



2020

The Many Worlds of Neurosurgery and the Labyrinth of Borges

Juan F. Villalonga

Universidad Nacional de Tucuman, San Miguel de Tucuman, Tucuman, Argentina, jfvillalonga@gmail.com

Giulia Guizzardi

Università degli Studi di Napoli Federico II, Naples, Italy, giuliaguizzardimd@gmail.com

See next page for additional authors

Follow this and additional works at: <https://www.ansjournal.org/home>



Part of the [Educational Methods Commons](#), [Neurosurgery Commons](#), and the [Special Education and Teaching Commons](#)

Recommended Citation

Villalonga, Juan F.; Guizzardi, Giulia; and Solari, Domenico (2020) "The Many Worlds of Neurosurgery and the Labyrinth of Borges," *Archives of Neurosurgery*. Vol. 1 : Iss. 2 , Article 6.

Available at: <https://www.ansjournal.org/home/vol1/iss2/6>

This Neurosurgery culture and International relationships is brought to you for free and open access by Archives of Neurosurgery. It has been accepted for inclusion in Archives of Neurosurgery by an authorized editor of Archives of Neurosurgery. For more information, please contact ansjournal.israel@gmail.com.

The Many Worlds of Neurosurgery and the Labyrinth of Borges

Abstract

Nowadays, an apprentice of neurosurgery has to complete long and different pathways of education. The encounter between the schools of Napoli and Tucuman, make us identify a common strategy of neurosurgical education. In attempt of defining the philosophy behind it we attempt a comparison in between the life and training of a modern neurosurgeon and the character of a tale of Borges (i.e. Ts'ui Pên). As neurosurgeons of the 21st century we must be like the inextricable Ts'ui Pên.

Visual Abstract

Keywords

Neurosurgical training, surgical education, teamwork

Creative Commons License



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

Cover Page Footnote

NOTES Conflict of interest: The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript. Funding source: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authors

Juan F. Villalonga, Giulia Guizzardi, and Domenico Solari

The Many Worlds of Neurosurgery and the Labyrinth of Borges

Juan F. Villalonga ^{a,*}, Giulia Guizzardi ^b, Domenico Solari ^b

^a LINT, Facultad de Medicina, Universidad Nacional de Tucumán, Tucumán, Argentina

^b Department of Neurosciences, Reproductive and Odontostomatological Sciences, Division of Neurosurgery, Università degli Studi di Napoli Federico II, Naples, Italy

Abstract

Nowadays, an apprentice of neurosurgery has to complete long and different pathways of education.

The encounter between the schools of Napoli and Tucuman, make us identify a common strategy of neurosurgical education.

In attempt of defining the philosophy behind it we attempt a comparison in between the life and training of a modern neurosurgeon and the character of a tale of Borges (i.e. Ts'ui Pên).

As neurosurgeons of the 21st century we must be like the inextricable Ts'ui Pên.

Keywords: Neurosurgical training, Surgical education, Teamwork

Over the last decades, the discipline of neurosurgery has evolved at a vertiginous pace. Therefore, young neurosurgeons face a real dilemma in their first steps in life: they need to create a solid backbone of theory, to lean the training toward their favorite field of knowledge, and, above all, to enter their network guild to share ideas. Hence, they must continue medical education, practice surgical skills, produce research, attend congresses and symposia, embrace technological advances, learn foreign languages, acquire political skills, and keep human-sensitive while providing healthcare, among the others.

Should a single person demonstrate all these skills? Or, should the neurosurgeon of the twenty-first century focus on a single interest?

We will try to identify this common thread, which could be considered the main path of education in neurosurgery, paralleling the thinking of the renowned writer Jorge Luis Borges.

1. The surrealistic paths of Borges

The Argentinian literate Jorge Luis Borges published a tale in 1941 entitled “The Garden of the

Forking Paths.” It is a police piece where Yu Tsun, a spy, and the protagonist, is chased by Captain Richard Madden. Yu Tsun aims to kill a wise sinologist, Stephen Albert. The victim recognizes Yu Tsun as the great-grandson of Ts'ui Pên, a Chinese astrologer famous for having defined two impossible tasks: building an infinitely complex maze and writing an endless book. Albert reveals to Yu Tsun that he has discovered the enigmatic secret behind the ideas of his ancestor; the book is a labyrinth, non-spatial but temporary [1].

In a paragraph of the tale, we can read:

“In all fictional works, each time a man is confronted with several alternatives, he chooses one and eliminates the others; in the fiction of Ts'ui Pên, he chooses, simultaneously, all of them. He creates, in this way, diverse futures, several times, which themselves also proliferate and fork. Here, then, is the explanation of the novel's contradictions” [2].

This paradox has gained further relevance thanks to the famous works in Physics of Hugh Everett III. He published his Ph.D. thesis “The Relative State Formulation of Quantum Mechanics” in 1957.

In section five of the original study, Everett says:

Received 30 June 2020; revised 19 January 2021; accepted 6 August 2021.
Available online 28 January 2022

* Corresponding author. LINT Facultad de Medicina, Universidad Nacional de Tucuman, Lamadrid 875, San Miguel de Tucuman, Tucuman, Argentina.
E-mail address: jvillalonga@gmail.com (J.F. Villalonga).

ISSN-Pending. Published by Mexican Society of Neurological Surgery (Sociedad Mexicana de Cirugía Neurológica A.C.). © Copyright the Authors. This journal is open access.

“The trajectory” of the memory configurations of an observer performed sequence is thus not a linear sequence of memory configurations, but a branching tree, with all the possible outcomes existing simultaneously in a final superposition with different coefficients in the mathematical model” [3].

Both the American physicist and the Argentinian writer present the idea strikingly similar: the garden is the image of the universe as Ts'ui Pên conceived it, and if we accept Everett's hypothesis, the world is a garden of forking paths [1].

2. The crossing routes of current neurosurgery

Nowadays, neurosurgery embraces a conspicuous number of subspecialties, and, accordingly, an apprentice of this art has to complete long and different pathways of education.

2.1. Surgical techniques

Along with the development of the various surgical procedures, the innovations and advancements in visualization, lighting, and magnification of the surgical field can be definitely advocated as keystones. We can date the first true revolution in 1957 when Kurze moved his efforts to introduce the microscope in neurosurgery [4]; at that time, Yasargil began his legacy to be later recognized by a whole generation of neurosurgeons as a real quantum leap for understanding and practice. In the following years, the need to unveil the hidden corners and shady areas without completing extensive opening and bone removal, especially at the skull base, afforded the introduction and widespread of the endoscope in neurosurgical procedures. It was helpful in the navigation of ventricles, in removing sellar tumors and accessing the median and paramedian skull base [5,6,7]. More recently, the exoscope - offering a concrete synthesis of the features of the two tools - has been developed and brought into the neurosurgical community [8]. We should admit that these three visualizing resources have independently pushed the development of so many different surgical techniques in quite a short time. Each one of them requires specific training and a good learning curve to achieve adequate confidence. In this environment, the young neurosurgeon acquires advanced skills and may opt for one of the ways, but they should be trained in as many techniques as possible.

2.2. Surgical praxis

Various training programs have been developed according to the level of surgical practice, which

Abbreviations

e.g. exempli gratia

residents need to acquire [9] particularly we underline the relevance of refining praxis. It is crucial to have adequate case-load in the training center [10], practice various exercises outside the time of surgery, and attend the hands-on courses [11]. Today, the selective and dedicated environment of the different fields of neurosurgery allowed the young practitioners to acquire praxis through intensive training focused on the peculiar skills of the specific procedures.

2.3. Anatomical knowledge

The key to achieving an adequate understanding of a surgical technique is the knowledge of anatomy [12,13]; we firmly believe that cadaveric dissection rehearsal is mandatory.

2.4. Research and technological advances

Scientific research is the cornerstone to build knowledge and advancement in practice [14,15]; it also allows sharing achievements in the community and congresses and symposia. For these reasons, the young neurosurgeon must be at the forefront of technological advances, but at the same time, it should be acquired judiciously.

2.5. Politics and humanitarian medicine

Socially, neurosurgeons are expected to handle controversies, support teammates, and evenly provide the best possible neurosurgery. This requires a high dose of generosity and desire to fight against injustice: it also invokes a mixture of romanticism, utopia, and spirit of adventure, along with political skills [16,17].

3. The many worlds of the neurosurgeon's life in the twenty-first century

The encounter between Napoli and Tucuman's schools makes us identify a common strategy of education many young staff neurosurgeons have run to complete their training. To define the philosophy behind it, we attempt to compare the social life and professional training of a modern neurosurgeon and the character of the tale of Borges.

The twentieth century's surgeon, whenever challenged with the different activities, opts for one (e.g.,

operating room) and eliminates the others (e.g., research); the multifaceted surgeons of the twenty-first century, should opt “simultaneously” for all: in this way, they move along several routes, adopt new ideas, which also proliferate and bifurcate and indeed progresses. Therefore, as young avant-garde neurosurgeons, we should strive to acquire knowledge of the multiple worlds to ensure the most adequate and complete neurosurgical care [18].

As neurosurgeons of the twenty-first century, paraphrasing Borges, we must be like the inextricable Ts'ui Pên.

Funding source

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Financial disclosure

No.

References

- [1] Alberto R. Borges y la física cuántica: un científico en la biblioteca infinita, vol. 1. Buenos Aires; 2013.
- [2] Luis B.J. Ficciones. Buenos Aires. 1944.
- [3] III EH. Relative state formulation of quantum Mechanics, vol. 29. Reviews of Modern Physics; 1957. p. 454–78.
- [4] Kriss TC, Kriss VM. History of the operating microscope: from magnifying glass to microneurosurgery. *Neurosurgery* Apr 1998;42(4):899–907. discussion 907-898.
- [5] Cappabianca P, Cinalli G, Gangemi M, Brunori A, Cavallo LM, de Divitiis E, et al. Application of neuroendoscopy to intraventricular lesions. *Neurosurgery* Feb 2008;62(Suppl 2):575–97. discussion 597-578.
- [6] Carrau RL, Jho HD, Ko Y. Transnasal-transsphenoidal endoscopic surgery of the pituitary gland. *Laryngoscope* Jul 1996;106(7):914–8.
- [7] Cappabianca P, Alfieri A, de Divitiis E. Endoscopic endonasal transsphenoidal approach to the sella: towards functional endoscopic pituitary surgery (FEPs). *Minim Invasive Neurosurg* Jun 1998;41(2):66–73.
- [8] Mamelak AN, Danielpour M, Black KL, Hagike M, Berci G. A high-definition exoscope system for neurosurgery and other microsurgical disciplines: preliminary report. *Surg Innovat* Mar 2008;15(1):38–46.
- [9] Burkhardt JK, Zinn PO, Bozinov O, Colen RR, Bertalanffy H, Kasper EM. Neurosurgical education in Europe and the United States of America. *Neurosurg Rev* Oct 2010;33(4):409–17.
- [10] McLaughlin N, Laws ER, Oyesiku NM, Katznelson L, Kelly DF. Pituitary centers of excellence. *Neurosurgery* Nov 2012;71(5):916–24. ; discussion 924-916.
- [11] Yadav YR, Parihar V, Ratre S, Kher Y, Iqbal M. Micro-neurosurgical skills training. *J Neurol Surg A Cent Eur Neurosurg* Mar 2016;77(2):146–54.
- [12] Frati P, Frati A, Salvati M, Marinozzi S, Frati R, Angeletti LR, et al. Neuroanatomy and cadáver dissection in Italy: history, medicolegal issues, and neuro-surgical perspectives. *J Neurosurg* Nov 2006;105(5):789–96.
- [13] Cappabianca P, Magro F. The lesson of anatomy. *Surg Neurol* May 2009;71(5):597–8. discussion 598-599.
- [14] Yucel K. Research and publishing in neurosurgery. *Wien*. 2002.
- [15] Black PM. Challenges in contemporary academic neurosurgery. *Neurosurgery* Mar 2006;58(3):419–25. discussion 419-425.
- [16] Lapierre F. Humanitarian medicine: what is the role of neurosurgery? *Acta Neurochir (Wien)* 2007;149(5):445–51. discussion 451-443.
- [17] Cappabianca P, Magro F. Leadership. *Surg Neurol* Sep 2007; 68(3):354–5.
- [18] Stranjalis G. The overproduction of neurosurgeons jeopardizes future neurosurgical care. *Surg Neurol* Apr 1996;45(4): 314–9.