



Neurosurgical Forum

LETTERS TO THE EDITOR

Hidden traces of the exemplary mentorship of Harvey Cushing in Europe

TO THE EDITOR: Harvey Cushing's role in the establishment of neurosurgery as an independent branch of medicine and in expounding its basic principles is credited around the world. An article by Catalino and Laws¹ published in the *Journal of Neurosurgery* not only provides clear evidence of Cushing's mentorship in the US, but also sheds light on and offers further evidence of the ways in which his legacy spread across Europe (Catalino MP, Laws ER Jr. Exemplary mentorship in action: Harvey Cushing's trainees from 1912 to 1919. *J Neurosurg.* 2021;134[2]:343–350). Some physicians from the US who studied under Cushing worked and shared their knowledge in Europe, and some European surgeons, such as Adams Andrew McConnell, a pioneer of Irish neurosurgery, visited Cushing in the US and had the opportunity to benefit from Cushing's mentorship directly.²

However, it is also possible to see traces of Cushing in physicians who never worked with or even met him. Thus, the neurosurgical movements begun by Cushing in the US can be thought of as a starting point of a domino effect that brought benefits to others far away. The establishment of neurosurgery in Europe was affected by Cushing's mentorship both directly and indirectly. For example, in Turkey, Hami Dilek visited French pioneers, such as Clovis Vincent and Thierry de Martel, who were pupils of Cushing and the pioneers of French neurosurgery; Dilek then established the first independent Department of Neurosurgery in Turkey in 1949.³ Dilek and his student Aysima Altınok,⁴ who became the first female neurosurgeon in Turkey in 1959, adopted Cushing's qualities as a dedicated scientist, pioneer, physician, surgeon, and medical illustrator. Similarly, Dimitrie Bagdasar, who trained under Cushing, conveyed Cushing's legacy to Lenke Horvath, a pioneering female neurosurgeon and the founder of the first pediatric neurosurgery department in Romania.⁵ Thus, Cushing's teachings are clearly observable not only in the US, but also in Europe, both directly and indirectly. In conclusion, the impact of worthy role models in transferring neurosurgical knowledge and techniques to future generations and thus developing ethical neurosurgeons cannot be denied,^{6,7} and a glimpse into the establishment of neurosurgery in Europe clearly proves the ongoing impact of Cushing's legacy.

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Response

We are delighted to see Dr. Naci Balak's interest in our paper on Harvey Cushing's legacy of exemplary mentorship, and we thank the Editor-in-Chief for allowing us to respond to this letter.

The traces of exemplary mentorship in global organized neurosurgery are like seeds planted in the fertile hearts and minds of surgeons already destined to be pioneers. In fact, Harvey Cushing's focus on international collaboration is not surprising given that his interest in neurosurgery during medical school may, in part, be credited to Sir Victor Horsley.¹ Horsley demonstrated neurosurgical procedures to John Wheelock Elliot when Elliot, a surgeon at Massachusetts General Hospital, visited Horsley

in 1889. After the end of World War I, Cushing himself began hosting international visitors. We recently completed a monumental effort to highlight their contributions.¹ At least 32 international visitors were formally engaged as “voluntary graduate assistants” under Cushing at the Peter Bent Brigham Hospital according to the annual reports. We acknowledge that the global influence of Cushing surpasses the records we examined; thus, we thank Dr. Balak for highlighting the contributions of Irish pioneer Adams Andrew McConnell and others.²

In 1928, a proposal was made to the council of the American Neurological Association for an International Neurological Congress.^{3,4} Although Bernard Sachs was ultimately elected as president of the Congress, Harvey Cushing was both its champion and its focus. Cushing had just completed his 2000th brain tumor operation before returning, fully matured as a surgeon-scientist, to Berne for the Congress meeting in 1931, where he would be accompanied by preeminent neurologists and neurosurgeons from around the world. Berne was the birthplace of his lifelong friend Arnold Klebs⁴ and, arguably, where Cushing emerged as “the great philosopher of the central nervous system.”³ Despite the palpable global energy behind neurosurgery as a new “school” of medicine, there was a sense of finality from its leader, likely because of Cushing’s deteriorating physical health. After Cushing described his dramatic reduction in the mortality rate of cerebral operations, he charged future generations to pick up where he left off.³ It would be his last statistical report on his life’s work.

Harvey Cushing did not just share knowledge and skill. Arnold Klebs said that he “had the rare gift of friendship.”⁴ We live in tumultuous times, when differences too often divide us. As an international neurosurgical community, we must continue to strive toward a greater sense of camaraderie and friendship as we seek to improve the lives of our patients and live full meaningful lives ourselves.

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Exploring cognitive functions in low-grade glioma surgery

TO THE EDITOR: We read with great interest the article by Rijnen et al.¹ (Rijnen SJM, Kaya G, Gehring K, et al. Cognitive functioning in patients with low-grade glioma: effects of hemispheric tumor location and surgical procedure. *J Neurosurg.* 2020;133[6]:1671–1682). The article deals with a central issue in modern neurooncological surgery as the growing understanding of neurocognitive function is changing the approach to low-grade glioma (LGG) surgery. A critical analysis of intraoperative stimulation mapping (ISM) impact is, hence, of utter importance. Therefore, we congratulate the authors for addressing such a timely topic.

However, after a careful analysis of the article, several concerns arise and, in particular, some regarding the methodology, which may have affected the authors’ conclusions.

The concern is in regard to the final message of the paper, surprising and in partial contrast to the current literature, concluding that ISM assessment does not positively influence clinical outcome in LGG surgery. Even though the authors stated this in their study limitations, we observe that a major selection bias stands behind the entire structure of the analysis: patients selected to undergo an ISM-guided surgery, in fact, are indeed those who display lesions in areas at greater risk of neurological sequelae and thus are a priori more susceptible to cognitive postoperative impairment.

Second, little information is given about glioma localization. In the statistical analysis, the comparison is limited to right- versus left-sided tumors. Other important information, such as eloquent areas of involvement, or affected lobe, is not taken into account (whose impact would be significant).

Moreover, the authors did not analyze sufficiently the extent of resection, which was only considered as a homogeneity factor between groups. Instead, extent of resection has been associated in several studies with an improvement in survival, nevertheless with a higher risk of neurological sequelae.^{2,3}

A third concern relates to the timing of postoperative tests. The final evaluation was conducted 3 months after surgery, a period of time too short to obtain a conclusive and reliable neurocognitive evaluation, since patients are still in a physiological recovery curve of cognitive functions.⁴

Finally, we have some doubts about the choice of neuropsychological tests that were administered preoperatively and postoperatively. Aside from verbal and visual memory tests, the other functions investigated in the entire battery are largely influenced by executive functions and psychomotor speed, the same functions that are altered in individuals who have undergone surgery for LGG, especially considering the relatively early times for the final evaluation.

It is worth noting that the authors provided very limited information on the neuropsychological protocol followed intraoperatively, about what language functions (Naming? Comprehension? Repetition? Writing? Reading?) were tested intraoperatively, since the neuroanatomical substrate of language encompasses a broad network (mainly, but not exclusively, in the left hemisphere). This issue, together with the lacking analysis of intrahemispheric localization, makes interpretation of the results difficult, especially considering that ISM represents the core of the study.

Notwithstanding these remarks, we recognize that this paper encourages a critical reflection on central and current aspects of the intra- and perioperative management of LGG patients, highlighting the preponderant role of neurocognitive aspects endorsing a broader awareness of a patient-oriented outcome in the functional/oncological balance in LGG surgery.

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Response

No response was received from the authors of the original article.

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