**CASE REPORT**

**Use of External Memory Aids With a Head-Injured Patient**

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Perhaps the most common symptoms of persons with brain injury are memory deficits and disorientation to time. Various strategies have been used to retrain these cognitive deficits. Harris (1984) categorized memory strategies linked directly to the environment as external memory aids. Included in this group of strategies are diaries, wall charts, shopping lists, electronic cueing devices, and memory notebooks.

Wilson (1984) noted that external memory aids are most effective with persons who have adequate intellectual functioning but who also have a specific memory deficit or global amnesia. These aids eliminate the need to store important information because they cue head-injured persons as to how and where to find what they need to know within their environment.

Although external memory aids such as notebooks appear promising as a way to improve orientation and memory functioning, little has been published on their effectiveness (Sohlbery & Mateer, 1989). The exception is the report by Giles and Shore (1989) that described how a head-injured woman used a diary and a microcomputer with an alarm to increase her functional independence within a rehabilitation setting.

Sohlbery and Mateer (1989) noted that, unfortunately, memory notebooks are rejected by patients. Some patients with head injury have poor insight into their memory abilities and believe that external aids are unnecessary. Frequently, persons with amnesia must be trained to use these aids because they do not use them unless cued to do so. Sandler (1990) found that the use of a memory notebook along with reinforcement and prompts, two behavioral modification approaches, improved the ability of a head-injured woman in a rehabilitation setting to verbalize the correct day and month.

The present paper describes how a young man with severe cognitive deficits learned to use a memory notebook and an activities of daily living checklist to improve his memory and orientation to time as well as his functioning in daily living skills. These compensatory strategies are generalized throughout the rehabilitation setting.

**Case History**

In 1984, the patient, age 18 years, was found beside a 25,000-volt wire, which he had apparently touched with his right hand. He had no pulse, was in cardiopulmonary arrest, and had been anoxic for an unknown period of time. He may have suffered an additional head injury from his fall from a telephone pole. His right hand was amputated during his initial hospitalization due to this injury.

The patient had experienced behavioral problems throughout his school years, and his mother placed him in juvenile custody when he was 14 years old. He attended military school, completing the ninth grade. In school,
it appears he may have had a learning disability, because he did well in math but poorly in English. He states that he was impatient and that the teachers spoke too fast. His I.Q. in high school was reported to be 86, which is in the low-average range of intellectual functioning. There is no history of drug or alcohol abuse.

After the accident, the patient had been admitted to several psychiatric hospitals due to behavioral problems at home. In September 1988 he was admitted to our 50-bed long-term residential facility, which specializes in psychosocial rehabilitation for persons with head injury. He remains a patient there. Family involvement is limited. The patient receives occupational therapy for 30 min twice per week and cognitive therapy with the psychologist once per week. He also participates in six skill-acquisition groups daily.

Evaluation Findings

A neuropsychological report completed 8 months after admission showed the patient’s verbal intelligence to be in the mildly retarded to borderline range. Visuomotor intelligence was estimated to be in the low-average range and appeared to be an area of relative strength. A severe attentional deficit was also indicated, which was most apparent when the patient was presented with audiovisual information. The patient was less distracted when he interacted in a visuomotoric modality. His severe memory deficits were attributed to the attentional deficit, which interfered with his ability to attend to, process, and store new information. When the patient listened to a list of nine words, after a 2-min delay he could recall only three words, and after a 10-min delay he could not recall any words. Deficits were also noted in executive functioning, as evidenced by his poor organizational and planning abilities. The patient also tended to be stimulus-bound (i.e., drawn to an immediate stimulus rather than a premeditated plan).

Clinical observations of the patient’s daily routine were made during the occupational therapy evaluation. His morning routine was characterized by an impulsive approach to the various tasks that needed to be done. For example, he would insist on stripping his bed daily, although he was only required to do this activity twice per week. He would often forget that he had already shaved or brushed his teeth and would repeat these actions twice within one morning. He misplaced personal belongings and lost many memory notebooks and schedules, even though he was reinforced with tokens when he brought these items to groups. He depended on staff to direct him throughout the day because he never knew the name or location of his groups.

A sensorimotor assessment in occupational therapy revealed that the patient was able to compensate for the loss of his right hand by using his left hand for all tasks. In bilateral activities, he automatically used his right residual limb as a stabilizer. The patient walked quickly, bumped into people, and slammed doors into walls. He frequently yelled to staff as he walked through the facility.

The patient’s orientation was assessed in the beginning of each occupational therapy and cognitive therapy session. He never knew the day, month, or season during these sessions. He would then be shown a calendar or rehearse verbally, but after a 1-min delay he typically would verbalize the incorrect day and month. He was unable to recall basic personal information, such as his age and birth date. He could not recall the name of the occupational therapist after a 30-sec delay with three repetitions.

Intervention

Initially, the primary goal of treatment was to improve the patient’s orientation to day, date, and season. To compensate for his severe memory deficits and because the neuropsychological evaluation indicated that he attended best to visual stimuli, the occupational therapist (the second author) initiated the use of a memory notebook, which appeared to be a promising intervention. The memory notebook was a file folder that contained a monthly calendar and a weekly schedule of groups, which was given to all the residents within the facility. A new calendar was placed in the notebook each month. Occupational therapy and cognitive therapy sessions were written on the calendar as well as the 2 days each week that the patient was supposed to strip his bed.

The patient made little progress using his memory notebook during the first 3 months of use. He frequently lost his notebook and never brought it to the group or therapy sessions unless prompted to do so. If he did bring the notebook to a group, he usually left it there when the group was finished. Frequently, a new notebook had to be made because the old one was lost.

During these first 3 months, progress in individual therapy sessions was also slow. At the beginning of each therapy session and intermittently throughout the session, the patient was asked orientation questions regarding day, month, year, or season before being allowed to look in his memory notebook. He answered these questions correctly less than 10% of the time and tried to answer the questions too quickly (within 2 sec). When he verbalized incorrect answers, he was prompted to look at his memory notebook and verbalize the correct answer. Cues to slow down prior to answering the questions as well as praise and tokens contingent on responding after 5 sec (to reduce impulsivity) did not increase his accuracy level.

Because of his lack of progress within this 3-month period, the memory program was modified. The modifications have been in effect for over 1 year. His memory notebook—a file folder—was noted to be similar to many
other file folders in his extremely cluttered room. To distinguish the notebook from the other file folders, the occupational therapist printed the patient's name and the words memory notebook on a large orange three-ring binder. The weekly schedule that was given to all the residents in the facility was replaced each morning by a daily schedule of groups and individual therapies. He was told to cross off each group and therapy on the schedule after he attended them. Prior to his first meeting of the day, staff reminded him to get his notebook. Whenever he came to groups or therapy sessions without the notebook, he was told to get it. The patient rarely complained when he was told to retrieve his notebook and was praised by staff on his return.

Within 10 months, the patient could carry his memory notebook to all of his groups and individual sessions without being prompted. At the time of this writing, he has not lost his current notebook in the past 4 months.

Another modification within the memory program that was made during individual sessions was that the patient no longer was told to answer orientation questions prior to looking in his memory notebook. Staff throughout the facility were also instructed not to ask him orientation questions without first cuing him to find the answer in his notebook. When needed, staff provided prompts that directed him to open his notebook and turn the calendar so that he would be facing it correctly before answering orientation questions.

The patient is currently able to use his notebook to answer questions related to day, month, and season, and he answers these questions correctly more than 95% of the time. He does not have to be cued to look in this notebook before answering orientation questions. He typically takes more time before responding to questions. He is also able to answer orientation questions that require higher-level reasoning skills (e.g., "In how many days will it be the end of the month?" "How many times have you stripped your bed this month?") with 80% accuracy. During group meetings, the patient uses his memory notebook to accurately answer orientation questions, thus indicating that this compensatory strategy has been generalized outside of individual sessions.

An additional modification was made in conjunction with the memory notebook to help the patient complete his activities of daily living. Shortly after the memory program was modified, the notebook was used to help the patient complete his activities of daily living. The occupational therapist posted a 15-step checklist on the patient's bathroom door, as follows:

1. Get memory notebook.
2. Open notebook to calendar.
3. Check off yesterday.
4. Circle today's date.
5. Ask nurse to double-check date for accuracy.
6. Check if it is Monday or Thursday.
7. If it is Monday or Thursday, strip bed and change linens.
8. If it is Tuesday, Wednesday, Friday, Saturday, or Sunday, just make bed.
10. Wash face.
11. Shave.
13. Comb hair.
15. Clean closet floor.

The checklist was brightly colored and had the patient's name printed in large letters at the top. Every morning, the patient would check off each step after completing that task. The occupational therapist monitored the patient's progress in activities of daily living 2 mornings per week.

The frequency of days that the patient incorrectly strips his bed has been reduced. Generalization has been noted, as evidenced by the fact that he is able to strip the bed on the correct day even though the occupational therapist no longer monitors his progress in activities of daily living.

The patient initially required more than 12 cues each morning to complete the 15-step checklist. At the time of this writing, he required fewer than 4 cues to complete his morning activities.

There are no plans to discharge the patient to a less restrictive environment. We anticipate that his progress in completing activities of daily living independently will continue with additional morning supervision. Future occupational therapy goals include the addition of a section within the memory notebook that can be used to help the patient take notes in groups about important information.

**Discussion**

External memory aids can be used effectively to remediate orientation activities of daily living deficits related to memory impairments. The external memory aids used by the patient with brain injury in this report consisted of a memory notebook and an activities of daily living checklist. After 1 year of practice with the aids, the patient showed improvement both in his orientation to time and his activities of daily living skills. These improvements have been generalized outside of individual therapy sessions and have been maintained for over 5 months at the time of this writing.

Many persons with head injury require training and frequent cues to use their memory notebooks. This training should take into consideration the person's strengths and weaknesses. In the present case, the patient's impulsivity and severe memory deficit prevented him from effectively using his notebook until he learned to look in it
before responding to orientation questions. Progress was not made until the rehabilitation staff stopped asking him to answer these questions without first using the notebook. Most likely, persons with severe amnesia will carry these aids if they are easily distinguished from other folders and notebooks within their environment. Memory aids appear to be necessary until independent use of this compensatory device generalizes into all settings.

References


Editor's Note. To continue the Case Report department, we need and welcome reports that document the practice of occupational therapy for specific clinical situations. Guidelines for writing case reports are available from the Editor.