Book Review: *Rhoton's Atlas of Head, Neck, and Brain: 2D and 3D Images*

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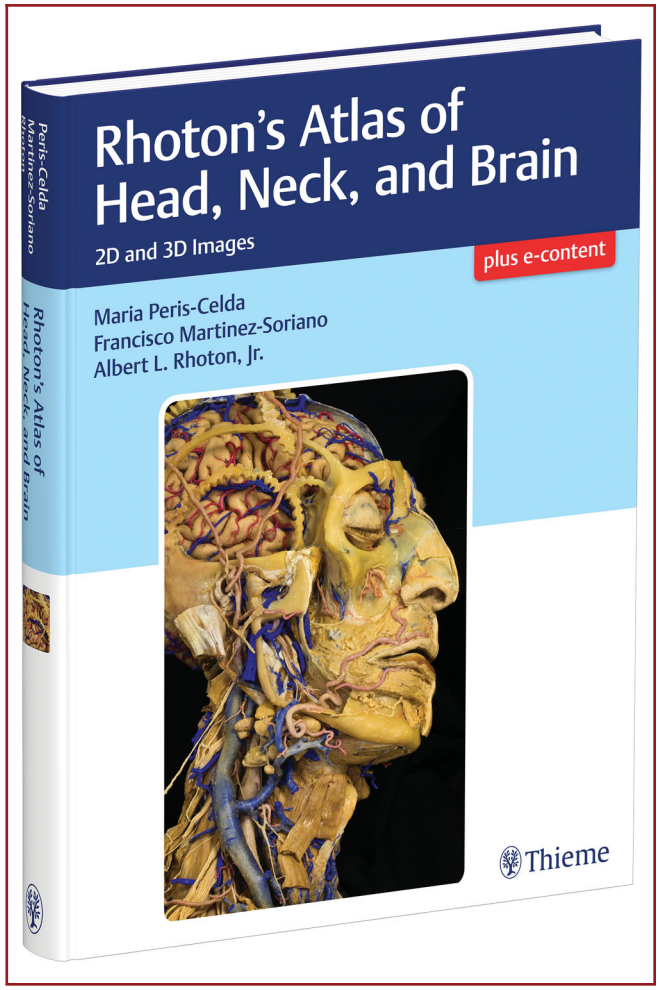
Rhoton's Atlas of Head, Neck, and Brain: 2D and 3D Images is the crown jewel of the books authored by Dr Rhoton and his fellows and colleagues subsequent to his bestsellers *Atlas of Facial Nerve and Related Structures*, *The Orbit and Sellar Region: Microsurgical Anatomy and Operative Approaches*, *Rhoton's Cranial Anatomy and Surgical Approaches*, and *Color Atlas of Cerebral Vascularization: Anatomy, Techniques, Clinical Cases*.

Rhoton's Atlas of Head, Neck and Brain is 623 pages and includes 624 total color two-dimensional (2D) figures in the book and three-dimensional (3D) figures in the online E-version of book. 3D glasses are also provided for viewing the 3D online E-version of the book. It is subdivided into 4 parts:

1. Osteology of the Head and Neck: (1) Adult and Fetal Skull; (2) Bones of the Skull and Skull Bone Articulations; (3) Cervical Vertebrae
2. Face and Neck: (4) Face: Superficial Dissection; (5) Face: Deep Dissection, (6) Anterior Aspect of the Neck: Superficial dissection; (7) Anterior Aspect of the Neck: Deep Dissection; (8) Posterior Aspect of the Neck; (9) Parapharyngeal Dissection
3. Ear, Nose, Pharynx, Larynx, and Orbit: (10) External and Middle Ear; (11) Internal Ear; (12) Nose: Sagittal Dissection; (13) Nose: Coronal Dissection; (14) Endonasal Endoscopy; (15) Pharynx; (16) Larynx; (17) Orbit; (18) Eye and Orbital Contents; (19) Internal Structure of the Eyeball
4. Neuroanatomy and the Cranial Base: (20) Cerebrum; (21) Cerebellum and Brain Stem; (22) Brain, Meninges and Sutures; (23) Cerebrovascular and Intraventricular Dissection; (24) Cranial Base and Craniocervical Junction; (25) Sagittal and Endoscopic Dissection of the Cranial Base; (26) Cranial Nerves; (27) Brain Sections; (28) Fiber Dissection of the Brain

All images in the book include a title with a description of the view (eg, lateral, posterior, inferior, etc) and the side (ie, left, right). Furthermore, the images have an anterior/posterior, right/left, superior/inferior orientation. In the "Neuroanatomy and the Cranial Base" section, the *Atlas* provides anatomic specimen pictures not only in axial, coronal, and sagittal cuts, but



also with various fiber dissection specimens in both 2D and 3D, thus providing a unique appreciation of anatomy.

A lot is known about the work of Dr Rhoton and his fellows; however, the original dissection techniques they have developed to enhance better understanding of microsurgical central nervous system anatomy and the complex spatial relationship of many different anatomical structures is underappreciated and less well-known. This original artistic approach to anatomic dissection and the symbiosis of anatomy, neurosurgery, and artistry has significantly improved upon previously used traditional anatomic techniques.

In part I of the *Atlas*, for example, the skull is presented as a whole in all projections. The authors then separated individual bones, which were also presented in different projections and from different angles with arteries, veins, and nerves traced in color as they traverse via different foramina, hiatuses, and sulci. The superior-inferior and anterior-posterior views of the inside

skull vault and skull base help one to appreciate the bone anatomy much better "from the inside."

In part II, various areas of the face and neck were dissected while preserving some areas of skin, ears, lips, eyes, nose, cartilage, bones, and muscles in situ, thus helping to better understand the complex layered and spatial anatomic relationships. The same is true for specimens in which one side of the face or neck is dissected and the other side is kept completely or partially intact. Some organs, such as the pharynx and larynx, were nicely dissected and displayed from different angles while also preserving surrounding arteries, veins, and nerves. Using this method helps to illustrate the important mutual relationships of these structures and provide an in-depth view of potential surgical targets.

In part III, similar techniques were utilized for the ear and temporomastoid area. The dissections explored the middle and inner ears while preserving some superficial parts of the ear, mastoid, parotid gland, and other structures to better appreciate the deep layers of anatomy. The same techniques are used for the orbital and eye dissections, which are particularly impressive because they are done from superior, inferior, medial, and lateral directions.

Finally in part IV, the brain dissections are frequently done in "layers" as well. Central-targeted areas are dissected in-depth while preserving the surrounding areas of brain; in some instances, one side of the brain was dissected and while the other side was preserved to make it easier to understand spatial 3D anatomy. The cerebellum was dissected in a similar fashion. We also have to mention the magnificent anatomic views of the injected brain while preserving isolated cranial bone sutures and dural venous sinuses. The endoscopic endonasal views and dissections utilize the same techniques—deep anatomical dissections while preserving peripheral anatomic elements, such as mucosa, bone, and muscles, which are layered in a way similar to laying roof shingles. Finally, the cranial and spinal nerves and their branches were magnificently dissected and displayed in perfection from their origin to the target organ and from different projections and perspectives.

All pictures include anatomic labeling both in English and Latin. This feature is of particular importance as different anatomic schools throughout the world learn anatomy in two different systems. We can imagine Dr Rhoton smiling at this time since this important function additionally brings two different schools of anatomic nomenclature together symbiotically in one world of neurosurgery.

This book is an irreplaceable teaching and professional tool for all spectrum of neurosurgeons and a must-have book in their library, along with books like *Youmans Neurological Surgery*, Gazi Yasargil's *Microneurosurgery I–IV*, Ossama Al-Mefty's *Operative Atlas of Meningiomas*, Mark Greenberg's *Handbook of Neurosurgery*, and Madjid Samii and Venelin Gerganov's *Surgery of Cerebellopontine Angle Lesions*. As the understanding of anatomy is the pillar of neurosurgery, *Rhoton's Atlas of Head, Neck, and Brain* will serve those interested in pursuing a career in neurosurgery to familiarize themselves with anatomy of their prospective profession. For neurosurgery residents, it will be a daily source of anatomic learning. For young neurosurgeons, it will be a source to solidify their understanding of anatomy. Finally, for seasoned neurosurgeons it will be a resource to check delicate minute anatomic relationships in preoperative planning prior to pursuing delicate procedures. In addition to neurosurgeons, this book will be sought after by specialists and residents in neuroradiology and radiology, otolaryngology, ophthalmology, neurology, surgery, physiatry, nursing, and many other medical specialties.

In addition to thanking Dr Rhoton for this magnificent work, credit goes to all of his fellows who have over many years and decades working with him established the highest standards of neurosurgical publications. This *Atlas* and all its pictures attest the highest possible quality of specimen preparations, blood vessel injections, impeccable and skillful surgical anatomic dissections, and color photography. Particular credit goes to Dr Maria Peris-Celda and Professor Francisco Martinez-Soriano who worked hard for more than 5 yr to fulfill the promise given to Dr Rhoton and deliver this work for publication. What is particularly touching is that the torch of Dr Rhoton's legacy has been carried by his fellows well beyond his professional and natural life. Particular thanks go to generous donors of anatomic specimens, without whose ultimate gift such important anatomic research would not be possible. Last but not least, Thieme should be congratulated for undertaking such a Herculean endeavor with the authors of the *Atlas* to deliver a world class publication.

Disclosure

The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

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