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## NEUROBEHAVIORAL GRAND ROUNDS—INTRODUCTION

# Paging equals functionality

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There are a number of devices now used in automobiles that allow subscribed companies to track the car and to aid the owner in the case of accidents, lockouts, being lost, etc. Even in the age of the cell-phone, having a human whom you can routinely contact and who is paid to help you when a problem occurs is reassuring. Given the forthcoming graying of the baby boomers with a significant proportion of us developing a dementia, along with the large number of people who suffer head injuries, strokes, and similar disorders, the market for a similar device, worn on the body—perhaps as a secured bracelet—appears obvious. Compensatory aids may have an important role to play in helping patients become functional—particularly when used as a reminder, to orient them to time and place, or to provide a human voice to give instructions when necessary. Since one operator potentially can handle many patients at the same time, it could be a cost-effective device to obtain. I say “may have an important role” because very few studies have used such a device, much less carefully evaluated its usefulness. In this issue, Fish, Manly, and Wilson (2008) describe a very nice application of a single-case design to evaluate the use of a compensatory device in a patient with a frontal lobe lesion associated with deficits in planning that were characterized as goal-neglect by the authors.

Fish et al. (2008) first review the literature on the training of strategy use in patients with frontal lobe lesions. At best, this literature is mixed and dominated by small case series or case studies that do not enable definitive conclusions (Grafman & Robertson, 2007). To justify reimbursement for a clinical treatment, some minimum standards of generalization must be met, and functional usefulness must be demonstrated in a relatively large series of consecutively seen patients. Otherwise, neuropsychological practice will not improve upon the suboptimal standards that until recently have been the rule in other fields of rehabilitation medicine.

The methods used in studies of strategy training vary, but all studies either try to directly teach strategic thinking, or they use external aids to supplement strategic thinking, such as the checklist that was unsuccessfully employed in the current study. Fish et al. (2008) demonstrate an alternative approach to intervention that relies upon a pager device that can be carried on the person and acts as a reminder. They show that such a device has promise when used by patients who have some motivation, and the skills, to use the device. Even if this is just a subset of patients with functionally disabling executive deficits, it could be quite valuable. Even the partial remedy provided by such a pager could have significant effects upon the independence and daily life of the patient and the life and health of a caregiver responsible for the patient. The implementation of the device and the context in which it was used was clearly described by Fish et al. (2008) and there is no need to repeat that description here. Instead, I would like to emphasize that expansion of the capabilities of such a device might prove very useful indeed.

Some additional questions about the study of Fish et al. (2008) can be raised. Could they have enhanced the efficacy of the checklist by adding a reward condition? Effective checklist schemes might be of value for patients who cannot afford a paging device. What was the role of the caregiver in assuring the success of the pager? Could the caregiver have biased the results? Could the pager study be conducted in a more controlled setting than the home, relying upon staff who were “blinded” as to the purpose of the study and rated the functionality of the patient without knowing whether she was using a pager, a checklist, or some other strategy? There are many models of executive functions and particular pager rehabilitation techniques might be used to test their validity. What about standardization of a core set of tasks that a patient would use with the pager, thereby enabling a test of pager effectiveness in a large group of unselected patients with executive dysfunction? I think this would be important if a pager is to be recommended for widespread use.

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Thus, a sophisticated pager that can be used to assist a patient in functional activities has promise in rehabilitation and should be carefully and systematically studied within a more controlled environment than the home and in a variety of patients. That being said, what is more interesting to me is the expansion of the technical sophistication and capability of such a device. Could it be scaled down to the size of a wristwatch and secured so it could not be easily removed? Could it contain a speaker for verbal transmission of instructions or reassurance, as well as a small window for schedule-based automatic reminding? Could it include a response button or microphone to enable the patient to signal receipt of the message and eventual completion of the assigned task? Could it also include a GPS device that would enable an operator to locate the person wearing the device? The device would have to have an ergonomic design that made it simple to use and wear. Finally, the use of the device would be monitored by operators who could aid or orient the patient when necessary and confirm its use for assigned tasks. Perhaps in the near future, a cost effective video camera in such a device could be activated when the reminder came in to ensure that the person was in the vicinity of the environment where the task was to be performed. Detection of the correct environment could enable the provision of additional incentive to complete the task. The technology to create such a device is already available and it is just a matter of entrepreneurial spirit and commercial incentive to produce it. The patient could be trained to use the

device in a virtual environment, thereby enabling monitoring of the patient's mastery of the device.

Lastly, the work of Fish et al. (2008) represents the latest output from one of the few centers in the world doing systematic research in order to find novel techniques that significantly and reliably improve outcome in patients with executive function deficits due to brain damage. More of these kinds of centers, staffed by experimental specialists with skills in psychology or neuropsychology, experimental design, neuroplasticity, and outcomes are needed.

## ACKNOWLEDGMENTS

The author is supported by the National Institute of Neurological Disorders and Stroke Intramural Research Program.

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