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Editorial

NeuroMind 2: Interactive decision support for neurosurgery

Pieter Kubben

Department of Neurosurgery, Maastricht University Medical Center, The Netherlands

E-mail: *Pieter Kubben – pieter@kubben.nl
*Corresponding author

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NeuroMind has been developed with a simple philosophy: There are many neurosurgical scores or grading systems that I need to use occasionally, but which I cannot remember. Software development is a hobby of mine, so why not apply my skills to create an application for my iPhone that helps me to apply these scores. A simple and straightforward application that lets me quickly check what I cannot (and do not want to) remember all the time.If this works for me, it might work for others too. Sure it did! It started being picked up by various weblogs and traditional media, and the number of downloads increased rapidly. In the beginning of 2012, 2 years after its original release, NeuroMind has been downloaded more than 100,000 times all over the world, and is topping the results for "neurosurgery" in the App Store and Android Market. Moreover, NeuroMind is now officially supported by *Surgical Neurology International* (SNI) and Neurosurgic.com. It has been mentioned repeatedly as a "Top App" on iMedicalApps.com and user-reactions have been positive.

INTERACTIVE DECISION SUPPORT

Still, there was one thing missing in my opinion: Interactivity. The scores and grading systems are very useful to carry in your pocket, but they are merely an eBook. Your smartphone device can do more than simply display some text, and this can be useful too!Evidence-based practice is limited by time. Literature suggests that if it takes more than 2 minutes to look up a guideline or some other piece of evidence, it is much less likely that it will be applied into clinical practice. The World Health Organization used to call this the "know-do gap": The knowledge is available in some form, but does not reach the patient's bedside. Meta-analyses and reviews have not been demonstrated to change this situation. However, studies that used personal digital assistants (PDA) found increased guideline adherence compared with the control group.[1,2] It makes sense to conclude that PDAs, smartphones, or tablet computers are useful tools to increase guideline adherence. They also offer another benefit: Individualized medicine. If guidelines are to be remembered by heart, if scoring systems need to be applied without external tools, they need to be simplified. A balance must be sought between what is known, and what is reasonably possible to remember. A complex flowchart, or a scoring system with too many parameters, is likely to cause errors – making things worse instead of better. However, if an electronic tool offers a simple user interface to enter the relevant parameters, and has all the complex calculations beneath the surface, it will be possible to process much more (individual) patient parameters without compromising on usability or safety. Obviously, it should be clear what is going on below the surface: No single physician will feel comfortable by putting patient data into a black box.This is the foundation for interactive decision support. Note: I am only talking about decision *supporting* system, and not about decision *making* systems. The computer does not treat patients, you do. Hence, the computer does not make decisions, you do. The computer can help you to apply the guideline, and tailor the advice to the individual as much as possible. Still, you are dealing with the patient, and it is perfectly possible to ignore an advice or guideline if you have a reason to do so, which is fine.

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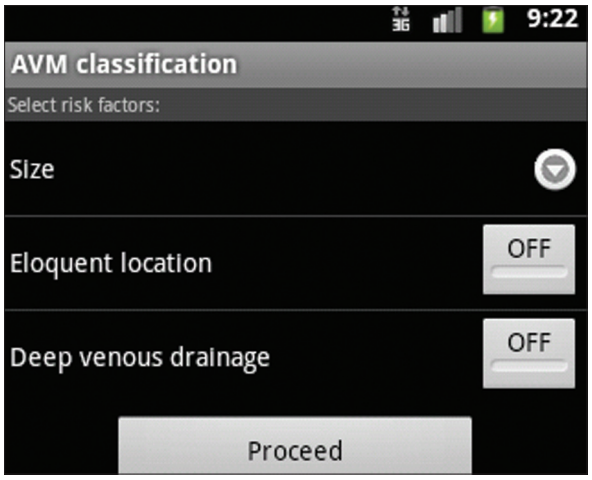

Figure 1: Start screen of decision support item

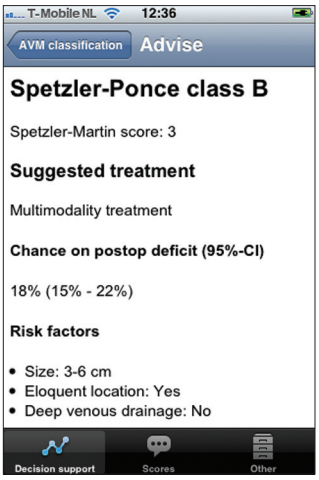

Figure 2: Results screen with patient-individualized data

In contrast, not following a guideline simply because you did not check it will be more problematic in the future. At least this is what I think. Yes, I am fully aware that evidence-based medicine is not heaven. Yes, I am fully aware that it is not always possible. But I do think that if we decide to create a guideline for a certain topic, we need to adhere to it as much as possible. Otherwise it makes no sense to create one in the first place[Figure 1] [Figure 2].

NEUROMIND 2

So, how does this relate to NeuroMind? In April 2012, NeuroMind 2 has been released. This version includes interactive decision support for brain trauma, spine trauma, oncology, and vascular. All items are supported by evidence in peer-reviewed literature, which are accessible by the info-button in the right upper corner of the screen (on iPhone or iPad), or using the menu-function on Android. Besides, the total number of scores and grading systems has been expanded to 95, and will exceed 100 in the next update.The new version of NeuroMind 2 has been received well. Not only has it got an honorable mention by iMedicalApps.com ("created by a Neurosurgeon and simply a must have for neurosurgeons and also neurologists"), but NeuroMind 2 is now also officially supported by the European Association of Neurosurgical Societies (EANS). New collaborations are currently being explored, and will be posted on SNI too.

Feel free to send me any comments or content suggestions, either from within the application or directly by e-mail (pieter@kubben.nl). The application is yours to use, and I appreciate any opportunity to improve it.

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