CASE REPORT

Improving Functional Independence in a Patient With Encephalitis Through Behavior Modification Shaping Techniques

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Patients with viral encephalitis are often considered by rehabilitation professionals to be poor rehabilitation candidates because of their multiple deficits and grave prognosis (Rao & Costa, 1991). McMillan, Papadopoulos, Cornall, & Greenwood (1990) stated that deficits after encephalitis are largely cognitive and behavioral. Wood and Eames (1989) suggested that patients with herpes simplex encephalitis often have a poor prognosis because the resulting brain damage does not seem to improve with time, as would be expected after traumatic brain injury, nor does it respond well to traditional forms of therapy.

Behavioral techniques such as prompting, shaping, and contingent reinforcement are widely used in the treatment of patients after traumatic brain injury (McMillan et al., 1990). However, these techniques have only rarely been reported in treatment of the postencephalitic patient. Giles and Clark-Wilson (1988) reported favorable outcomes in showering, dressing, and grooming tasks in a patient who had developed herpes simplex encephalitis 4 years before their study. In this case, both social praise and a tangible reinforcer (i.e., chocolate or a token) were used in conjunction with practicing the actual task. The tangible reinforcers were used after successful performance of each step of the self-care routine. McMillan et al. (1990) reported similar results with showering and dressing in a patient 2 months after onset of herpes simplex encephalitis. They also used tangible rewards, usually a piece of fruit, immediately after appropriate behavior was displayed.

This report describes the treatment of a patient who had developed viral encephalitis 4 months before being seen at our facility. Remediation of self-care skills was achieved with behavior modification techniques, without tangible reinforcers and constant praise. Social praise was only given at the end of the self-care routine. The behavior modification techniques used with this case report included step-by-step structure and shaping throughout the self-care activity, verbal cues, and physical assistance.

Case History

In April 1991, the subject, a 34-year-old woman, developed symptoms later diagnosed as viral encephalitis. She was admitted to an acute medical center, where she underwent a craniotomy during which her right parietal skull bone was removed to relieve pressure. She developed a seizure disorder that was controlled with anticonvulsant medications. At the time of discharge, she was occasionally agitated and confused; however, she was able to be managed at home by her family.

In May 1991, she was readmitted to the same facility because of the seizure disorder and mental status changes. During this hospitalization, she underwent surgery to replace the parietal skull bone.

In June 1991, she again underwent a temporal pari-
ternal craniotomy for decompression, after which she continued to receive treatment with intravenous antibiotics. She was lethargic and confused and had hallucinations and delusions. Additionally, she had been demonstrating functional and cognitive deficits such as poor short-term memory, lack of initiation, and motor perseveration. Physically, she presented with ataxic gait and decreased left-sided coordination. She continued her medication regimen of an anticonvulsant to which antipsychotic medications were added. She began receiving cognitive and physical rehabilitation. She was transferred from the acute treatment setting to our transitional living center on August 21, 1991 for continued rehabilitation.

Evaluation Findings

On admission to the Transitional Living Center, the patient underwent complete evaluations by the neuropsychologist, physical therapist, speech and language pathologist, recreational therapist, behavior specialist, and occupational therapist. Range of motion was normal and coordination, muscle tone, and sensation were all within normal limits. However, she often walked with her eyes closed, which resulted in her requiring either contact guard assistance or moderate assistance for safety with ambulation. Additionally, she processed written and verbal information slowly. Her performance of tasks greatly decreased as the complexity of the task increased. She was also highly sensitive to external distractors, which adversely affected her task performance. Her tendency to focus almost exclusively on details of information prevented her from following any lengthy directions. The patient displayed mild to moderate memory deficits that also affected her ability to learn a sequence of steps necessary for completion of functional activities, specifically her self-care.

Level of functioning for self-care activities was further evaluated with behavioral observations over 5 days. This method of evaluation was used because there are no objective scales available that incorporate the level of detail required when assessing self-care skills in persons with brain injury. Every morning at 7:00, the patient was instructed that it was morning and time for her to get out of bed, take a shower, and dress and groom herself. Once given these instructions, the patient was observed carrying out her self-care routine to see how much she was able to do on her own. If she failed to initiate a step of the task after a period of 1 min, a verbal cue or physical assistance was given. This observation and intervention when needed also allowed the evaluator to see how much assistance, either verbal or physical, the patient needed to complete the tasks, and exactly which part or parts of the task she needed assistance with. This evaluation yielded the information necessary to determine the type and number of cues the patient required to complete the task.

To complete her morning showering, dressing, and grooming activities, the patient required assistance at least 50% of the time. Assistance consisted of verbal and physical cues to gather all shower supplies and to initiate many of the steps because of her marked level of perseveration during functional tasks. This perseverative behavior is often typical in a person with brain injury. Wood and Eames (1989) reported that severe brain injury often intensifies preexisting obsessional traits, frequently to the point of interfering with everyday activities because of the time burdens needed to carry out such rituals.

Treatment Method

The primary goal of treatment was to improve the patient’s overall activities of daily living functioning level from that of moderate assistance to that of stand-by assistance or supervision for self-care tasks. Because of the cognitive and behavioral deficits presented by this patient, a performance level of independence in self-care tasks was thought to be unobtainable; however, if marked improvements were noted, the goal would be upgraded to that of independence. A performance level of stand-by assistance would require that a responsible party be within reach of the patient to intervene verbally or physically as needed. A supervised level of functional task performance would require a responsible party to check on the patient’s progress during self-care tasks and intervene if necessary. Unlike stand-by assistance, the supervised level of assistance does not require constant supervision.

A step-by-step shaping paradigm, taking into consideration the patient’s deficits as well as strengths, was used to design a self-care program. Deficits thought to have a major effect on her ability to carry out her self-care routine independently were her decreased ability to process even simple verbal information, her sensitivity to external stimuli, and her tendency to focus on details rather than the big picture. Her demonstrated strength of being able to remember simple immediate information was used in developing the appropriate program for her. This program was implemented by the occupational therapist and support staff members (for example, the behavior specialist) once per day, 7 days per week.

A 30-step program (see Appendix A) involved an entire self-care routine starting with getting out of bed and ending with making the bed and going for breakfast. The staff members monitored the level of assistance required for the patient to complete all 30 steps. The assistance levels were monitored as I (self-initiated and independent), C (verbal cues required to initiate or complete the step), or P (physical assistance required to initiate or complete the step [hand-over-hand technique]). For each step of the program, she was first given the opportunity to independently initiate the given task. If she did not initiate the task within 3 min, she was given a verbal cue to do so. If she still did not initiate that task within an
During the first 30 days of this program, average performance in the patient’s self-care routine was as follows: 28% of the time physical assistance was required, 25% of the time verbal cues were required, and 47% of the time she was self-initiating and independent. Over the following 6 weeks, she showed a steady improvement and achieved a consistent level of performance averaging a 90% level of self-initiation and independence with this externally structured program. The reduction of verbal cues and physical assistance required over the first 12 weeks of the program are shown in Figure 1.

After the first 8 weeks, the self-care program was consolidated to reflect her progress and the decreased need for external structure and to decrease the amount of cuing that would be required by her at her home, where she would be assisted by her husband and a cousin. To meet the needs of the discharge placement, the patient needed to be able to complete her self-care tasks with verbal cues only. She also would need to be able to complete these tasks on average within 60 min and maintain a level of independence of about 80%. This level of assistance was necessary for maximum ease of care as well as to prevent caretaker burnout. Consolidation of specific steps occurred only after she had demonstrated consistency at a 90% level of independence with those steps for 2 weeks. In the consolidated program (see Appendix B), steps 2 through 9, which originally included separate steps for gathering articles of clothing such as underwear, pants, shirt, socks, and shoes, became the single cue “Pick out your clothes.” This process of consolidation occurred throughout the program, reducing the number of external cues from 30 to 14.

A further attempt to consolidate the program and move the patient from a stand-by assistance level to a supervised level resulted in a significant increase in her perseverative behavior, which lengthened the completion time to an amount considered to be nonfunctional for the discharge placement. Without the structure, she would initiate 2 to 3 steps, become distracted, and be unable to return to the proper step within the sequence. Reimplementation of the structured 14-step program allowed the patient to return to a 93% level of independence. However, continuation of the program at home was necessary to maintain the required minimum independence level of 80%.

**Conclusion**

This report demonstrates that constant social praise and tangible reinforcement after each step of the routine are not necessary to effect behavioral changes with self-care activities in patients with diffuse brain injury secondary to viral encephalitis. This is important because time spent in a rehabilitation facility could be shortened if these patients did not have to be weaned from a more traditional...
step-by-step reinforcement procedure. The success of this program can be attributed to careful and diligent evaluation techniques highlighting strengths in addition to deficits and to the development of a treatment program using these strengths as well as daily monitoring of progress. Additionally, the employment of a consistent team approach using trained staff members for the implementation of this program helped to achieve the favorable results reported in this study. Therefore, the use of behavioral modification techniques and intermittent social praise, along with a structured step-by-step shaping program, allowed the patient to achieve and maintain a performance level of stand-by assistance (93%) with her self-care routine. Thus, the goal of returning the patient home requiring only verbal cues and 60 min to complete her self-care routine was achieved. Follow-up of this patient was limited because of a change of address outside the immediate area of the hospital. However, at 1 month after discharge, the program continued to be carried out by the caregiver (her cousin) who reported a performance level of 85% to 90% independence and an average completion time of 60 to 65 min.

This type of a structured, step-by-step shaping procedure could be generalized to other functional activities for this patient. However, careful consideration would be required in choosing an activity that is routine and does not allow for any deviation from that routine. For example, setting the table each morning for breakfast where only cold cereal and juice are served would be more amenable to this treatment approach than assisting with meal preparation where the specific steps needed to complete the activity may change for each meal. Furthermore, Giles and Clark-Wilson (1993) have shown that related methods of behavioral modification can be effectively used in a variety of functional activities, such as toileting, learning to cross streets safely, learning to be independent in new environments by using maps, or learning to use a daily appointment diary as a compensatory strategy for memory impairment, with patients with brain injury. ▲

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Appendix A

Washing, Dressing, and Grooming Program — 30 Steps

1. Good morning, it's time to get up and shower.
2. Swing your legs off of the bed.
3. Now sit on the edge of the bed.
4. Stand up and we will pick out your clothes for today.
5. Pick out some underwear.
6. Pick out some pants (or shorts).
7. Pick out a shirt.
8. Pick out a pair of socks.
9. Get your shoes now.
10. Okay, let's get your towel.
11. Get your grooming basket (contains soap and shampoo).
12. Let's go to the bathroom now.
13. Put your shower items down and use the toilet.
15. Step into the shower and turn on and adjust the water.
16. Wash your body and rinse off.
17. Wash your hair and rinse it.
18. You need to turn off the water now (she was given 15 min maximum in the shower).
19. Here's your towel, dry yourself off.
20. It's time to get dressed now:
   (a) put on your underwear
   (b) put on your shirt
   (c) put on your pants
   (d) put on your socks
   (e) put on your shoes.
21. Okay, get your dirty clothes and towel.
22. Get your soap and shampoo and put them in your basket.
23. Let's go back to your room.
24. Put your basket away.
25. Put your towel away.
26. Put your dirty clothes in the laundry basket.
27. Okay, it's time to comb your hair.
28. Let's brush your teeth.
29. Now let's make your bed and then you will be all done.
30. Good job, let's go have breakfast now.

Appendix B

Washing, Dressing, and Grooming Program, Consolidated – 14 Steps

1. Good morning, it's time to get up and shower.
2. Pick out your clothes.
3. Gather your shower supplies.
4. Go to the bathroom, use toilet.
5. Undress, get into shower, turn on/adjust water.
6. Wash and rinse your body.
7. Wash and rinse your hair.
8. Turn off water (15 min maximum in shower).
9. Dry off, get dressed.
10. Gather all belongings, go back to bedroom, put belongings away.
11. Comb your hair.
12. Brush your teeth.
13. Make your bed.

References