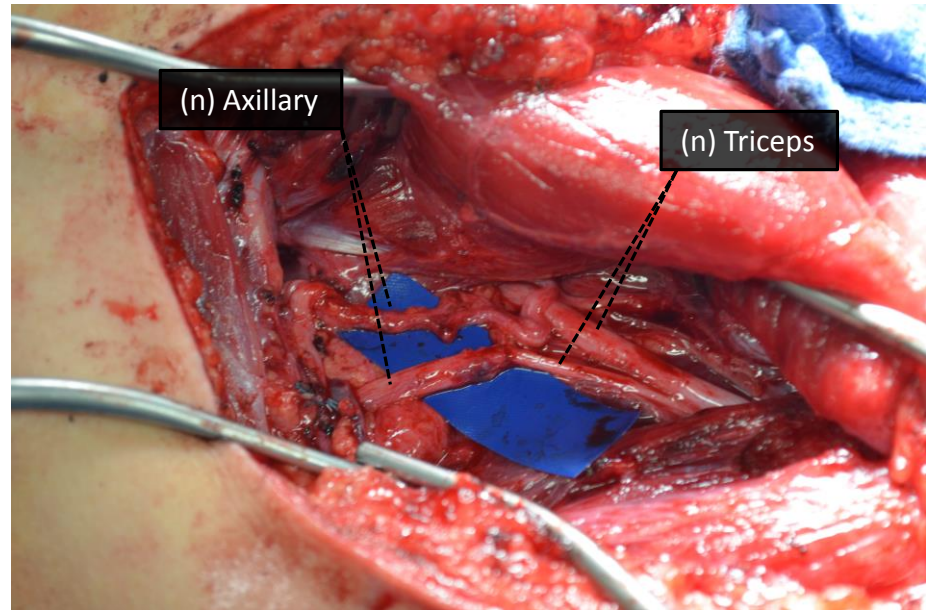
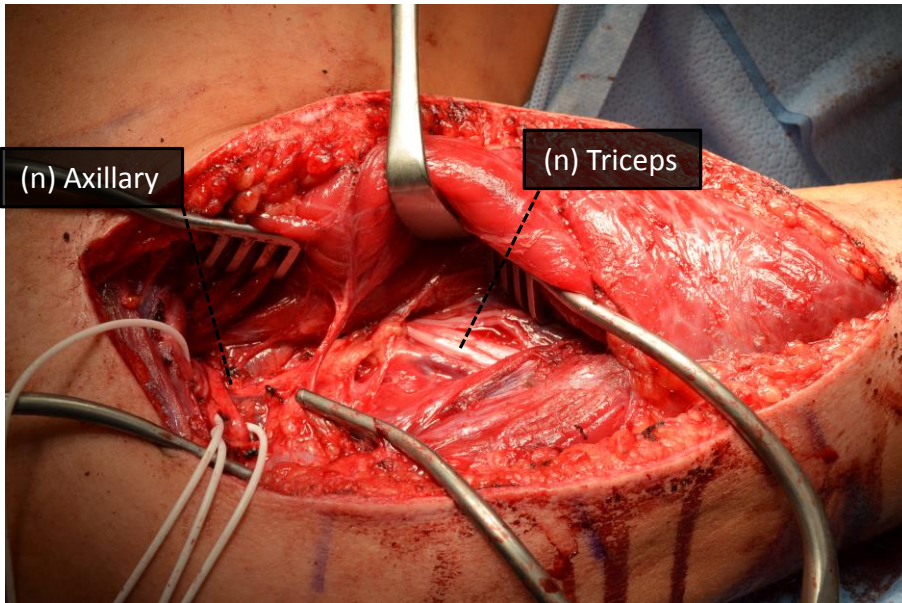
Nerve Transfers

- Most common nerve transfers
 - Elbow-flexion
 - Oberlin procedure (ulnar fascicle to biceps) or double fascicular transfer (median/ulnar fascicle to biceps and brachialis)
 - Shoulder abduction
 - Triceps to axillary and spinal accessory to supraspinatus



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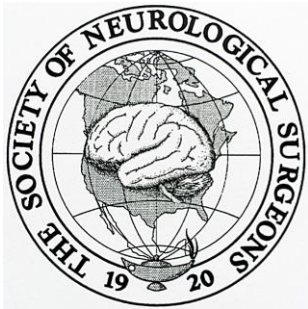
Triceps to Axillary



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Conclusions

- Surgery of the spine plays a large role in the field of neurosurgery
- Even within the subspecialty of spinal surgery, there are several further subspecialties, including trauma, degenerative spine disease, and spinal oncology
- Peripheral nerve surgery is a relatively smaller subspecialty but can provide pain relief and improved function for many patients



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