

SmartExam automation serves both clinicians and technologists

University of Bonn experiences many workflow advantages with new MR technology



Dr. Winfried Willinek



Renate Blömer

At the University of Bonn, the first site to operate SmartExam, both technologist and clinical staff are reporting positive experience of this Philips-exclusive technology. SmartExam provides automatic planning, scanning and processing, thus streamlining department workflow and affording an efficient, reproducible scanning methodology for all patients. SmartExam is built on Philips' ExamCards – complete, standardized and customizable examinations available at a single touch. Sophisticated SmartExam software recognizes and localizes anatomy to plan the MR study, then ExamCard software automatically conducts the examination and finishes processing the image data.

"Automated planning really helps multi-tasking. Clearly, my productivity has increased."

Like many imaging departments worldwide, the University of Bonn's MRI department is striving to increase operational efficiency partly by limiting technologist staff numbers. At the same time, while individual MRI sequences continue to run faster – facilitating potentially higher throughput – the addition of new techniques (e.g., DWI, DTI, MRA) to routine protocols has further added to the technologist's workload.

"Large data sets are routinely acquired in virtually all clinical applications. For example, more than 7,000 images are obtained in time-resolved MRA of the whole brain," says Renate Blömer, University of Bonn chief technologist. "To deal with data, post-processing becomes indispensable. Even very fast sequences can incur a great deal of technologist work – so it's becoming increasingly important to reallocate or automate some technologists' tasks."

ExamCards, which the University of Bonn has been using for 18 months, are the foundation of SmartExam. For completely automated brain scanning, Bonn has created 15 ExamCards, which represent

90% of all routine brain applications, Blömer states. Philips has now integrated ExamCards into SmartExam, which added automated planning. University of Bonn has been using the complete SmartExam package for nearly a year.

SmartExam can boost productivity

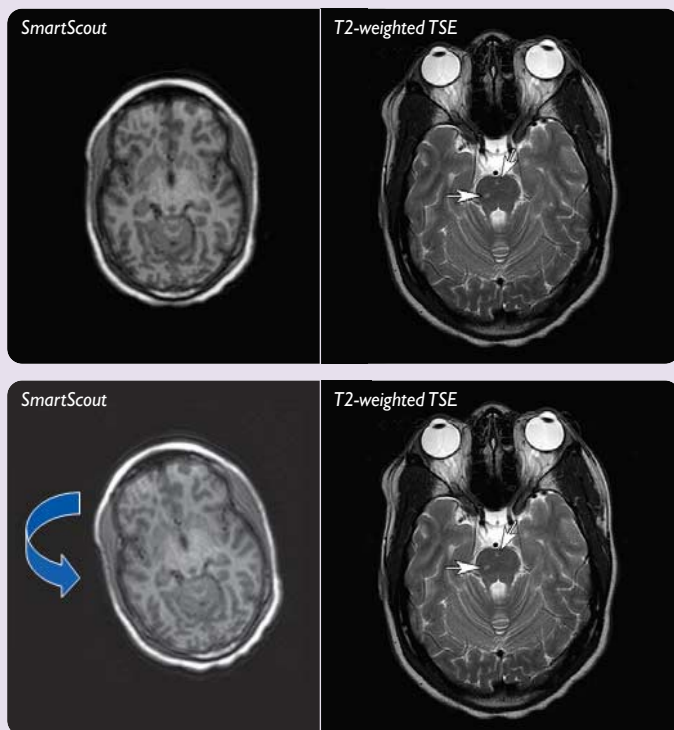
"Automated planning really helps multi-tasking in our MR department," she says. "While SmartExam is planning the study, I can focus on other things, like preparing for the next patient or doing some of the more complex post-processing that's now available right at the console, so I'm near the patient. Clearly, my productivity has increased."

SmartExam automates the entire acquisition protocol based on a one-time operator input. In this way, examinations are performed in precisely the same way that they would be with a manual operator. Regardless of patient position or age, or the pathology or the operator, clinicians obtain excellent reproducibility. The end result is consistent scanning performance and improved operator efficiency.

Physicians benefit as much as technologists from the convenience of SmartExam, says

References

1. Young S, Bystrov D, Netsch T, Bergmans R, van Muiswinkel A, Visser F, Springorum R, Gieseke J.
Automated planning of MRI neuro scans.
SPIE Medical Imaging 2006, in press.



Reproducible results with SmartExam planning

Intra-individual comparison of axial T2-weighted TSE images of a patient with multiple sclerosis (MS). Automated planning with SmartExam was used for both normal (upper row) and tilted head positions (bottom row) as seen on the scout images (images on the left). Note that despite different head positions identical slices are obtained by the automated planning system allowing for reliable depiction of small hyperintense MS plaques in the brainstem (images on the right; arrow).

University of Bonn radiologist, Winfried Willinek, M.D. “SmartExam gives us consistency – both in follow-up exams of the same patient as well as consistency between different patients,” he says. “We are used to looking at pathologies in a certain way. If the angulation differs between patients, then making a diagnosis is sometimes challenging. Consistency is also important in in-house research studies and will be a great asset in multi-center studies when more sites acquire SmartExam.”

Dr. Willinek is impressed by the robustness of SmartExam’s anatomy recognition software, which uses multiple anatomical markers to facilitate slice positioning. “I anticipated that SmartExam would function accurately if we used normal brains, but I was surprised that it also

works well with patients who have severe pathology,” he says. “SmartExam works even in cases where pathology has shifted the geometrically crucial midline. It also works in stroke cases and in pediatric studies in which congenital malformations present in hypoplasia of midline structures.”

Working behind the scenes

After the first two months of daily SmartExam use, doctors and technologists at University of Bonn had already developed a lot of trust in the technology, according to Dr. Willinek. “SmartExam worked so well that we almost forgot we were using it,” he says. “After a short while, we realized that this tool is very robust and doesn’t need constant supervision. That’s very good news.” ■

“SmartExam works even in cases where pathology has shifted the geometrically crucial midline.”

