BOOK REVIEW

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3D Atlas of Neurological Disorders

Nowinski WL, Chua BC, Wut Yi SH. 3D Atlas of Neurological Disorders. Thieme, New York, 2015; colour illustrations, ISBN 978-1-62623-173-3. Recommended retail price AUS 286.

The objective of the 3D Atlas, according to the Introduction, is to address neurological disorders resulting from brain damage. A bold assertion. However, there is justification for such a claim as the primary author, Wieslaw Nowinski has produced 35 such brain and neurological atlases. He has a significant number of publications to his name and has received awards and honours for his research. He definitely has pedigree. The other credits go to Beng Choon Chua, project leader with experience in all aspects of system engineering, and Su Hnin Wut Yi, software engineer involved with design and development of object-oriented programming. All three are associated with A*STAR (the Agency for Science, Technology and Research), a Singapore public sector agency involved in research to promote development of innovative technology.

The Atlas is designed for use by medical students, health care generalists, and specialists such as neurosurgeons. This is quite a broad range. It is an advantage in one sense (wider audience), but a disadvantage in another, in that it could be too demanding for students but not up to date, specific or detailed enough for specialists.

The Disclaimer notes that medical knowledge is ever changing. Therefore, the authors are careful to mention the possibility of error. They recognise that any publication in this area may quickly be superseded. This is true for the technology as well as the pathologies. To mitigate against this, the anatomical and pathological information is solid rather than detailing latest research. It is hard to predict how soon the technology will be superseded, but as these authors are on the cutting edge of its development, it is likely they will produce the next version.

Content

Unlike a book, where all you need is a comfortable chair and an imagination, access to this Atlas requires a minimum of 2 GHz Intel Core 2 Duo or higher processor, 1 GB RAM or greater, a graphics card that supports OpenGL 2.1 with at least 512 MB of video memory, a 500 MB hard disc space, a monitor with at least 1280 × 720 pixels resolution and Windows XP Service Pack 2 or later (e.g., Windows 7 or Windows 8) and the English version is recommended. If you understand that, it will be a cinch. If you don’t, it could be costly.

Once the Atlas is installed, it is colourful, visually interesting and clear. Pictorially, all the structures are instantly recognisable. Functionally, you are able to rotate and spin the models, pan, increase and decrease (i.e., zoom in and out). All are useful, especially if you are going to be looking at real images of these structures where spatial recognition is essential to understanding.

The Atlas has two parts: Anatomy and Disorders. The Anatomy section shows normal structures which are categorised according to their function into cerebrum, cerebellum, brain stem, spinal cord, ventricular system etc., all the way through to head muscles, glands and skin. All are fascinating from an anatomist’s point of view. The 3D element is an advantage in that components can be added or removed depending on what you want to see. For example, projecting fibres can be added to an image of the diencephalon. This is thrilling as relational anatomy is a difficult concept and takes a while to grasp.

The Disorders section is divided into three components: (1) labelled anatomical models identifying the area affected by the pathology with a description of it (major signs and symptoms), (2) text book material related to the pathology and (3) a glossary. The pdf files are from standard textbooks so the information is sound without a lot of detailed explanation. They often just flesh out the summary which is in bullet points on the animation. Diagrams are included which are helpful and suit the style of information provided in the rest of the Atlas.

The colour coding of the images is intuitive and helps with identifying and locating the anatomy and its related pathology. For example, the different parts of the middle cerebral artery are coloured slightly differentially as are their branches, which helps identify the pathologies located at the different parts of the artery. The authors describe their system of coding in the Introduction (e.g., . . .aneurysm is a semitransparent sphere of the same colour as the discussed artery . . . . . emboli as white balls . . .), but these are obvious to the educated
viewer without having to read the description. A minor point on presentation; slightly stronger colours and larger fonts for the Disorders panel which outlines the pathologies, might have made it easier to read.

Labelling, always tricky with animations ... actually, even with diagrams in books for that matter, is very accurate. The cursor is delicate and, for example, small differences between deeper cerebral nuclei, the ventricular system and white matter tracts can be distinguished.

But the apogee for me was the ability to super impose tri-planar (MR) images over the 3D animated constructions. This was extraordinary, very skilfully engineered and a delight to play with, not unlike a video game. The only slight difficulty I have with this is that larger structures (the cerebral hemispheres etc.), do not work so well with the superimposition because the real images become completely obscured by the animations. By comparison, the superimposition of deeper structures, for example nuclei, ventricles and white matter tracts etc., over the real images was splendid and would be helpful for students as well as specialists.

A suggestion for the development of this type of 3D Atlas might be to show the progressive changes associated with pathologies. For example, demonstrate the leak of an aneurysm into the cerebrum, the resultant cerebral oedema and displacement of other structures (ventricles, falx etc.). If this could be shown in a progressive sense with colour coding and be linked to the real pathology on image, then that would be extraordinary.

**Conclusion**

I was initially sceptical that this Atlas could show anatomy and related pathology well enough for medical or neurology specialists, but its versatility and comprehensiveness have won me over. It does not claim to replace the real specimen or diagnostic image. Instead, it fits neatly between a textbook and reality, providing something plain paper cannot by emulating the real thing. Those who have good spatial cognitive ability tend to learn and understand anatomy very well. Visual learners will revel in this method of instruction. Those who find neuroanatomy difficult will be thankful this complex subject has been made easier. Also, many students/young professionals are now very familiar with this sort of software and will have no trouble navigating it.

This is a good resource, much as a well-thumbed text book remains on your shelf for many years; this Atlas could be retained as a compendium of information skilfully presented and easy to understand.

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