Fall ■ 2019

Spine Section Newsletter

AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves

American Association of Neurological Surgeons and the American Association of Neurosurgeons

Congress of Neurological Surgeons — Education and Innovation

Dear Members

Welcome to the 2019 CNS edition of the DSPN Newsletter!

Welcome to the 2019 CNS edition of the DSPN Newsletter! In these pages you will find information on the issue of quality in spine surgery. There are updates from the RUC, Rules and Regulation, Payor Response, and CPT committees. Our colleagues from UCSF provide a spinal cord injury research update. And, as always, there is excellent education on a peripheral nerve topic, this time nerve transfers.

There is all this and more!

Looking forward to seeing you at CNS! If you have any suggestions for future newsletters, please don't hesitate to contact me.

Sincerely,

Khoi D. Than, M.D. khoi.than@duke.edu

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Quality in Spine Surgery – An Interview with Oren Gottfried, M.D.

Khoi D. Than, M.D.

Dr. Oren Gottfried is Professor of Neurosurgery and Orthopaedic Surgery at Duke University. He is a national leader in the realm of quality in neurosurgery. I sat down with Dr. Gottfried to learn more about quality and how it affects us as spine surgeons.

How did you become interested in the field of quality?

Dr. Gottfried: I had a strong interest in quality outcomes for myself and my group as I started working at Duke University in 2010. I initiated several databases to track and collect our spine group's patient related outcomes. We collect data internally with multiple databases and contribute to national registries including QOD, NSQIP, and others.

I realized that in order to have the group provide the best possible care, I needed access to real time data and needed the ability to get this data back to the surgeons and group as close to the point of care as possible. In 2013, I partnered with hospital performance services to build a mechanism and platform to track quality and safety outcomes across our health system in real time with easy to access web links. It took several years to perfect all these pre-scripted and standardized searches, but at this time I can really see all quality data for our spine group and for each surgeon and compare

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Interview with Dr. Oren Gottfried

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surgeons to local and national peer groups in a click of a button. I can track data on every single patient we treat in the inpatient or outpatient settings. Since that time, we have tracked all quality and safety outcomes data for the spine division and the neurosurgery department, including hundreds of outcomes and metrics such as mortality index, readmissions, complications, patient satisfaction, and many others. We built an easy-to-digest dashboard that I send out to all spine surgeons on a regular basis, and it includes case reviews that shows opportunities for quality improvement, as well as benchmarks and champions. The use of this data is key in the creation, success, and monitoring of all of our many QI initiatives. Every few months, I add a new initiative and we design and track lead and lag metrics based on these locally created spine performances services databases which have risk adjustment from Vizient.

How would you define "quality" in terms of healthcare and spine surgery?

Dr. Gottfried: I think there is quite a bit of conversation about trying to maximize improving quality outcomes and value. The bottom line is we must have great patient outcomes at the individual and at the total population level without major complications or significant morbidity, with high survival rates, with longevity and low risk of treatment recidivism, improving patients' quality of life, maximizing patient satisfaction with all interventions, and we must do all of these efforts in the most efficient manner for the least amount of money. There is no way to achieve these results without seeing our data real time. Surgeon quality and value dashboard delivered regularly with appropriate benchmarks in an easy to digest fashion is a key first step to improvement. The next step is designing simple but efficacious initiatives for a group that can promote safety and quality care with little to no disruptions to a busy spine surgeon's practice. I have been fortunate to have an engaged group to roll out these efforts to, and I enjoy not just facilitating ideal outcomes for my practice but for our entire group.

What are the most important quality metrics that a spine surgeon should pay attention to?

Dr. Gottfried: I adjust our dashboards to outcomes that matter to my spine colleagues. Although I have access to hundreds of outcomes, we pick 10-20 per year as a group that we want to follow and improve upon. These dashboards trend surgeons' data and the group's data over time, and compare data to benchmarks. In a value based world, we need to have great outcomes and at the least amount of cost. Some examples of data we value include mortality index, length of stay index, unplanned readmissions, complication rates, infection rates, return to OR rate, total costs and cost variability data, CGCAHPS, HCAHPS, and many other quality, satisfaction, and operational metrics. I think the cost side of things and the expensive complication, reoperation, and readmission metrics will become more and more relevant to improve on. I think we should not just judge the immediate 30-90 days or 1 year results of our procedure, but the expenses incurred and satisfaction and results for our patients beyond a year. We see a high rate of recurrent pathology and return to OR, and we as a group need to find the most durable and least expensive interventions.

What are some measures that surgeons can employ to improve these metrics?

Dr. Gottfried:

- Gain access to risk adjusted outcomes data and review these metrics and cases with complications on a regular basis.
- Review costs and look for opportunities to use less expensive but comparable surgeries or hardware. Make sure you see data over long periods, even years.
- Follow trends and identify opportunities early.
- Generate a platform to get this data in easy to read reports.
- Develop and track success of these initiatives based on high quality data. Simple initiatives with easy to track lag and lead outcome variables will be easier to maintain.
- Get buy in from colleagues about the importance of quality work, and the program will just get stronger and stronger.

How do you foresee quality impacting physician reimbursement?

Dr. Gottfried: In a value based world, our outcomes—and attaining them in the most efficient way with the lowest cost—will be more important than any other variable. Our success and ability to continue to perform spine surgery as we like to do is absolutely dependent on having really solid outcomes at the lowest expense and our care will have to hold up to best evidence guidelines. Ideally, we will continue to have a say over the standards we practice and defining quality and appropriate care costs. It is important we as surgeons maintain involvement and really be the driver in these

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huge decisions and conversations of how spine care reimbursement is done. It is our job to drive long term spine surgery quality outcomes and find ways to do it in the least expensive manner.

For surgeons who want to impact quality, what are some ways to get involved locally and nationally?

Dr. Gottfried: Collecting data locally, adding your data to national registries, and then move to larger multi-institutional projects is a path to quality success. Work on perfecting your local data and getting this data back to the hands of the surgeons. Also, it is important to contribute to national registries including QOD and the new version with AAOS, as well as the many others including NSQIP. It is important to observe risk adjusted data, monitor trends, compare data to national benchmarks, and always look for QI initiative opportunities. I am working with other spine quality groups to standardize successful quality improvement projects. I think these kind of multi-institutional efforts will be key to our future.

Rules & Regulations Update

Robert Whitmore, M.D.

Change proposed to Section 4.05 Duties, #6:

Original:

Members at Large: The Members at Large shall provide oversight of Ad-hoc Committee Heads and coordinate reports at the Executive Committee meetings at DSPN and CNS. Members at Large report to the Secretary and Section Chairperson.

Revision:

Members at Large: The Members at Large shall monitor the progress of Ad-hoc Committee initiatives and action items via monthly updates with Ad-Hoc Committee Heads and gather Ad Hoc Committee reports prior to Executive Committee meetings. Members at Large report to the Secretary and Section Chairperson.

The purpose of this revision to the Rules and Regulations document of DSPN is to clarify the role of those individuals serving as Members at Large within the Executive Committee of DSPN. The Members at Large are individuals appointed by the Chairperson of the Executive Committee. Ad-Hoc Committee initiatives are set up at the direction of the DSPN Chairperson, compared to standing committees, which are mandated by the DSPN bylaws.

Social Media Corner

John H. Shin, M.D.

Do you currently use social media in your practice? Have you found it helpful to patients, referring physicians, and colleagues?
Whether in private or academic practice, we would like you to share with us news from the frontlines of practice. This can include anything related to your spine practice, including patient stories and testimonials. Follow us on Twitter, Instagram, Facebook, and LinkedIn. We would like to highlight the accomplishments of our members and bring attention to your outstanding work. Forums such as Twitter are a great way to share news of publications, promotions, and people worth highlighting in practice.

What's up with the RUC?

John Ratliff, M.D.

Two quick topics that I can bring you up to date and up to speed on with this DSPN Newsletter column: reporting laminectomy with interbody fusion and the new E&M codes.

Interbody Fusion Concurrent with Lumbar Laminectomy

As anyone who reads this newsletter is aware, there has been years of work with regard to changing erroneous Medicare and other payer policy around reporting a decompression via lumbar laminectomy (such as 63047) at the same level where a lumbar interbody fusion (22630/22633) is performed. Our most recent efforts in this space were around getting the AMA to rescind a mistaken CPT Assistant Article that noted that a laminectomy should not be reported at the same level as an interbody fusion in the lumbar spine.

I will not belabor the details; Lou Tumialan wrote up a fantastic review of the history of this conflict and the years of work that AANS/CNS Coding and Reimbursement have devoted to trying to correct this and to restore appropriate valuation of physician work for our members. The review was published in Neurosurgery and may be accessed at: https://academic.oup.com/neurosurgery/article/84/2/E122/5289228

We were successful in getting this CPT Assistant article retracted. As a byproduct of that, though, spine societies were asked to come up with better explanatory language around these code descriptors to decrease the uncertainty on how the procedures should be reported.

The leadership of NASS, CNS, and AANS all met and reviewed the conflicts between the societies on this issue, and came with a compromise that would allow for reporting of physician work when performing a concurrent laminectomy/interbody fusion and would decrease inappropriate coding.

This coding proposal is being reviewed at CPT at present. Unfortunately, we do not have a final word from the CPT Editorial Panel that we can review; these results are still embargoed. However, it does appear that we are making slow, but hopefully steady, progress to address this issue. More to come once the CPT decision on our joint proposal is available for public review.

E&M

Lou also provided us with a great review in the Spring 2019 DSPN Newsletter of the changes in how we code evaluation and management services, meaning our clinic visits. While neurosurgeons generate most of their billing with procedures, we still all do clinic and hence these changes impact every neurosurgeon in the United States.

This effort grew out of a larger CMS directive titled "Patients over Paperwork." CMS proposed a number of changes in how we value clinic visits and how we document our clinic evaluations. As anyone who has studied E&M coding would attest, the rules are byzantine and correctly coding for a level 5 clinic visit requires an onerous amount of documentation that may have little or no relevance to the clinical care being provided to a given patient. E&M coding became a system of checking boxes, not a rational representation of the work a physician does in evaluating and managing a patient in an outpatient environment.

The initial CMS proposals were reviewed by Lou last month in this Newsletter, check that out if you want to read more. Bottom line is that the AMA CPT Panel developed a new set of E&M code descriptors, focused either solely on medical decision making or on total time. The descriptors also allowed for some time both before and after the day of service for preliminary work and follow-up after the clinic visit.

It was emphasized by AMA as the workgroups reviewed the new CPT descriptors for E&M codes that the goal of this effort was to improve documentation requirements and to reduce the burden on physicians for documenting outpatient visits, not to rebalance the fee schedule and to direct more funds to outpatient, clinic tasks as opposed to specialty care or procedures.

The proposed Medicare Physician Fee Schedule (MPFS) for 2020 gives us a lot of insight in where Medicare is going next with this effort. First, CMS rescinded the proposal to flatten all E&M reimbursement to just 2 values; they will continue to pay higher values for higher levels of service. CMS also accepted the new descriptors provided by the CPT Editorial panel, and accepted the recommendation to value E&M work based on medical decision making or on time, decreasing requirements for documentation. These changes are proposed for adoption in 2021.

Since this family of codes was redefined by the CPT Editorial Panel, the codes came through the RUC for re-valuation. There was a very active discussion about the valuations of these codes, and whether this effort would entail increasing valuations for E&M services or not.

After spirited debate, the RUC passed new values for E&M codes that, as noted in the proposed 2020 MPFS, will go into effect in 2021. This summary from Hart Health Strategies summarizes the new code descriptors, the new values, and the new times **(Figure 1)**. As you can see, most values for E&M go up, some quite significantly.

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New Patient Office/Outpatient E/M Codes					
CPT Code	Proposed Descriptor	Current wRVU	***Proposed CY 2021 wRVU***	Current Total Time	***Proposed Total Time***
99202	*Office or other outpatient visit for the evaluation and management of a new patient, which requires a medically appropriate history and/or examination and straightforward medical decision making. When using time for code selection, 15-29 minutes of total time is spent on the date of the encounter*	0.93	***0.93***	22	***22***
99203	*Office or other outpatient visit for the evaluation and management of a new patient, which requires a medically appropriate history and/or examination and low level of medical decision making. When using time for code selection, 30-44 minutes of total time is spent on the date of the encounter*	1.42	***1.6***	29	***40***
99204	*Office or other outpatient visit for the evaluation and management of a new patient, which requires a medically appropriate history and/or examination and moderate level of medical decision making. When using time for code selection, 45-59 minutes of total time is spent on the date of the encounter*	2.43	***2.6***	45	***60***
99205	*Office or other outpatient visit for the evaluation and management of a new patient, which requires a medically appropriate history and/or examination and high level of medical decision making. When using time for code selection, 60- 74 minutes of total time is spent on the date of the encounter. (For services 75 minutes or longer, see Prolonged Services 99XXX))*	3.17	***3.5***	67	***85***

Established Patient Office/Outpatient E/M Codes					
CPT Code	Proposed Descriptor	Current wRVU	***Proposed CY 2021 wRVU***	Current Total Time	***Proposed Total Time***
99211	*Office or other outpatient visit for the evaluation and management of an established patient, that may not require the presence of a physician or other qualified health care professional. Usually, the presenting problem(s) are minimal)*	0.18	***0.18***	7	***7***
99212	*Office or other outpatient visit for the evaluation and management of an established patient, which requires a medically appropriate history and/or examination and straightforward medical decision making. When using time for code selection, 10-19 minutes of total time is spent on the date of the encounter*	0.48	***0.7***	16	***18***
99213	*Office or other outpatient visit for the evaluation and management of an established patient, which requires a medically appropriate history and/or examination and low level of medical decision making. When using time for code selection, 20-29 minutes of total time is spent on the date of the encounter)*	0.97	***1.3***	23	***30***
99214	*Office or other outpatient visit for the evaluation and management of an established patient, which requires a medically appropriate history and/or examination and moderate level of medical decision making. When using time for code selection, 30-39 minutes of total time is spent on the date of the encounter*	1.5	***1.92***	40	***49***
99215	*Office or other outpatient visit for the evaluation and management of an established patient, which requires a medically appropriate history and/or examination and high level of medical decision making. When using time for code selection, 40-54 minutes of total time is spent on the date of the encounter. (For services 55 minutes or longer, see Prolonged Services 99XXX)*	2.11	***2.8***	55	***70***

Figure 1

Great news, right? We get to document less while receiving greater payments for our clinic visits. What could be bad about that?

There are two significant problems:

1. The MPFS notes that these values will not be added to the global values for surgical codes. This means that the value for procedures will not go up, and it also means that surveys for procedure valuation after these new values take effect in 2021 will be much more confusing (if that is possible). I personally think it means that CMS has something significant planned for the global period in the coming couple of years

2. CMS cannot go and print more money to pay for all of these increased valuations. So they will have to decrease the conversion factor to pay for all of this

What's the conversion factor? The formula is here on **Figure 2**. Bottom line: the conversion factor is how Medicare turns RVUs into dollars, and determines how much they pay for a given service.

E&M services are about 40% of the entire physician fee service. If that goes up, something has to go down. What goes down becomes everything else in the fee schedule other than E&M, to maintain budget neutrality.

What's the impact on neurosurgery? The net impact from the change in E&M valuations alone is about negative 3%, as estimated by the 2020 MPFS. It may be higher. We will not know until the conversion factor for 2021 is published next year.

So the end result of this E&M effort to put patients over paperwork became rebalancing the fee schedule and to directing more funds to outpatient, clinic tasks as opposed to specialty care or procedures.

This is just a proposed policy, though, and the final fee schedule has not be released. AANS and CNS, through the Washington Committee, are offering our comments on improving the final document and focusing upon the key elements of the original E&M documentation reduction effort. More to come!

I will provide more information about each of these topics as it becomes available. We also did not even mention the Rand Reports on the global period; hopefully a review of that can be shared with a future newsletter.

Thanks again for the hard work of our AANS/CNS Coding and Reimbursement team and for the many hours they devote to championing access to neurosurgical care for our patients!

Medicare Fee Schedule Formula

$$[(RVU_w \times GPCI_w) + (RVU_{pe} \times GPCI_{pe}) + (RVU_m \times GPCI_m)] = \text{Total RVU}$$

$$\text{Total RVU} \times \$CF = \$\text{Medicare Allowable (local)}$$

Fee Schedule Key:

$$MFS = [(RVU_w \times GPCI_w) + (RVU_{pe} \times GPCI_{pe}) + (RVU_m \times GPCI_m)] \times CF$$

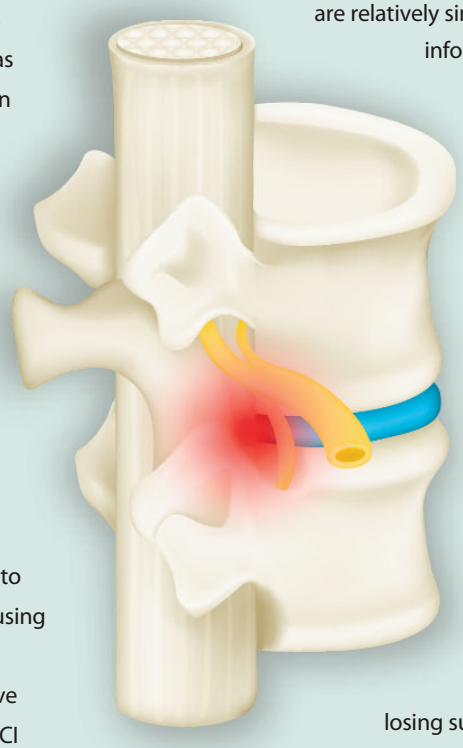
RVU =	**Relative Value Unit** (weight assigned to the colde)
GPCI =	**Geographic Practice Cost Index** (adjustment for geographic cost of living)
W =	**Work** (physician time/intensity)
PE =	**Practice Expense** (overhead)
M =	**Malpractice**
$CF =	**Conversion Factor** (the dollar amount paid for single RVU)

Figure 2

Research Update: Spinal Cord Injury

John Burke, M.D., Ph.D. and Sanjay Dhall, M.D.

Very often patients with spinal cord injury (SCI) require urgent surgical stabilization. Such surgery often happens very soon after injury; indeed, recent data has shown that "ultra-early" surgery (defined as within 12 hours of injury) leads to improved outcomes after SCI[1]. In this early time window, it is important to leverage all available data to help quickly predict both the severity of the injury, as well as the probability that surgical intervention can lead to a meaningful recovery. One source of data that is commonly available, but is uncommonly used to predict outcome, is intraoperative neurophysiological monitoring (IONM). Indeed, we have often been surprised that some patients with clinically severe SCI have motor evoked potentials (MEP) at the time of surgery. Even more surprising was that there is scant literature on the predictive value of such IONM activity. Although other studies have examined the ability of neuromonitoring to predict recovery after SCI, none have done so using intra-operative neuromonitoring. This point is important, because IONM is what surgeons have available for the vast majority of all operative SCI cases. If IONM predicts recovery, it would greatly add to our ability to offer meaningful prognostic information to our patients, and may even alter post-surgical treatment.



Given that motivation, our paper, "Motor Evoked Potentials Correlate with Magnetic Resonance Imaging and Early Recovery After Acute Spinal Cord Injury" [2], set out to investigate what IONM can tell us about the potential for recovery for patients with SCI. Specifically, we retrospectively looked at the operative records for 32 patients who underwent surgical stabilization after SCI. After splitting the patients into two groups based on the presence or absence of intraoperative MEPs, we found that patients with severe SCI and MEPs tended to show greater clinical improvement in association impairment scale (AIS) than those with severe SCI without MEPs. This finding was consistent with the imaging data, as patients without MEPs tended to have more edema and evidence of damage within the spinal cord.

Practically, these findings indicate that intraoperative MEPs, which are relatively simple to collect and are widely available, contain information that can be used beyond the operating room. The presence of MEPs suggests that there are at least some neural connections above and below the injury, which increase the probability of recovery in the acute setting. More globally, our study highlights a shifting attitude toward "complete" injuries. Indeed, some patients that were initially classified as having a very severe SCI ended up showing some degree of recovery. In the past, such patients were not emergently taken to surgery, and instead were managed conservatively until the severity of the injury could be more accurately determined. From our standpoint, these results suggest that this might be a self-fulfilling prophecy: the longer the SCI remains uncorrected, the higher the probability of losing surviving neural connections and the lower the probability of recovery.

Of note, this work was awarded the Neurotrauma & Critical Care 2018 Paper of the Year Award by *Neurosurgery*.

References

1. Burke JF, Yue JK, Ngwenya LB, Winkler EA, Talbott JF, Pan JZ, et al: Ultra-Early (<12 Hours) Surgery Correlates With Higher Rate of American Spinal Injury Association Impairment Scale Conversion After Cervical Spinal Cord Injury. *Neurosurgery 85*:199–203, 2019

2. Dhall SS, Haefeli J, Talbott JF, Ferguson AR, Readdy WJ, Bresnahan JC, et al: Motor Evoked Potentials Correlate With Magnetic Resonance Imaging and Early Recovery After Acute Spinal Cord Injury. *Neurosurgery 82*: 870–876, 2018

Payor Response Committee Update

Kurt Eichholz, M.D., FACS, FAANS

The Payer Response Committee of the AANS/CNS Joint Section for Disorders of the Spine and Peripheral Nerves has continued its work with monitoring and responding to new payer policies and changes in coverage related to surgical spine issues. Listed below is a summary of a few of the many issues that have arisen over this past summer that have been addressed.

Percutaneous Vertebral Augmentation

Earlier this summer, a Local Coverage Decision was released by several Medicare Administrative Contractors regarding coverage for percutaneous vertebral augmentation for osteoporotic vertebral compression fractures. The Payer Response Committee sent a response to the proposed decision. Concerns included that the decision limited vertebroplasty to the "acute" setting, within six weeks, which we recommended be removed, as there is literature support for vertebroplasty after six weeks. The decision also mandated a multidisciplinary team consensus between referring physician (i.e. rheumatologist, endocrinologist), treating physician, and radiologist or neurologist. We recommended that this mandate for a "team consensus" be removed since again, there is no literature support for such an approach, and the treating physician should have the freedom to make independent clinical decisions regarding the indication for vertebroplasty based on the clinical scenario. The decision also indicated that several relative contraindications for vertebroplasty should be considered absolute contraindications, and we recommended that this be changed. At this point, the AANS and CNS have sent our recommendations to contractors that have adopted this local coverage decision thus far.

Conservative Treatment for Back Pain – United Health Care

United Health Care conducted a conference call with leadership of several societies regarding a new initiative to try to reduce over-prescription of opiates. Patients who are seen and diagnosed with a number of ICD-10 codes for back pain will be eligible for three free sessions of either physical therapy or chiropractic care without needing to see a referring physician first. This does not change individual UHC carrier's policy on the requirements for conservative treatment prior to surgical intervention, but will increase access to initial evaluations by physical therapists and chiropractors by giving UHC patients three visits for free.

Anthem Policy on Intraoperative Neurophysiological Monitoring

In September, Anthem requested input from the AANS and CNS on a policy regarding intraoperative neurophysiological monitoring. The proposed policy established several criteria for utilization of intraoperative monitoring that would be required to be present for IOM to be medically necessary. It also stated that IOM would not be medically necessary for routine lumbar or cervical laminectomy or fusion in the absence of myelopathy or other complicated conditions. Our response cited the DSPN Updated Position Statement on Intraoperative Electrophysiological Monitoring from January 2018. We recommended that IOM be considered necessary based not only on the pre-operative neurological condition of the patient, but also based on the surgical approach. We recommended that the policy include language to include IOM as medically necessary for lateral retroperitoneal or trans-psoas approaches, as IOM should be utilized for those procedures. In addition, we feel that it should be at the discretion of the surgeon as to whether IOM will be a medically necessary diagnostic tool during a specific surgical intervention. Our recommendations were sent to Anthem, and we await any changes in the policy.

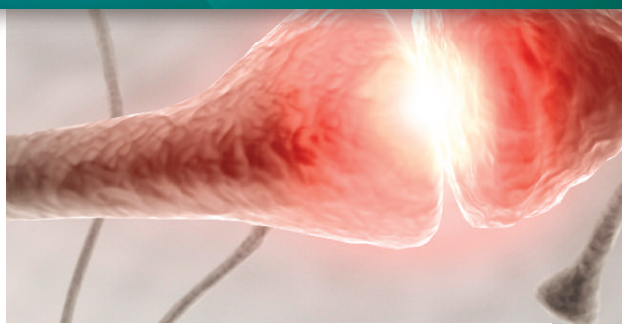
Medicare Inpatient Only Surgical Procedure List

Medicare proposed a change which would remove the following codes from the 2020 Medicare Inpatient Surgical Procedure List:

- **CPT Code 22633 and 22634:** Arthrodesis, combined posterior or posterolateral technique with posterior interbody technique including laminectomy and/or discectomy sufficient to prepare interspace (other than for decompression), single interspace and segment; lumbar. (22634 = each additional level)
- **CPT Code 63265, 63266, 63267, 63267:** Laminectomy for excision or evacuation of intraspinal lesion other than neoplasm, extradural. (63265 = cervical; 63266 = thoracic; 63267 = lumbar; 63268 = sacral)

The Payer Response Committee drafted a letter to CNS which agreed with the removal of the codes from the Inpatient Only List, but recommended that treatment for these codes be allowed in the inpatient setting for patients who need a higher level of care, or have a higher level of co-morbidities which would make the inpatient setting more appropriate.

The Payer Response Committee will continue to monitor changes in payer policies that would adversely affect patient's access to appropriate surgical care.



Novel Uses of Nerve Transfers

Thomas J. Wilson, M.D., and Wilson Zack Ray, M.D.

Nerve transfer, or neurotization, is a surgical technique that has traditionally been utilized to restore function after traumatic nerve or brachial plexus injuries. The technique involves transferring a donor nerve with an expendable or redundant function to a recipient nerve that has lost function. The Oberlin nerve transfer revitalized this technique due to its impressive and reproducible results.[1,2] Ultimately, the number of motor nerve transfers has markedly expanded.[3] More recently, the nerve transfer technique has been applied in a number of novel ways outside of the scope of traumatic nerve injuries.[4] The applications include the treatment and prevention of post-amputation neuromas, sensory reinnervation to the extremity and cornea, stroke and other spastic hemiplegia, and spinal cord injury. The technique is also being applied to non-traditional nerve injuries for motor restoration, such as Parsonage-Turner syndrome, post-infectious neuritis, and postoperative C5 palsy after cervical spine surgery.

Unilateral spastic paralysis that results from ischemic stroke, traumatic brain injury, or cerebral palsy can be extremely debilitating, both due to the limitation in function and the pain that ensues from the spastic posture. Zheng and colleagues hypothesized that functional improvements may be seen if a connection could be established between the ipsilateral, unaffected cerebral hemisphere and the affected limb and proposed contralateral C7 nerve transfer for patients with unilateral spastic hemiplegia.[5] In this technique, the C7 nerve/middle trunk on the unaffected side is used as a donor, tunneled across the prevertebral space, and coapted to the C7 nerve on the affected side. Zheng and colleagues found in a randomized, controlled trial comparing contralateral C7 nerve transfer plus rehabilitation against rehabilitation alone that patients undergoing contralateral C7 nerve transfer showed improvement in functional metrics for the affected upper extremity, improvement in spasticity, and improved range motion. Furthermore, they demonstrated using functional MRI that over 12 months there is a transition from activation of only the contralateral cerebral hemisphere when attempting to move the affected limb to primarily activation of the ipsilateral cerebral hemisphere, supporting the idea of a functional connection.[5] Based on these data, this technique bears consideration, but replication of these data is warranted before full adoption of the technique. In addition, understanding the relative contributions to the observed improvement of the C7 neurectomy on the affected side compared to the nerve transfer is also important and requires further study. Nonetheless, referral to a nerve surgeon for patients with unilateral spastic hemiplegia in order to discuss this surgical option is reasonable.

We have discussed nerve transfers for spinal cord injury in a previous edition of this newsletter. This technique relies on nerves originating from spinal levels above the zone of spinal cord injury to serve as donors for recipient nerves originating at the level of injury (typically a mixed upper and lower motor neuron injury) or below the spinal cord injury (an upper motor neuron injury) that have lost function. Typical targets for restoration include the diaphragm to help reduce the need for mechanical ventilation, triceps to aid in transfers and to power a manual wheelchair, pinch to aid in powering a motorized wheelchair, and wrist/finger extension to aid in grasp and release. When deciding how long to wait for potential spontaneous recovery, it is important to distinguish between nerves with a lower motor neuron component to the injury and those with a pure upper motor neuron injury. When there is a lower motor neuron component, this must be treated like a peripheral nerve injury, with the nerve transfer window being approximately 1 year post-injury. For those with a pure upper motor neuron injury, the window is much longer, but while theoretically limitless, we have found that target muscles below the level of injury still develop fibrillation potentials and ultimately become unreceptive to reinnervation, making extremely delayed nerve transfers ineffective. We have also found that extensor reinnervation seems to be more reliable than flexor reinnervation.[6,7] The role for nerve transfers versus tendon transfers and the optimal time window for each are still in evolution. The management of spinal cord injury patients requires multidisciplinary care, with involvement of a nerve surgeon on the team, in order to maximize functional recovery. Early referral facilitates timely evaluation to characterize the injury, in order to avail the patient of the full gamut of surgical options.

Another recent advance is the use of a nerve transfer technique referred to as targeted muscle reinnervation (TMR) for the prevention and treatment of post-amputation neuroma and phantom limb pain. Nerve pain, including phantom limb pain, following amputation occurs due to neuroma formation and deafferentation. TMR involves the identification of intact small nerve branches to muscle present on the residual limb, using these branches as recipients, transferring the major transected nerves to these muscle branches. This technique has proven successful. Utilizing this technique to treat phantom limb pain and neuroma-related residual limb has been shown to be beneficial in comparison to standard neurectomy.[8] Furthermore, the use of TMR at the time of amputation seems to reduce the incidence of phantom limb pain and neuroma formation.[9,10] While not clearly superior to

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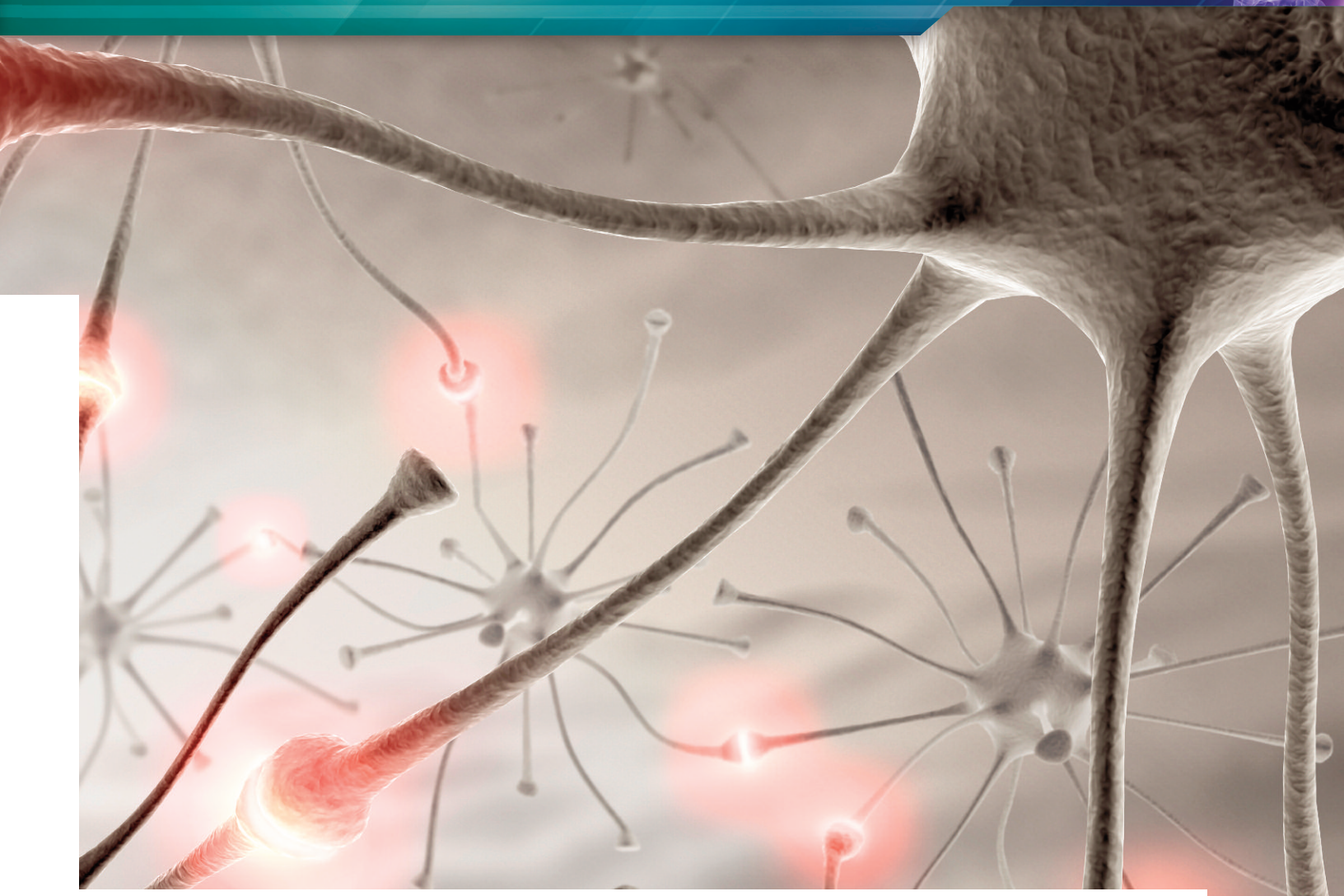

other proposed techniques such as creation of regenerative peripheral nerve interfaces or the nerve-to-nowhere technique, the evidence supports the role of targeted muscle reinnervation in the prevention and treatment of post-amputation neuroma and phantom limb pain.

The uses of nerve transfer surgery continue to expand. This is an exciting time in the world of nerve surgery, as the continued expansion is opening the door to treating new patient populations. Lack of awareness of these techniques continues to be a major barrier to implementation. Building awareness will hopefully result in improved outcomes as timely referral to peripheral nerve specialists increases.

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Transition to Practice:
Resources for Neurosurgical Trainees

Zachary A. Medress, M.D. and Anand Veeravagu, M.D.

The end of residency and fellowship training marks a time of tremendous growth and transition as neurosurgical trainees take on the responsibility of becoming autonomous providers of neurosurgical care. Although seven to eight years of neurosurgical training provides ample opportunities to hone our technical, clinical, and interpersonal skills, neurosurgical graduates may find themselves less prepared to negotiate the nuances of coding, billing, insurance authorization, and medico-legal challenges, particularly in an era of monumental flux in American health care policies and practice.

The AANS, CNS, and SNS provide numerous resources to facilitate this important transition for senior residents, fellows, and recent graduates. The SNS offers a full day course at the AANS annual meeting for senior residents focusing on how to build a successful practice, incorporate advance practice providers (APPs) into the neurosurgical team, and how to successfully utilize outpatient surgery centers. The CNS offers a two-day course in August entitled "The Basis of a Rewarding Neurosurgical Career: A Career Guide for New Attending Physicians and Fellows" emphasizing how to build a solid local reputation early in one's career, how to successfully prepare for case submission for ABNS certification, and how to navigate indication "gray areas" within each neurosurgical sub-specialty.

In order to prepare neurosurgeons to negotiate the complex and changing landscape of coding reimbursements, the AANS offers a multitude of resources for novice, intermediate, and advanced levels. Their online resources are very well organized with offerings such as "Top 10 Neurosurgical Procedures and How to Code Them" and "Introduction to Neurosurgical Coding with Anatomy and Terminology." Once graduates have obtained a solid foundation in coding principles, they may attend the AANS' three-day course "Reimbursement Challenges in Neurosurgery" taught by expert faculty from the AANS in order to gain expert-level coding and reimbursement knowledge. Together, these online resources and courses provide the tools, guidance, and framework for neurosurgical trainees to build a successful and rewarding career.

CPT Update

Cheerag Upadhyaya, M.D.

On June 22, 2019, the leaders of the AANS, the CNS, and NASS met to discuss coding and coverage issues and to achieve consensus on the language to clarify CPT guidelines for reporting arthrodesis and decompression codes **22633** and **63047** at the same interspace. The guidance was requested by the AMA CPT Assistant Editorial Board and the CPT Editorial Panel. In the May 2018 AMA CPT Assistant publication the AMA, after much advocacy from the AANS and CNS (supported in large part by the efforts of John Ratliff, Luis Tumialan, and Joseph Cheng[1]; and discussed at length in prior DSPN Newsletters) published a correction to an October 2016 erroneous Frequently Asked Question (FAQ) concerning the reporting of arthrodesis and decompression codes 22633 and 63047 at the same interspace. As a part of the agreement to do so, the AMA asked for a Code Change Application (CCA) clarifying language in the introductory sections for arthrodesis and laminectomy codes.

Following the meeting with the leadership of the AANS, the CNS, and NASS on June 22nd, 2019, the decision was made to develop an updated CCA reflecting the mutual concerns of the three societies. An updated CCA was developed and submitted on July 3rd, 2019, for consideration at the September 2019 CPT Editorial Panel Meeting. The proposal was presented at the September CPT meeting, however the panel members raised additional questions. Consequently, a revised proposal will be submitted in November for consideration at the February 2020 CPT Editorial Panel Meeting.

The CPT Committee of the DSPN continues to work on behalf of the DSPN members in conjunction with the AANS, the CNS, and other spine societies to ensure that the work of our members is fairly valued.

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Peripheral Nerve
Updates for DSPN Members

Line Jacques, M.D.

1. **The Peripheral Nerve Business Dinner** during the 2019 CNS Annual Meeting will be held on Sunday, October 20, 2019, at 6:30 PM at La Mar Pier 11/2 The Embarcadero, San Francisco, CA 94111. https://www.google.com/maps/place/La+Mar+Cebicheria+Peruana/@37.797387,-122.395196,15z/data=!4m5!3m4!1s0x0:0xaa881a41cd0c4037!8m2!3d37.797387!4d-122.395196

2. **The 2020 Kline lecture** will be presented by Dr. Mario G. Siqueira (University of Rio de Janeiro, Brazil) on Tuesday, April 28, 2020, during the AANS meeting in Boston, Massachusetts. The lecture title is "Evolution of the treatment of neonatal brachial plexus injuries."

3. **The Kline Research Award** will be offered again this year to support either basic or clinical research related to peripheral nerves with funding in the amount of $10,000. The research award provides means of peer review for clinical projects and, therefore, to enhance competitiveness for potential National Institutes of Health (NIH) funding.

Dr. Ilyas Eli (Dr. Mark Mahan, University of Utah) will present a talk entitled "Schwann cell delivery via enhanced collagen-glycosaminoglycan tubes to improve outcome from critical length nerve gap repairs" on Wednesday, April 17, 2019, during the AANS Annual Meeting in San Diego.

4. **The winner of the 2019 Kline Research Award is Dr. Christopher F. Dibble from St. Louis, MO, on Optimizing Nerve Regeneration.**

5. **Kline NREF Fund "Honor your mentor"** is on the NREF website. If you would like to contribute to the fund, please visit the Kline NREF Fund website: http://www.nref.org/donate

   Note that the Peripheral Nerve Division leadership controls the use of the NREF PN funds (including the Kline fund) for research or education, within the guidelines of the NREF.

6. Upcoming meetings

ASPN Annual Meeting, January 10-12, 2020, Marriott Harbor Beach, Ft. Lauderdale, Florida.
http://www.peripheralnerve.org/meeting

24th Meeting of the Sunderland Society, November 3-6, 2019, Jerusalem, Israel.

The 6th annual Peripheral Nerve Dissection Course, "The Kline Legacy," in New Orleans, Louisiana, will take place in February 7-8, 2020.

WFNS 5th theoretical & practical international course in peripheral nerve & brachial plexus surgery will be in Rio de Janeiro, Brazil. Date TBD.

Email your suggestions, meeting information, or other newsletter topics to: Khoi D. Than, MD khoi.than@duke.edu

SpineSection NEWSLETTER
AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves

American Association of Neurological Surgeons and the American Association of Neurosurgeons
Congress of Neurological Surgeons — Education and Innovation

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